REPUBLIK INDONESIA
KEMENTERIAN HUKUM DAN HAK ASASI MANUSIA

SURAT PENCATATAN
CIPTAAN

Dalam rangka pelindungan ciptaan di bidang ilmu pengetahuan, seni dan sastra berdasarkan Undang-Undang Nomor 28 Tahun 2014 tentang Hak Cipta, dengan ini menerangkan:

Nomor dan tanggal permohonan	:	EC00202202028, 10 Januari 2022
Pencipta		
Nama	:	**Antonius Bima Murti Wijaya, ST, MT., Desideria Cempaka Wijaya Murti dkk**
Alamat	:	Jalan Tutul No. 33, Papringan, RT 014/RW 005, Kel. Caturtunggal, Kecamatan Depok, Kabupaten Sleman., Yogyakarta, DI YOGYAKARTA, 55281
Kewarganegaraan	:	Indonesia
Pemegang Hak Cipta		
Nama	:	**Antonius Bima Murti Wijaya, ST, MT., Desideria Cempaka Wijaya Murti dkk**
Alamat	:	Jalan Tutul No. 33, Papringan, RT 014/RW 005, Kel. Caturtunggal, Kecamatan Depok, Kabupaten Sleman., Yogyakarta, DI YOGYAKARTA, 55281
Kewarganegaraan	:	Indonesia
Jenis Ciptaan	:	**Basis Data**
Judul Ciptaan	:	**Data Set Obyek Pembelajaran Desa Wisata Tinalah**
Tanggal dan tempat diumumkan untuk pertama kali di wilayah Indonesia atau di luar wilayah Indonesia	:	1 Oktober 2021, di Yogyakarta
Jangka waktu pelindungan	:	Berlaku selama 50 (lima puluh) tahun sejak Ciptaan tersebut pertama kali dilakukan Pengumuman.
Nomor pencatatan	:	000317238

adalah benar berdasarkan keterangan yang diberikan oleh Pemohon.
Surat Pencatatan Hak Cipta atau produk Hak terkait ini sesuai dengan Pasal 72 Undang-Undang Nomor 28 Tahun 2014 tentang Hak Cipta.

a.n Menteri Hukum dan Hak Asasi Manusia
Direktur Jenderal Kekayaan Intelektual
u.b.
Direktur Hak Cipta dan Desain Industri

Dr. Syarifuddin, S.T., M.H.
NIP.197112182002121001

Disclaimer:
Dalam hal pemohon memberikan keterangan tidak sesuai dengan surat pernyataan, Menteri berwenang untuk mencabut surat pencatatan permohonan.

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No	Nama	Alamat
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2	Desideria Cempaka Wijaya Murti	Universitas Atma Jaya Yogyakarta, Jl. Babarsari No.44, Janti, Caturtunggal, Kec. Depok, Kabupaten Sleman, Daerah Istimewa Yogyakarta 55281
3	Victoria Sundari Handoko	Universitas Atma Jaya Yogyakarta, Jl. Babarsari No.44, Janti, Caturtunggal, Kec. Depok, Kabupaten Sleman, Daerah Istimewa Yogyakarta 55281

LAMPIRAN PEMEGANG

No	Nama	Alamat
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2	Desideria Cempaka Wijaya Murti	Universitas Atma Jaya Yogyakarta, Jl. Babarsari No.44, Janti, Caturtunggal, Kec. Depok, Kabupaten Sleman, Daerah Istimewa Yogyakarta 55281
3	Victoria Sundari Handoko	Universitas Atma Jaya Yogyakarta, Jl. Babarsari No.44, Janti, Caturtunggal, Kec. Depok, Kabupaten Sleman, Daerah Istimewa Yogyakarta 55281

FAKULTAS ILMU SOSIAL
DAN ILMU POLITIK
UNIVERSITAS ATMA JAYA YOGYAKARTA

SURAT TUGAS
Nomor: 814b/In/U

Dekan Fakultas Ilmu Sosial dan Ilmu Politik Universitas Atma Jaya Yogyakarta memberikan tugas kepada :

Nama	:	1. Desideria Cempaka Wijaya Murti, S.Sos., MA., Ph.D. 2. V. Sundari Handoko, S.Sos., M.Si., Dr.
Jabatan	:	Dosen Fakultas Ilmu Sosial dan Ilmu Politik Universitas Atma Jaya Yogyakarta
Tugas yang diberikan	:	Membuat dan mengajukan HKI Basis Data berjudul Data Set Obyek Pembelajaran Desa Wisata Tinalah
Masa menjalankan tugas	:	01 Oktober 2021

Demikian surat tugas ini dibuat untuk dapat dipergunakan sebagaimana mestinya.

Dikeluarkan di : Yogyakarta
PadaTanggal : 28 September 2021

Dekan,

FAKULTAS ILMU SOSIAL DAN ILMU POLITIK UNIVERSITAS ATMA JAYA YOGYAKARTA

F.X. Rambang K. Prihandono, S.Sos., M.A.

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ICAITI2021

The 4th International Conference on
Applied Information Technology and Innovation

March 15th - 17th, 2022
Lombok, Indonesia

PROGRAMME BOOK

Moving toward Enterprise Intelligent System In Industry 5.0 Era

Editors:
Muhardi Saputra, S.ST., M.T.
Berlian Maulidya Izzati, S.Kom., M.Kom.

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JOIV

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Greetings From The Rector of Telkom University

Assalamu'alaikum warahmatullahi wabarakatuh

Good morning, ladies and gentlemen.

First of all, let us praise and gratitude the Almighty Allah Subhanahu Wata'ala because of His blessing, we can attend this event in healthy condition in the middle of Covid-19 pandemic.

I am pleased to extend a warm welcome to you at the 4th International Conference on Applied Information Technology and Innovation (ICAITI) 2021. Although we were unable to meet in person, I am pleased that we will be able to hold this conference online. As a result, I appreciate all of the visitors and delegates for coming and contributing their ideas, knowledge and energy.

This year, the conference raises a topic **"Moving toward Enterprise Intelligent System in Industry 5.0 Era".** The ICAITI have been recognized as the perfect platforms for both scholars and practitioners to share their knowledge, encourage scientific discussion, and learn from each other. Telkom University commits to become a research and entrepreneurial University and be beneficial to all our society, and collaboration is one of the most crucial factors in achieving this goal. On this special occasion, I would like to express my gratitude to Politeknik Negeri Padang and Universitas Mataram for being a part of this conference. I am hoping that our collaboration will continue in the future.

Hopefully, this conference can give a significant impact on the near- and long-term modern research cialdevelopment and can be benefia not only for Telkom University and Indonesia but also for around the world. You are the very important part of the conference success. Thank you all for your presence and participation.

Wassalamu'alaikum warahmatullahi wabarakatuh

Prof. Dr. Adiwijaya, S.Si., M.Si
Rector of Telkom University

Greetings From The Director of Politeknik Negeri Padang

Assalamu'alaykum wr wb,

Politeknik Negeri Padang is pleased to conduct the International Conference on Applied Information Technology and Innovation (ICAITI) 2021. As a leading higher vocational educational institution in Indonesia, Politeknik Negeri Padang must develop its international reputation to achieve long term vision as the best higher vocational education in South Eastern Asia by 2025. This international event is part of our strategic plans toward that vision which also to strengthen our cooperation with national and international universities.

We would like to warm welcome all authors and participants. Meeting with other researchers and academician from different universities, countries and cultures during the conference is of course a valuable experience toward your future career.

Warm Regards,

Dr. Surfa Yondri, ST., S.ST., M.Kom
Director of Politeknik Negeri Padang

Greetings From The Chair of Mataram University

The era of information technology and the industrial revolution 4.0 and Society 5.0 encourages people to be more familiar with intelligent information and communication technology devices, such as the Internet, social media, smartphones, tablets, smartwatches, smart tv, and other intelligent electronic media. They have even become one of the primary needs. Through intelligent information and communication technology devices, the world becomes borderless and distanceless, so the dissemination of information runs very fast, almost real-time. Moreover, the growth rate of internet usage is very high in Indonesia, more than 10% per year. The development of information technology and intelligent communication devices is also very rapid, and the required exchange of various aspects of communication media in information technology. Therefore, the implementation of the 4th International Conference on Applied Information Technology and Innovation (ICAITI 2022) as a media to communicate between researchers and industrial partners internationally to develop various aspects in the field of Applied Information Technology and Innovation. Moreover, the theme chosen is Moving Toward Enterprise Intelligence System in Industry 5.0 Era.

In the Industry 5.0 Era, the level of utilization of Information and Communication Technology is mandatory to replace various manual processes. Processes assisted by Information and Communication Technology influence business processes to be more reliable, full of certainty, fast, and accurate. Therefore, this conference, which will discuss various aspects of the Moving Toward Enterprise Intelligence System, will serve as a foothold for lecturers, practitioners, and industries in developing artificial intelligence (AI)-based systems. Furthermore, artificial intelligence-based systems can then be implemented into applications for mobile devices that will replace PCs or laptops today. Mobile applications based on artificial intelligence systems can assist users in supporting all activities/tasks at hand. Handlers can be more structured, evenly distributed, fast, and accurate.

We, the Informatics Engineering Study Program of the University of Mataram, are very proud and happy to be able to collaborate and play a role with Telkom University, Information Technology Department, and Padang State Polytechnic to conduct an international symposium which will be held on March 15 – 17, 2022 in Merumata Hotel, Senggigi, Lombok, West Nusa Tenggara, Indonesia. As the host, we welcome you to Lombok, especially as the tourist area of Senggigi Beach, Mataram, and welcome to enjoy the natural beautiful scenery and beaches on the island of Lombok. This joint conference implements the MOU between the University of Mataram and Telkom University, which aims to provide a comprehensive global forum for experts and participants from academia to exchange ideas and present research results in the state of computer science, computer science engineering, and information technology. Moreover, the papers received at this seminar will be published in the International Journal on

Informatics Visualization indexed by Scopus, which is an exceptional experience for our Juniors in the Informatics Engineering Study Program at the University of Mataram.

Hopefully, this conference can be a reference and consideration in developing intelligent systems and their applications. Hopefully, this collaboration will not be the last. It can be continued in other more significant collaborations to improve the quality of each institution and increase the primary performance as outlined in the IKU (The Main Indicator Performance). As colleagues, we apologize profusely if there are less please to this collaboration.

Mataram, March 2022

Chair

Greetings from the General Chair ICAITI 2021

Assalaamu'alaikum Wr Wb.

The presence of Industry 5.0 will arrive more quickly, which is only transitioning about ten years after the 4.0 era. This is triggered by 5G telecommunications technology and the massive Over TheTop digital platform. The industry is currently transitioning from the 4th industrial revolution to the 5th industrial revolution or Industry 5.0.

During Industry 4.0, all emphasized the digital revolution in the form of cyber-physical. Meanwhile, in the 5th industrial revolution, the emphasis will be more on the role of humans as the center of civilization that utilizes digital technology as a means of life in various fields. Thus, Industry 5.0 emphasizes machine-to-machine relations and robotic effectiveness and human-to-machine and vice versa.

This International Conference on Applied Information Technology and Innovation is the 4th international conference in 2021 which will be held in 2022, on March 15-17, 2022. In accordance with current IT and industrial technology developments, the 4th ICAITI carries the theme "Moving toward Enterprise Intelligent System in Industry 5.0 Era"

This book contains a summary of selected papers with the latest topics in the IT field and the modern digital industry which were selected from 203 registered papers. Hopefully, the research results summarized in this can bring benefits to knowledge, education in particular, and the international world in general. Nothing is perfect from work, and we look forward to suggestions and input to improve the future implementation.
Welcome to the industry 5.0 era.

Wassalaamu'alaikum Wr Wb

Rd. Rohmat Saedudin, ST., MT., Ph.D
General Chair of ICAITI 2021

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PROF.DR.IR. MARIJN JANSSEN

Prof.Dr.Ir. Marijn Janssen lectures the courses 'Design of Innovative ICT-Infrastructures and services', 'Business Processes Management and Technology" at the Delft University of Technology. He is teaching the module 'business process & technology' at the MBA Business & IT of Nyenrode Business University. Furthermore, he is the course manager of "Information Management & Design" Teaching Module 3 - information management - in the Master of Public Information Management (MPIM) of the Erasmus University, Rotterdam. He initiated a Massive Open Online Course (MOOC) in the field of 'open government' which attracted over 3500 subscribers. Prof.Dr.Ir. Marijn Janssen is a full professor in ICT & Governance. His research focused is on ICT-architecting in situations in which multiple public and private organizations need to collaborate, in which ICT plays an enabling role, there are various ways to proceed, and socio-technical solutions are constrained by organizational realities and political wishes. ICT-architecting provides principles, patterns and other instruments to guide organizations to design their infrastructure, applications, information, processes and organizations. As a full professor he is involved in society oriented technology foresight studies at The Netherlands Study Centre for Technology Trends (STT). This institute was established in 1968 by The Netherlands Royal Institute of Engineers (KIVI). STT is an independent non-profit foundation, funded by financial contributions from the Dutch government and industry and science (www.stt.nl).

PROF. HENDRO WICAKSONO

Prof. Hendro Wicaksono received Dr.-Ing.in Mechanical Engineering from Karlruhe Institute of Technology Germany, but he was graduated from Bachelor Informatics from Institut Teknologi Bandung. Today, He is a professor of Industrial Engineering in Jacobs University Bremen from 2018. He has appointed as the head of research group INDEED (Intelligent Data management in Industry 4.0). He is also served as Guest Lecturer in several University in the world. He has served as a President Commisioner and Advisor of Digital Start-Ups and as IT Consultant in EDS Itellium, an Hewlett-Packard Company. Some of the achievements that have been successfully obtained include total research grants of 3 Millions Euro from Germany and EU funding agencies, more than 50 scientific publications, more thab 100 invited and keynote talks and becoming teacher of the year Jacobs University Bremen in 2020.

DR. EDI TRIONO NURYATNO

Dr Edi Nuryatno was graduated from Edith Cowan University, Perth-WA with a PhD in MIS. With more than 20 years' experience as an MIS Specialist; Health Informatician by profession; and Researcher in the areas of informatics: Data Science, Advanced Digital & ICT. Edi also an ACS Certified Technologist accredited under the International Professional Practice Partnership (IP3). His expertise includes in EA, Health Data Science, MedTech & Digital Heath, Urban & Public Health Informatics. It identifies science & practice around information in health that leads to informed & assisted health care & non-health agencies to anticipate the activities of the health sector.
Edi currently focused on his role in managing the melanoma data, analytic and modelling within the health informatics discipline. Edi also a member of 1) Australasian Institute of Digital Health (formerly, the Health Informatics Society of Australia); 2) the Australian Computer Society; and 3) the Cognitive Artificial Intelligence Research Group – Australian Chapter, among others. Edi feels honoured and privileged to work with the WAKMAS team. Nowdays,, He managing the melanoma cancer data, analytic & modelling within the health informatics discipline in Western Australian Kirkbride Melanoma Advisory Service (WAKMAS), the Harry Perkins Institute of Medical Research. he was a recipient of 2 Australian Scholarship Awards: ECUPRS-International & IPREP WA. Listed as COVID-19 Expert in MIS & Public Health Informatics by the Australian Academy of Science & a member of ANZ COVID-19 International Community. Registered as an Expert in Information & Communication Sciences (ICS) by the National Committee for Information &

Communication Sciences (Australian Academy of Science). Active in international forums/engagements as invited speaker in webinars, public lectures, & to peer review publications. Recently, he was appointed as a contributor in COVID-19 Education Video Campaign by the Department of Health – Western Australia.

DR. MUHAMMAD SHAFIQ

Dr Muhammad Shafiq is a Director of Supply Chain and Project Manager Center, Pakistan. He was also Assistant Professor in Department of Industrial Engineering and Management University of the Punjab, Lahore, Pakistan. Dr. Muhammad Shafiq completed his PhD in Industrial and Manufacturing Engineering from Asian Institute of Technology, Thailand. Before joining University of the Punjab, he served UET Taxila as an Assistant Professor. Dr. Shafiq also worked as Erasmus Mundus Postdoctoral research fellow at University of Sannio, Italy. His areas of research interests include Operations Research (OR), Operations Management (OM), Supply Chain Management (SCM), Production and Operations Management (POM), Logistics Management (LM), Optimization, Healthcare Systems (HS), Telemedicine, Ergonomics, Project management (PM), Engineering management (EM), and Data Science (DS).He has been actively publishing more than 20 Journal Publication of journals in the area of industrial, management, and information technology – most are coming from his experiences of practicing his knowledge and skills in different fields and other service-based industries. Simultaneously, he has been supervising research and theses in University of the Punjab. He is actively taking part in the local and international research and academic organizations include as a Chair of Continuous Quality Improvement (CQI) Committee and Outcome Based Education (OBE) accreditation committee for IQTM, Member TVET Sector Support Program (TSSP) for Qualification Development, and Ph.D. External examiner to evaluate PhD thesis of a student from University of Sannio, Italy.

RUNDOWN

Tuesday, 15 March 2022					
Start WITA	End WITA	Start WIB	End WIB	Program	Location
4:00 PM	4:45 PM	3:00 PM	3:45 PM	Keynote Speaker 2 (Prof. Marijn- TU Delft)	https://us05web.zoom.us/j/84787096617?pwd=SFYxcFVwQk1IVGt6UHIvRk9nd0YvQT09#success / Hybrid from Merumata Hotel
4:45 PM	5:30 PM	3:45 PM	4:30 PM	Keynote Speaker 4 (Prof. Hendro- Jacobs Bremen Univ)	
Wednesday, 16 March 2022					
Start WITA	End WiTA	Start WIB	End WIB	Program	Location
9:30 AM	9:45 AM	8:30 AM	8:45 AM	Registration	https://us02web.zoom.us/j/85613540815?pwd=RTZOUWYzVGdoMlBqYUl2akk0ZEZTdz09 / Hybrid From Merumata Hotel
9:45 AM	10:00 AM	8:45 AM	9:00 AM	Opening	
10:00 AM	10:15 AM	9:00 AM	9:15 AM	Opening Entertainment	
10:15 AM	10:25 AM	9:15 AM	9:25 AM	Committee Report	
10:25 AM	10:35 AM	9:25 AM	9:35 AM	Welcome Speech	
10:35 AM	10:45 AM	9:35 AM	9:45 AM	Welcome Speech	
10:45 AM	11:00 AM	9:45 AM	10:00 AM	Opening Remark	
11:00 AM	1:00 PM	10:00 AM	12:00 PM	Parallel Session 1	
1:00 PM	2:00 PM	12:00 PM	1:00 PM	BREAK	
2:00 PM	4:00 PM	1:00 PM	3:00 PM	Parallel Session 2	
3:00 PM	3:45 PM	2:00 PM	2:45 PM	Keynote Speaker 4 Dr Edi Triono Nuryatno (PhD, MSc, MACS CT, BSc)	
3:45 PM	4:30 PM	2:45 PM	3:30 PM	Keynote Speaker 3 (Dr. Muhammad Shafiq)	
3:45 PM	4:00 PM	2:45 PM	3:00 PM	Closing	
4:00 PM	5:00 PM	3:00 PM	4:00 PM	BREAK	
8:00 PM	10:00 PM	7:00 PM	9:00 PM	Gala Dinner	Merumata Hotel Restaurant
Thursday, 17 March 2022					
CONFERENCE DAY TOUR					

DETAILS SESSION PROGRAMME

Morning Session - 11.00 AM - 1.00 PM (WITA TIME) / (GMT + 8)

Breakout Room 1 : Information System				
Moderator : Dr. Iphov Kumala Sriwana, ST., MT., M.Si., IPM Co-Moderator : Wahyu Alfandi				
No	**Schedule (WITA / GMT+8)**	**Paper ID**	**Tittle**	**Author**
	10.00 - 10.05	Preparation		
1	11.05 - 11.15	2	Sustainability Analysis of Bintulu Hospital Information System Through e3value and i* Modeling	Sim Yee Wai, Cheah Waishiang, Muhammad Asyraf Bin Khairuddin and Azmi Jaini
2	11.15 - 11.25	156	Validation of an IT Value Model: The Case Study of PT. PLN(Persero) Indonesia	Noor Alamsyah, Moh. Ali Albar, Nadiyasari Agitha and Yanuar Satrhio Insanaputra
3	11.25 - 11.35	86	Customization of Cost Allocation Monitoring Report for Improving Activity-Based Costing Process	Risma Nur Damayanti, Muhardi Saputra and Tien Fabrianti Kusumasari
4	11.35 - 11.45	122	Technological Knowledge Profile and the Role of Emerging Technologies for Patenting in Indonesia: An Analysis of Universities and Public Research Institutions (PRIs)-invented Patents	I Wayan Agus Arimbawa
5	11.45 - 11.55	153	Performance Evaluation of Successive Interference Cancellation on Gain Ratio Power Allocation using Underwater Visible Light Communication Channel	Luthfi Nur'Adli, Arfianto Fahmi and Brian Pamukti
6	11.55 - 12.05	24	Designing and ERP System: a Sustainability Approach	Aveicena Kemal Adriansyah, Ari Yanuar Ridwan and Umar Yunan Kurnia Septo Hediyanto
7	12.05 - 12.15	19	Knowledge Management Factors and Its Impact on Organizational Performance: A Systematic Literature Review	Slamet Darmawan, Novia Agusvina, Sofian Lusa and Dana Indra Sensuse
8	12.15 - 12.25	58	IT Governance onNon-Governmental Organization	Hanif Fajri, Taufik Safar Hidayat and Muharman Lubis
9	12.25 - 12.35	66	Enterprise Architecture: A Strategy to Achieve e-Government Dimension of Smart Village using TOGAF ADM 9.2	Muhammad Ilham Alhari and Asti Amalia Nur Fajrillah
10	12.35 - 12.45	28	Design Thinking Approach for User Interface Design and User Experience on Campus Academic Information Systems	Irfan Darmawan, Muhammad Saiful Anwar, Alam Rahmatulloh and Heni Sulastri
	12.45 - 13.00	Q & A Session		

Breakout Room 2 : Health Informatics				
Moderator : Luthfi Ramadhani, ST., MT, Ph.D Co-Moderator : Mizanul Ridho Aohana				
No	Schedule (WITA / GMT+8)	Paper ID	Tittle	Author
	10.00 - 10.05	Preparation		
1	11.05 - 11.15	35	Classification of Diabetic Retinopathy Disease in the Eyes Using EfficientNet-B7 Model	Agus Eko Minarno, Mochammad Hazmi Cokro Mandiri, Yufis Azhar, Fitri Bimantoro, Hanung Adi Nugroho and Zaidah Ibrahim
2	11.15 - 11.25	45	Convolutional Neural Network featuring VGG-16 Model for Glioma Classification	Agus Eko Minarno, Bagas Yoni Sasongko, Yuda Munarko, Hanung Adi Nugroho and Zaidah Ibrahin
3	11.25 - 11.35	57	Classification of Brain Tumors on MRI Images Using DenseNet and Support Vector Machine	Agus Eko Minarno, Ilham Setiyo Kantomo, Fauzi Dwi Setiawan Sumadi, Hanung Adi Nugroho and Zaidah Ibrahim
4	11.35 - 11.45	123	Brain Tumor Identification Based on VGG-16 Architecture and CLAHE Method	Suci Aulia and Dadi Rahmat
5	11.45 - 11.55	181	Cataract Classification Based on Fundus Images Using Convolutional Neural Network	Richard Bina Jadi Simanjuntak, Yunendah Fu'Adah, Rita Magdalena, Sofia Saidah, Abel Bima Wiratama and Ibnu Da'Wan Salim Ubaidah
6	11.55 - 12.05	100	Application of Reverse Engineering in CFD and Ansys Software to Determine the Rate of Heat Propagation in the Briquette Drying Oven	Dhiya Shafa Azizah and Agus Kusnayat
7	12.05 - 12.15	186	Multi-Temporal Factors to Analyze Indonesian Government Policies regarding Restrictions on Community Activities during COVID-19 Pandemic	Adiwijaya Adiwijaya, Mahmud Dwi Sulistiyo, Alfian Akbar Gozali and Syafrial Fachri Pane
8	12.15 - 12.25	74	Small Scale Aerial Monitoring for Human Body Temperature Measurement Using Rotary Wing Drone	Muhammad Ikhsan Sani, Simon Siregar, Farhan Hamdani, Bagas Musamma Nanda and Ryan Febriansyah
9	12.25 - 12.35	76	Implementation of CRNN Method for Lung Cancer Detection based on Microarray Data	Azka Khoirunnisa, Adiwijaya Adiwijaya and Didit Adytia
10	12.35 - 12.45	79	Chatbot for Diagnosis of Pregnancy Disorders using Artificial Intelligence Markup Language (AIML)	Alam Rahmatulloh, Irfan Darmawan, Anjar Ginanjar and Neng Ika Kurniati
	12.45 - 13.00	Q & A Session		

Breakout Room 3 : Information System				
Moderator : Dr. Eng. Budi Irmawati, S.Kom., MT Co-Moderator : Liza Julia				
No	Schedule (WITA / GMT+8)	Paper ID	Tittle	Author
	10.00 - 10.05	Preparation		
1	11.05 - 11.15	27	Exploring The Extended Configuration of Digital Eco-Dynamic Influence on Small E-Business' Product Innovation	Yuniarty Yuniarty, Idris Gautama So, Sri Bramantoro Abdinagoro and Mohammad Hamsal
2	11.15 - 11.25	34	Exploring The Determinants of Supply Chain Social Sustainability Disclosure in Indonesian Banking	Frihardina Marsintauli, Eka Novianti and Roni Patar Situmorang
3	11.25 - 11.35	53	DEVELOPMENT OF EARLY STARTUP COMPANIES' VALUATION MODEL BASED ON AN ANDROID MOBILE APPLICATION: THE ANGEL INVESTOR'S PERSPECTIVE	Patriani Wahyu Dewanti, Ratna Candra Sari, Muhammad Andryzal Fajar, Denies Priantinah and Arin Pranesti
4	11.35 - 11.45	61	A Blockchain-based Halal Certificate Recording and Verification Prototype	Anak Agung Gde Agung, Heru Nugroho and Robbi Hendriyanto
5	11.45 - 11.55	165	Decentralized Children's Immunisation Record Management System for Private Healthcare in Malaysia using IPFS and Blockchain	Faiqah Hafidzah Halim, Nor Aimuni Md Rashid, Nur Farahin Mohd Johari and Muhammad Amirul Hazim Abdul Rahmana
6	11.55 - 12.05	114	Prototype of Integrated National Identity Storage Security System in Indonesia using Blockchain Technology	Rana Zaini Fathiyana, Syifa Nurgaida Yutia and Dinda Jaelani Hidayat
7	12.05 - 12.15	174	A Review Of Digital Home-Based Medical Monitoring Application	Muhammad Asyraf Mohamad Jamil and Sharifalillah Nordin
8	12.15 - 12.25	21	Digital Experience Platform Adoption in The Banking Industry	Tanni Maisari, Lyvia Winyanti and Muharman Lubis
9	12.25 - 12.35	23	Topics and Sentiment Analysis on Omni-Channel E-Commerce Reviews in Indonesia	Maria Sugiat, Deden Witarsyah, Juan Rizky Maulana, Babita Singla, Sandhir Sharma, Kumar Shalender and Tri Widarmanti
10	12.35 - 12.45	69	GoEkopz: An E-Koperasi and Marketplace Synergy of Koperasi MSMEs Model Platform	Robbi Hendriyanto, Anak Agung Gde Agung, Heru Nugroho, Rizza Indah Mega Mandasari, Wardani Muhamad, Sri Widaningsih and Retno Setyorini
	12.45 - 13.00	Q & A Session		

Breakout Room 4 : Data Engineering				
Moderator : Noor Alamsyah, ST., MT Co-Moderator : M. Giri Restu Adjie				
No	Schedule (WITA / GMT+8)	Paper ID	Tittle	Author
	10.00 - 10.05	Preparation		
1	11.05 - 11.15	144	THE BEST MALAYSIAN AIRLINE COMPANIES VISUALIZATION THROUGH BILINGUAL TWITTER SENTIMENT ANALYSIS: A MACHINE LEARNING CLASSIFICATION	Khyrina Airin Fariza Abu Samah, Nur Farhanah Amirah Misdan, Mohd Nor Hajar Hasrol Jono and Lala Septem Riza
2	11.15 - 11.25	51	Karonese Sentiment Analysis: A New Dataset and Preliminary Result	Ichwanul Muslim Karo Karo, Mohd Farhan Md Fudzee, Shahreen Kasim and Azizul Azhar Ramli
3	11.25 - 11.35	11	Sentiment Analysis Classification on Movie Review Using Support Vector Machine Algorithm with Chi Square Feature Selection	I Gusti Ayu Mas Tyagita Prabarani, Adiwijaya and Mahendra Dwifebri Purbalaksono
4	11.35 - 11.45	37	Omnichannel Question Classification Using the Support Vector Machine Method	Deden Witarsyah, Maria Sugiat, Jacques Bazen and Wiyono Wiyono
5	11.45 - 11.55	59	Implementation of Data Mining Algorithm for Nowcasting Modeling of Total Domestic Traveler in Bali Using Indonesian Statistics and Google Trends Data	Rizqi Prima Hariadhy, Alif Shofa Danutirta, Hanif Fakhrurroja, and Muharman Lubis
6	11.55 - 12.05	9	Investigation of RGB to HSI conversion methods for early plant disease detection using Hierarchical Synthesis Convolutional Neural Networks	Raseeda Hamzah, Khyrina Airin Fariza Abu Samah and Sharifalillah Nordin Nordin
7	12.05 - 12.15	180	The Use of Image Processing and Sensor in Tomato Sorting Machine by Color, Size, and Weight	Marlindia Ike Sari, Rizal Fajar, Tedi Gunawan and Rini Handayani
8	12.15 - 12.25	80	Design of Audio-based Accident and Crime Detection and its Optimalization	Sukaridhoto Sritrusta, Afis Asryullah Pratama, Mauridhi Hery Purnomo, Achmad Basuki, Vita Lystianingrum and Rizqi Putri Nourma Budiarti
9	12.25 - 12.40	Q & A Session		

Breakout Room 5 :Software Engineering				
Moderator : IBK Widiarta Co-Moderator : Indira Yunia				
No	Schedule (WITA / GMT+8)	Paper ID	Tittle	Author
	10.00 - 10.05	Preparation		
1	11.05 - 11.15	46	Modified LeNet-5 Architecture to classify high variety of Tourism Object. Case Study: Tourism Object for Education in Tinalah Village	Antonius Bima Murti Wijaya, Desideria Cempaka Wijaya Murti and Victoria Sundari Handoko
2	11.15 - 11.25	82	A Multi-Agent Simulation Evacuation Model using The Social Force Model: A Large Room Simulation Study	Norhaida Hussain, Cheah Waishiang, Seng Wai Loke and Muhammad Asyraf Bin Khairuddin
3	11.25 - 11.35	146	Avoiding Overfitting dan Overlapping in Handling Class Imbalanced Using Hybrid Approach with Smoothed Bootstrap Resampling and Feature Selection	Hartono Hartono and Erianto Ongko
4	11.35 - 11.45	194	AN ASSESSMENT ALGORITHM FOR INDOOR EVACUATION MODEL	Khyrina Airin Fariza Abu Samah, Amir Haikal Abdul Halim and Zaidah Ibrahim
5	11.45 - 11.55	200	Evaluating Web Scraping Performance Using XPath, CSS Selector, Regular Expression And HTML DOM With Multiprocessing Technical Applications	Irfan Darmawan, Muhamad Maulana, Rohmat Gunawan and Nur Widiyasono
6	11.55 - 12.05	116	Modelling Fire Evacuation Simulation Through Emotion-Based BDI Methodology	Celine Haren Paschal, Cheah Waishiang, Sim Keng Wai and Muhammad Asyraf B Khairuddin
7	12.05 - 12.15	36	Data Visualization in Response to The Coronavirus: Socioeconomic Impact, Policy Response, and Opportunity	Deden Witarsyah
8	12.15 - 12.25	189	Students Demography Clustering Based on The ICFL Program Using K-Means Algorithm	Rachmadita Andreswari, Rokhman Fauzi, Berlian Maulida Izzati, Vandha Pradwiyasma Widartha, Dita Pramesti, Sabila Chanifah and Larasati Valensia
9	12.25 - 12.35	166	Comparison of Apache SparkSQL and Oracle Performance (Case Study of Data Cleansing Process)	Ilma Nur Hidayati, Tien Fabrianti Kusumasari and Faqih Hamami
10	12.35 - 12.45	138	Classification of Industrial Relations Dispute Court Verdict Document with XGBoost and Bidirectional LSTM	Galih Wasis Wicaksono, Ulfah Nur Oktaviana, Said Noor Prasetyo, Tiara Intana Sari, Nur Putri Hidayah, Nur Rohim Yunus and Solahudin Al-Fatih
	12.45 - 13.00	Q & A Session		

Breakout Room 6 : Machine Learning (Onsite)				
Moderator : Heri Wijayanto, ST.,MT., Ph.D Co-Moderator : Dila Ega				
No	Schedule (WITA / GMT+8)	Paper ID	Tittle	Author
	10.00 - 10.05	Preparation		
1	11.05 - 11.15	70	Solar Powered Vibration Propagation Analysis System using nRF24l01 based WSN and FRBR	Wirarama Wedashwara, Made Sutha Yadnya, I Wayan Sudiarta, I Wayan Agus Arimbawa and Tatang Mulyana
2	11.15 - 11.25	129	Tree-based Filtering in Pulse-Line Intersection Method Outputs for An Outlier-tolerant Data Processing	Karisma Trinanda Putra, Cahya Damarjati, Heri Wijayanto, Hsing-Chung Chen and Toha Ardi Nugraha
3	11.25 - 11.35	191	Application of Gray Scale Matrix Technique for Identification of Lombok Songket Patterns Based on Backpropagation Learning	Sudi Mariyanto Al Sasongko, Erni Dwi Jayanti and Suthami Ariessaputra
4	11.35 - 11.45	88	A Conversion of Signal to Image Method for Two Dimension Convolutional Neural Networks Implementation in Power Quality Disturbances Identification	Sunneng Sandino Berutu, Yeong-Chin Chen, Heri Wijayanto, Haeni Budiati and Ahmad Musnansyah
5	11.45 - 11.55	84	Outage Probability Analysis by Implementing RIS to Cooperative NOMA Network on Channel with Ip-CSI condition	Andika Wisnujati, Agung Mulyo Widodo, Heri Wijayanto, and Mohammad Deni Akbar
6	11.55 - 12.05	91	Analyzing Coverage Probability of Reconfigurable Intelligence Surface-aided NOMA	Agung Mulyo Widodo, Heri Wijayanto, I Gede Pasek Suta Wijaya and Mohammad Deni Akbar
7	12.05 - 12.15	67	Solar Powered nRF24L01 Based Smart Drip Irrigation System using FARM for Water Usage Efficiency	Wirarama Wedashwara, I Komang Damar Jaya, Andy Hidayat Jatmika, I Wayan Agus Arimbawa and Tatang Mulyana
8	12.15 - 12.25	71	Text Classification using Genetic Programming with implementation of Map Reduce and Scraping	Wirarama Wedashwara, Budi Irmawati, Heri Wijayanto, I Wayan Agus Arimbawa and Vandha Pradwiyasma Widartha
9	12.25 - 12.40	Q & A Session		

Afternoon Session - 2.00 PM - 4.00 PM (WITA TIME) / (GMT + 8)

Breakout Room 7 : IT Security and Networking				
Moderator : Hidra Amnur, S.Kom, M.Kom Co-Moderator : M. Firdaus				
No	Schedule (WITA / GMT+8)	Paper ID	Tittle	Author
	14.00 - 14.05	Preparation		
1	14.05 - 14.15	56	SD-Honeypot Integration for Mitigating DDoS Attack Using Machine Learning Approaches	Fauzi Dwi Setiawan Sumadi, Alrizal Rakhmat Widagdo, Abyan Faishal Reza and Syaifuddin Syaifuddin
2	14.15 - 14.25	41	Public Protection and Disaster Relief Planning Using Terrestrial Trunked Radio in West Java	Tengku Ahmad Riza, Asep Mulyana and Rendy Munadi
3	14.25 - 14.35	43	Security Awareness Strategy for Phishing Email Scams: A Case Study One of a Company in Singapore	Widia Febriyani, Dhiya Fatiya, Adityas Widjajarto and Muharman Lubis
4	14.35 - 14.45	7	Gray Level Differences Matrix (GLDM) for Alcoholic EEG Signal Classification	Bandiyah Sri Aprillia, Achmad Rizal and Muhammad Arik Geraldy Arik Fauzi
5	14.45 - 14.55	55	Phishing Attacks for Instagram	Mutiara Rizka Nasution, Hanif Fajri, Adityas Widjajarto and Muharman Lubis
6	14.55 - 15.05	109	Entropy Based Method For Malicious File Detection	Muhammad Edzuan Zainodin, Zalmiyah Zakaria, Rohayanti Hassan, Zubaile Abdullah and Shahreen Kasim
7	15.05 - 15.15	126	The Reliability Analysis for Information Security Metrics in Academic Environment	Prajna Deshanta Ibnugraha, Anas Satria, Fabian Sekar Nagari and Moch Fahru Rizal
8	15.15 - 15.25	137	Identification of Mirai Botnet in IoT Environment Through Denial of Service Attacks	Alam Rahmatulloh, Irfan Darmawan, Nur Widiyasono and Galih Muhammad Ramadhan
9	15.25 - 15.35	105	Implementation of Wireless Sensor Network: A Review	Avon Budiono, Moh Adli Akbar, Fahdi Saidi Lubis, Galih Rashif Husaini, Gredy Ramadhany and Rohmat Saedudin
10	15.35 - 15.45	147	Design of A Secured Electronic Voting System by Using Cross-Hash Validation Mechanism	Ahmad Zafrullah Mardiansyah, Ario Yudo Husodo, Cahyo Mustiko Okta Muvianto, Ryan Adhitya Nugraha and Iqbal Santosa
	15.45 - 16.00	Q & A Session		

Breakout Room 8 : Machine Learning				
Moderator : Prof. Dr. Eng. I Gede Pasek Suta Wijaya, ST., MT Co-Moderator : M. Daden Kasandi Putra				
No	Schedule (WITA / GMT+8)	Paper ID	Tittle	Author
	14.00 - 14.05	Preparation		
1	14.05 - 14.15	90	Implementing Random Forest Algorithm in GEE: Separation and Transferability on Built-up Area in Central Java, Indonesia	Aninda W. Rudiastuti, Yustisi Lumban-Gaol, Florence Elfriede Sinthauli Silalahi, Yosef Prihanto and Widodo Pranowo
2	14.15 - 14.25	164	Implementation Of Support Vector Regression for Polkadot Cryptocurrency Price Prediction	Deny Haryadi, Arif Rahman Hakim, Dewi Marini Umi Atmaja, and Syifa Nurgaida Yutia
3	14.25 - 14.35	25	Long-lived Learning Classification Model with Naïve Bayes Classifier in the Medical Dataset	Anik Andriani and Sri Hartati
4	14.35 - 14.45	98	Automatic Summarization of Court Decision Documents over Narcotic Cases Using BERT	Galih Wasis Wicaksono, Sheila Fitria Al'Asqalani, Yufis Azhar and Nur Putri Hidayah
5	14.45 - 14.55	134	Text Summarization on Verdicts of Industrial Relations Disputes Using the Cross Latent Semantic Analysis and Long Short-Term Memory	Galih Wasis Wicaksono, Muhammad Nafi, Nur Hayatin, Nur Putri Hidayah and Tiara Intana Sari
6	14.55 - 15.05	107	Predictive Maintenance in Oil and Gas Industry by using Naive Bayes and Gaussian Elimination Method	Goh Alex Chee Hong, Shahreen Kasim, Norshakirah Abd Aziz and Hairulnizam Mahdin
7	15.05 - 15.15	108	Cluster Analysis of Japanese Whiskey Product Review Using K-Means Clustering	Deden Witarsyah, Maria Sugiat, Moh Adli Akbar, Villy Satria Praditha
8	15.15 - 15.25	112	Arabic Character Recognition using CNN LeNet-5	Gibran Satya Nugraha, I Gede Pasek Suta Wijaya, Fitri Bimantoro, Ario Yudo Husodo, Arik Aranta, Faqih Hamami, Muhammad Ilham Darmawan, Wahyu Alfandi and Alidin
9	15.25 - 15.35	110	Video Content Selection (VCS) Model in Android Devices for Energy Efficiency	Muhamad Hanif Jofri, Mohd Farhan Md Fudzee, Shahreen Kasim, Mohd Norasri Ismail and Hairulnizam Mahdin
10	15.35 - 15.50	Q & A Session		

Breakout Room 9 : IT Network / Infrastructure / IoT				
Moderator : Dr. Eng. I Gede Putu Wiratama Wedashwara W, ST., MT Co-Moderator : M. Arsyad				
No	Schedule (WITA / GMT+8)	Paper ID	Tittle	Author
	14.00 - 14.05	Preparation		
1	14.05 - 14.15	92	Wireless Sensor Network Based Monitoring System: Implementation, Constraints, and Solution	Apip Miptahudin, Titiek Suryani and Wirawan Dea
2	14.15 - 14.25	89	A PROTOTYPE OF IoT- BASED INFUSION MONITORING AND NOTIFICATION USING ANTARES	Gita Indahhapsari, Fany Maulany, Lisda Meisaroh and Roy Chaidir
3	14.25 - 14.35	169	Performance Experiment of An Ethereum Blockchain-based Degree Certificate Verification within IPTM-DLT Infrastructure	Zubaile Abdullah, Mohd Anuar Mat Isa, Shahreen Kasim, Isredza Rahmi A.Hamid, Hairulnizam Mahdin, Azizul Azhar Ramli and Mohd Farhan Md. Fudzee
4	14.35 - 14.45	179	Review on Information-Centric Networking for Internet of Things	R. Wahjoe Witjaksono, Edi Sutoyo and Ahmad Almaarif
5	14.45 - 14.55	104	Android-based System Monitoring of Supporting Variables for Nursery-Plant Growth in Plantation Areas	Adis Kusyadi Nugraha, Giva Andriana Mutiara, Gita Indah Hapsari and Tedi Gunawan
6	14.55 - 15.05	60	Simultaneous Hydroponic Nutrient Control Automation System Based on Internet of Things	Demi Adidrana, Ade Rahmat Iskandar, Ade Nurhayati, Suyatno, Mohamad Ramdhani, Kharisma Bani Adam, Rizki Ardianto, and Cahyantari Ekaputri
7	15.05 - 15.15	184	Data Clustering for Identification of Building Conditions Using Hybrid Multivaritae Multinominal Distribution Soft Set (MMDS) Method	Rd Rohmat Saedudin, Avon Budiono, Iwan Tri Riyadi Yanto, Sely Novita Sari, Mustafa Mat Deris and Norhalina Senan
8	15.15 - 15.25	48	Development of IoT Control System Prototype for Flood Prevention in Bandung Area	Yessy Permatasari, Muhamad Ridwan Firdaus, Hafidh Zuhdi, Hanif Fakhrurroja and Ahmad Musnansyah
9	15.25 - 15.35	127	Smartphone-based Indoor Navigation for Guidance in Finding Location Buildings with WiFi-RSSI : A case study at the Politeknik Negeri Semarang	Liliek Triyono, Prayitno Prayitno, Sukamto Sukamto and Amran Yobioktabera
10	15.35 - 15.50	Q & A Session		

Breakout Room 10 : E-Learning System				
Moderator : Ir. Budi Sulistyo, MT., Ph.D Co-Moderator : L. Rudi Setiawan				
No	**Schedule (WITA / GMT+8)**	**Paper ID**	**Tittle**	**Author**
	14.00 - 14.05	Preparation		
1	14.05 - 14.15	187	VaccineLand: Interactive Digital Board Game to Educate Public about Vaccines	Zuhri Arafah Zulkifli, Mohamad Nornazmi Mohd Noor and Nur Farahin Mohd Johari
2	14.15 - 14.25	30	Student Engagement Mechanisms of Online Learning: The Effect of Service Quality of Learning Management System	Hartiwi Prabowo, Yuniarty Yuniarty and Ridho Bramulya Ikhsan
3	14.25 - 14.35	38	A Cloud-Based Learning Management System for Senior High Schools	Anderes Gui, Nicholas, Vincent, Kenji M. Hartono, Muhammad S. Shaharudin and Anwar A. Pitchay
4	14.35 - 14.45	62	Analysis of Resilience of Education System in Higher Education Due to Covid-19 Pandemic in Indonesia, a Systematic Literature Review	Ida Bagus Ketut Widiartha, Jun-Seok Hwang, Hyoen-Yeong Yoon and Oktariani Nurul Pratiwi
5	14.45 - 14.55	136	The Implementation of EgameFlow Model in Educational Game to Increase Vaccine Knowledge	Nur Farahin Mohd Johari, Muhammad Amirul-Na'Im Muhammad Ridzuan Lim, Norshahidatul Hasana Ishak and Hazrati Zaini
6	14.55 - 15.05	12	Factor Affecting Intention to Use E-Learning	Anderes Gui, Gabriella Marchella Umbas, Rachel Gloria Reinatha and Melliana
7	15.05 - 15.15	103	Constructive Alignment by Implementing Design Thinking Approach in Artificial Intelligence Course: Thematic and Learner's Sentiment Analysis	Rohayanti Hassan, Aida Ali, Weng Howe Chan, Noraini Ibrahim, Zalmiyah Zakaria and Shahliza Abd Halim
8	15.15 - 15.25	183	3D Scanner using Infrared for Small Object	Marlindia Ike Sari, Anang Sularsa, Surya Badrudin Alamsyah and Siswandi Riki Rizaldi
9	15.25 - 15.35	188	How to Deeply Analyze the Content of Online Newspapers Using Clustering and Correlation	Yeni Rokhayati, Sartikha Sartikha and Nur Zahrati Janah
10	15.35 - 15.50	Q & A Session		

Breakout Room 11 : Enterprise System				
Moderator : Dr. Basuki Rahmat Co-Moderator : M. Giri Restu Adjie				
No	Schedule (WITA / GMT+8)	Paper ID	Tittle	Author
	14.00 - 14.05	Preparation		
1	14.05 - 14.15	102	Factors Influencing Readiness Towards Halal Logistics Among Food and Beverages Industry In The Era of E-Commerce In Indonesia	Prafajar Suksessanno Muttaqin, Erlangga Bayu Setyawan and Nia Novitasari
2	14.15 - 14.25	4	An Effective Open ERP System for Automation in Financial Reporting for SMEs based on Service Oriented Architecture	Muhardi Saputra and Rafa Fadlila
3	14.25 - 14.35	172	Development of Automatic Object Detection and IoT for Garbage Pickup Assignment Problem using Neural Network Training	Erlangga Bayu Setyawan, Nia Novitasari and Nashirudin Anwar
4	14.35 - 14.45	130	The IT Services Management Architecture Design for a Large and Medium-sized Companies based on ITIL4 and TOGAF Framework	Iqbal Santosa and Rahmat Mulyana
5	14.45 - 14.55	149	Intelligent Warehouse Picking Improvement Model for E-Logistics Warehouse using Single Picker Routing Problem and Wave Picking	Dida Diah Damayanti, Nia Novitasari, Erlangga Bayu Setyawan and Prafajar Suksessanno Muttaqin
6	14.55 - 15.05	176	Managing Information Technology Risks to Achieve Business Goals: A Case of Pharmaceutical Company	Berlian Maulidya Izzati, Yosephine Mayagita Tarigan, Luthfi Ramadani and Rosanicha
7	15.05 - 15.15	177	Development of Automatic Real Time Inventory Monitoring System using RFID Technology in Warehouse	Erlangga Bayu Setyawan, Ajeng Yunita and Satriana Rasmaydiwa Sekarjatiningrum
8	15.15 - 15.25	190	Enhanced Technology for Logistics Courier Delivery Using RFID Label to Minimize Processing Time	Nia Novitasari, Erlangga Bayu Setyawan and Nashirudin Anwar
9	15.25 - 15.35	119	Smart Campus Governance Design of XYZ Polytechnic based on COBIT 2019	Ryan Adhitya Nugraha and Ratih Syaidah
10	15.35 - 15.50	Q & A Session		

Breakout Room 12 : Information System				
Moderator : Dr. Lukman Abdurrahman, ST., MIS Co-Moderator : Mizanul Ridho Aohana				
No	Schedule (WITA / GMT+8)	Paper ID	Tittle	Author
	14.00 - 14.05	Preparation		
1	14.05 - 14.15	83	Omni-Channel Service Analysis of Purchase Intention	Maria Sugiat, Nadia Suwara and Deden Witarsyah
2	14.15 - 14.25	101	Omni-Channel Ordering Based on Customer Perspective	Muhammad Reza-Imaduddin and Deden Witarsyah
3	14.25 - 14.35	202	Design of Egg Quality Selection Tool Using ESP-Now at XYZ Company	Nur Ikhsan Ashari, Haris Rachmat and Murman Dwi Prasetio
4	14.35 - 14.45	10	Sotware Quality Measurement for Functional Suitability, Performance Efficiency, and Reliability Characteristic using Analytical Hierarchy Process	Sarwosri Sarwosri, Umi Laili Yuhana and Siti Rochimah
5	14.45 - 14.55	201	Automation Reporting Design of Electric Usage Measurement Using Industrial Smart Metering at XYZ Company	Raka Aditya Prayoga, Haris Rachmat, Denny Sukma Eka Atmaja and Murni Dwi Astuti
6	14.55 - 15.05	197	SMART CITY ARCHITECTURE DEVELOPMENT FRAMEWORK (SCADEF)	Yuli Adam Prasetyo and Ichwan Habibie
7	15.05 - 15.15	145	Enhance Document Contextual using Attention-LSTM to Handle Sparse Rating Matrix For E-Commerce Recommender System	Hanafi
8	15.15 - 15.25	148	An Intrusion Detection System Using SDAE to Enhance Dimensional Reduction in Machine Learning	Hanafi Hanafi
9	15.25 - 15.35	170	Mapping User Experience Information Overload Problems Across Disciplines	Wahyu Andhyka Kusuma and Azrul Hazri Jantan
10	15.35 - 15.50	Q & A Session		

Breakout Room 13 : Software Engineering / Machine Learning (Onsite)				
Moderator : Royana Afwani, S.T., M. T Co-Moderator : Wahyu Alfandi				
No	Schedule (WITA / GMT+8)	Paper ID	Tittle	Author
	14.00 - 14.05	Preparation		
1	14.05 - 14.15	192	Blockchain-based Smart Contract for Decentralized Marketplace	Syifa Nurgaida Yutia, Rana Zaini Fathiyana, Siti Zahrotul Fajriyah and Deny Haryadi
2	14.15 - 14.25	77	Early Detection of Asymptomatic Covid-19 Infection with Artificial Neural Network Model Through Voice Recording of Forced Cough	Aisyah Khairun Nisa, I Gede Pasek Suta Wijaya and Arik Aranta
3	14.25 - 14.35	141	The Design of E-Commerce System to Increase Sales Productivity of Households Industry in Indonesia	Nadiyasari Agitha, Ario Yudo Husodo, Royana Afwani and Faishal Mufied Al Anshary
4	14.35 - 14.45	171	Design of Customer Churn Prediction Model for Segmentation and Classification in E-Commerce Mall in Mall.	Ilham Huda, Agus Achmad Suhendra and Moch Arif Bijaksana
5	14.45 - 14.55	75	The Design of Convolutional Neural Networks Model for Classification of Ear Diseases on Android Mobile Devices	I Gede Pasek Suta Wijaya, Heru Mulyana, Hamsu Kadriyan, Didit Yudhanto, Eka Arie Yuliani and Riska Yanu Fa'Rifah
6	14.55 - 15.05	71	Text Classification using Genetic Programming with implementation of Map Reduce and Scraping	Wirarama Wedashwara, Budi Irmawati, Heri Wijayanto, I Wayan Agus Arimbawa and Vandha Pradwiyasma Widartha
7	15.05 - 15.15	182	COVID-19 Lung X-ray image Classification using CNN	Alidin Alidin, I Gede Pasek Suta Wijaya, Fitri Bimantoro, Deden Witarsyah and Faqih Hamami
8	15.15 - 15.25	203	Implementation of 5G Telecommunication Network Services in Indonesia based on Techno-Economic Analysis	Siti Hajar Komariah, Bijaksana Prabawa, Rizki Yantami Arumsari and Umar Yunan
9	15.25 - 15.40	Q & A Session		

LIST OF ABSTRACT

Parallel Session 1 : Information System

.:: Paper ID: 2 ::.

Sustainability Analysis of Bintulu Hospital Information System Through e3value and i* Modeling

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Abstract— As a pivotal supporting arm and the driving force to ensure better healthcare services, the Hospital Information System (HIS) provides the backbone support for the efficient management of the hospital's operations and services. Against the backdrop of the current economic situation and the uncertainties in the grim global economic outlook, it is crucial to optimize the cost of the information system while meeting the objectives. This paper contributes to introduce a technique to optimize the funding of the public Hospital Information System in Malaysia. It explores the prolonged financial viability of the HIS in Bintulu, East Malaysia, through e3Value methodology. The e3value methodology is able to evaluate the financial sustainability of HIS projects, and it can serve as a tool for early requirement analysis on future HIS deployment. From the e3value model, it is interesting to discover that there are actors contributing positive revenue to the hospital, allowing the hospital to generate more profit, which benefits the Government. However, actors that give negative revenue might affect future financial status. Based on the result, the recommendations presented in this paper are very crucial to ensure the continuous financial sustainability of HIS. Compared to the existing method, the e3value model offers early requirement study analysis and structured analysis with systematic approaches.

Keywords— value-based software engineering; information system; financial sustainability models.

Validation of an IT Value Model: The Case Study of PT. PLN(Persero) Indonesia

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Abstract— Recently, Information Technology has become a key factor that can help corporate in many areas. It is believed that IT spending has influenced business performance and has an impact on the competitive advantage of a corporate. Referring to the theory which stated that resources owned by business organizations have a close relationship to the business competitive advantage as Resource-Based View (RBV) theory proposes. Many studies have been performed to confirm this theory. However, none of them focused on the electric power industry area. This research is directed to approve the IT value model for the largest company that supports electric power all over Indonesia. The validation process is done by dynamic PAV. The validation method is carried out by comparing the Average Performance Ratio (APR) between the two-factors (without IT) and the three-factors (with IT) model. The value of APR with IT is constantly higher than APR without IT since 2010. This research can provide evidence that PLN's performance is better with IT rather than without IT.

Keywords— *IT value model; RBV theory; Partial adjustment valuation*

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Customization of Cost Allocation Monitoring Report for Improving Activity-Based Costing Process

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Abstract— In the age of a global competition environment, accurate costing measurement is essential for every company. The more accurate allocation process to final outputs will indicate what potential impact a company's decision will have on costs. Activity-based costing is a technique for allocating organizational costs to activities that utilize the organization's resources and then tracing the costs of these activities to products, consumers, or distribution channels that generate profits or losses for the business. With a large number of cost allocations in the business processes, it makes it difficult for companies to identify the number of costs that have been allocated, especially if the data that must be processed is in large quantities. To overcome this problem, it's necessary to require cost mapping for the business process from resource to cost center to compare the number of costs that have been allocated. This research will discuss the application of monitoring reports by using ALV customization in XYZ Ltd. This report was created using an iterative and incremental model approach. The simulation results show there is a 50% reduction of the time to execute the customization monitoring report, and it only takes one single step to generate reports and analyze data. The results of this research are expected to be used as a study to provide the right solution in facilitating the process of checking the cost allocation on ABC to objectively monitor and analyze each business process (resource, activity, and cost object) and support the decision-making process.

Keywords— Activity-Based Costing; Cost Allocation; Enterprise Resource Planning; SAP, ABAP List Viewer

.:: Paper ID: 122 ::.

Technological Knowledge Profile and the Role of Emerging Technologies for Patenting in Indonesia: An Analysis of Universities and Public Research Institutions (PRIs)-invented Patents

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Abstract— Given the universities' significant roles on innovation, entrepreneurial university concept has been taken to many discussions among researchers. Relevant to this knowledge economic era, universities and PRIs are trying to acquire new knowledge assets by exploring sources of knowledge inside or even outside of the institution. Companies, research institutions, experts, and other universities can be a part of many available sources. For developing countries, research universities and PRIs play significant roles since they are supported by government and linked to international partners. This paper reveals the Indonesian patent's profile and the Indonesian universities and PRIs' contributions in the period of year 2000 to 2021. Moreover, using graph analytic, this paper analyses the roles of the inventor's technological knowledge, such as AI, Robotics, Big Data, AR, VR, and IoT in patent co-inventorship network of universities and PRIs-invented patents in Indonesia. This study could help Indonesian governments and research institutions to picture Indonesian patent profile and develop a suitable policy to improve their patenting capabilities and technological knowledge strategies.

Keywords— Patent Analysis; University; Public Research Institution; Emerging Technology; Technological Knowledge; Indonesia

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.:: Paper ID: 153 ::.

Solar Powered nRF24L01 Based Smart Drip Irrigation System using FARM for Water Usage Efficiency

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Abstract— The availability of a controlled environment, especially water irrigation, is needed for plant cultivation on dry land. This study aims to develop a solar-powered intelligent drip irrigation system divided into five nodes with an nRF24l01 network and integrated with the Fuzzy Rule-Based Regression (FRBR) algorithm for regression of the evaporation rate soil and water used. The five nodes consist of monitoring soil temperature and humidity, main irrigation pump, drip irrigation pump, main solar monitoring and monitoring of air temperature and humidity, light intensity, and a GSM module for uploading data to the internet. Evaluation of Quality of Service (QoS) for all data transmission lines resulted in average throughput of 99.680%, Packet Delivery Ratio (PDR) 99.734% and a delay of 0.073ms. Evaluation of energy available for one week divided based on light intensity and air temperature produces an average current of 0.282A and a voltage of 2.755V generated on the solar panel. Evaluation of data in clusters using Fuzzy Rule-Based Clustering (FRBC) into two parts based on the level of water use resulted in conditions of high soil moisture duration spending 141,828L of water and low conditions consuming 36,728L. The correlation matrix shows that soil moisture and water use duration correlates 0.857. FARM gains followed these results with average support of 0.272 and confidence of 0.932. The FRBR results showed MSE 0.034 and MAE 0.031 in regressing the duration of soil moisture and MSE 0.045 and MAE 0.042 for water use.

Keywords— Smart Farming; Internet of Things; Fuzzy Association Rule Mining

.:: Paper ID: 24 ::.

Designing and ERP System: a Sustainability Approach

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Abstract— Technology has grown up massively which is numerous aspects. Whether the system is limited or open-source had to adapt to certain circumstances. For instance, decades ago, people mainly used to have a paper to work on reporting or simply to make notes. These days, people started to migrate the work stuff into digitalization. Furthermore, environmental pollution has been triggered by emissions from vehicles. Moreover, the manufacturing process does not apply the sustainability process, due to a lack of knowledge and resources to solve this issue. Other than that, this matter has also led to an impenetrable environmental issue in the manufacturing area for years. Therefore, developing a sales module dashboard system that is configured on Sales Order (SO) transactions and customer data could assist the problem-solving process. The reason for this matter is to highlight the Key Performance Indicator (KPI) at the sustainability that has been added by the open-source Enterprise Resources Planning (ERP) System and displayed the indicator of data visualization application. Furthermore, the development of the ERP system is aligned with the purposed of the Quickstart methodology that will be applied in this research. To sum up, the sales module dashboard system is designed to assist the new user in this implementation, in classifying the material, process, or products that require the consideration to be maintained. Moreover, to reduce the number of raw materials or shipment processes that did not apply the eco-friendliness.

Keywords— Sales; Dashboard; Enterprise Resources Planning; Sustainability; Indicator.

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Knowledge Management Factors and Its Impact on Organizational Performance: A Systematic Literature Review

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Abstract— Knowledge management can help organizations to reach performance. Many studies show that knowledge management impacts organizational performances. Human capital is considered as mediating role in the impact of knowledge management on organizational performance, but it is still blurred, and there are only a few studies related to this issue. Moreover, various factors influence knowledge management, such as organizational structure, culture, technology, strategy, trust, and leadership, but maybe other factors have not been identified. This factor can help knowledge management impacts organizational performance. This study was conducted to find out how the human capital role mediates the impact of knowledge management on organizational performance and determine another factor that affects knowledge management, which can have an impact on organizational performance. This study was based on the Systematic Literature Review (SLR), which includes 37 articles published from 2016 to 2021. The study showed that human capital mediates the impact of knowledge management on organizational performance directly and indirectly through innovation. Meanwhile, organizational structure, culture, trust, leadership, human behavior, human resources practices, technology, strategy are identified as factors that affect knowledge management, whereas human resources practices affect human behavior and leadership. Finally, we proposed a conceptual model that described how knowledge management factors and impact on human capital and organizational performance. This research can contribute to enriching knowledge management theory and used to give recommendations for improving the implementation of knowledge management. Further research involves data collection, and empirical analysis needs to be conducted in an organization to examine the conceptual model.

Keywords— knowledge management; knowledge management system; human capital; organizational performance; KM impact; KM Factor

.:: Paper ID: 58 ::.

IT Governance Assessment in Non-Governmental Organizations: A Case Study of NGO Institution in Indonesia

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Abstract— IT governance is the organizational capacity exercised by the board, executive management, and IT management to control the formulation and implementation of IT strategy and in this way ensure the integration of business and IT. So that IT Governance is a very important thing to be done by the business sector, so that IT is able to support and expand the strategies and goals of the organization. At this time, of course, private business organizations and the government have started to implement IT Governance properly. However, what about IT Governance in NGOs (Non-Governmental Organizations). Non-governmental organizations are recognized as one of the key players in the development landscape, human rights, humanitarian action, environment and many other areas of public action since the 2004 tsunami reconstruction efforts in Indonesia, India, Thailand and Sri Lanka. The research method used in this study is a qualitative method by applying interpretive case studies and data collection is carried out through interviews as primary data including secondary data collected from NGO Institutions. The result of this research is that NGO institutions have implemented IT Governance well. However, according to Maturity Model Duffy 2002a, the implementation of IT Governance in NGO Institution is still at level three. So in this research it is also suggested that NGO institutions can implement the IT Committee and start implementing the IT implementation process based on COBIT or ITIL so that NGO institutions are expected to reach Level Four in the future based on the strategic alignment.

Keywords—IT governance; Non-Governmental Organization; structure, process; relational mechanism, NGOs in Indonesia

.:: Paper ID: 66 ::.

Enterprise Architecture: A Strategy to Achieve e-Government Dimension of Smart Village using TOGAF ADM 9.2

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Abstract— Transformation in village government with the enterprise architecture smart village design model is significant for developing digital technology in the village government environment to realize a government with aspects of integrity values that are in synergy with the SDGs sustainable development goals. The method used in this study uses the adoption of the TOGAF ADM 9.2 framework, which consists of five phases: Preliminary, Architecture vision, Business architecture, Data architecture, Application architecture, while determining the clustering of villages by taking into account several aspects of the assessment released directly by the Ministry of Village, The Development of Disadvantaged Regions and Transmigration of the Republic of Indonesia in the form of a village index building the IDM which aims to identify and facilitate analysis of village capabilities and the characteristics of village government at each level. The output produced in this study is in the form of an enterprise architecture smart village design that will assist the village government in describing a target in the form of a digital development design on the e-Government dimension in the form of several application platforms covering various management of public administration services, public development aspirations, and management. Village development, as well as the management of village government documents. From a village sample that was used as the object of research with the value of the advanced village clustering index according to the Village Index data, the IDM was built so that the smart village design concept and the synergy of the SDGs development goals.

Keywords— Enterprise Architecture, e-Government, TOGAF ADM 9.2, Smart Village, SDGs, IDM

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.:: Paper ID: 28 ::.

Design Thinking Approach for User Interface Design and User Experience on Campus Academic Information Systems

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Abstract— Currently, an academic system with structured data is needed for all lecture institutions, especially universities in Indonesia, Siliwangi University, with its academic system, namely the Campus Academic Information System (SIMAK). Over time, complaints from the visual aspect and user experience that did not keep up with the times became a new problem for SIMAK with student access rights. Therefore, the UI/UX aspect in developing an application is vital in accessing the available features. In this study, the method applied is Design Thinking to develop SIMAK WEB and SIMAK MOBILE application designs according to the data and input obtained from users. The research stages include Empathize, Define, Ideate, Prototype, and Test. The final result is user testing from expert users with ten examiners, each producing a success rate percentage of 100% for SIMAK WEB and a percentage of 90% for SIMAK MOBILE. In addition, the User Experience Questionnaire (UEQ) assessment from the same expert user plus end-users of 39 respondents and 33 respondents for web and mobile respectively increased 6 UEQ scales, namely Attractiveness, Clarity, Efficiency, Accuracy, Stimulation and lastly especially Novelty which has an increase of 5.286 and 5.264 from the initial value of -0.880. The Novelty scale is the only scale with a negative impression initially and was successfully evaluated in this study with a good score.

Keywords— Design Thinking; Campus Academic System; User Experience; User Experience Questionnaire; User Interface

Classification of Diabetic Retinopathy Disease Using Convolutional Neural Network

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Abstract— Diabetic Retinopathy (DR) is a disease that causes visual impairment and blindness in patients with it. Diabetic Retinopathy disease appears characterized by a condition of swelling and leakage in the blood vessels located at the back of the retina of the eye. Early detection through the retinal fundus image of the eye will take time and requires an experienced ophthalmologist. This study proposed a deep learning method, the Efficientnet-b7 model to identify diabetic retinopathy disease automatically. This study applies three preprocessing techniques that will be implemented in the dataset "APTOS 2019 Blindness Detection". In preprocessing technique trial scenarios, Usuyama preprocessing technique obtained the best results with accuracy of 89% of train data and 84% in test data compared to Harikrishnan preprocessing technique which has 82% accuracy in test data, and Ben Graham preprocessing has 81% accuracy in test data. In this study, Hyperparameter tuning was conducted to find the best parameters for use on the EfficientNet-B7 Model. In this study, we tested the Efficientnet-B7 model with an augmentation process that can reduce the occurrence of overfitting compared to models without augmentation. Preprocessing techniques and augmentation techniques can influence the proposed EfficientNet-B7 model in terms of performance results and reduce the overfitting of models.

Keywords— Image; Classification; Diabetic Retinopathy; CNN; APTOS

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Convolutional Neural Network featuring VGG-16 Model for Glioma Classification

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Abstract— Magnetic Resonance Imaging (MRI) is a medical imaging technology used to detect brain malignancies. This study is being carried out in order to address the limitations of previous investigations that resulted in "worse than ideal accuracy." Convolutional Neural Network (CNN) is one of the image classification methods available, detecting picture features through the feature map utilizing CNN's pooling methodology. The goal of this research is to use CNN to classify image of brain tumors. Furthermore, this study was carried out by utilizing the VGG-16 model in conjunction with image augmentation techniques in order to improve on past studies' accuracy rates. A dataset of 520 data points was used in this investigation, with a split ratio of 68 percent for train data and 32 percent for test and validation data. This research shows promising results.

Keywords— Classification; MRI; Brain Tumor; Glioma; CNN; VGG-16

.:: Paper ID: 57 ::.

Classification of Brain Tumors on MRI Images Using DenseNet and Support Vector Machine

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Abstract— The brain is a vital organ in the human body, performing a variety of functions. The brain has always played a major role in the processing of sensory information, the production of muscular activity, and the performance of high-level cognitive functions. Among the most prevalent diseases of the brain is the development of aberrant tissue in brain cells, which results in the formation of brain tumors. According to data from the International Agency for Research on Cancer (IARC), more than 124,000 people worldwide were diagnosed with brain tumors in 2014, and more than 97,000 people died as a result of the condition. Current research indicates that magnetic resonance imaging (MRI) is the most effective means of detecting brain cancers. Because brain tumors are associated with a significant mortality risk, a large number of brain tumor MRI imaging datasets were used in this research to detect brain cancers using deep learning techniques. To classify three forms of brain tumors, including glioma, meningioma, and pituitary, a deep learning model called DenseNet 201 paired with Support Vector Machines (SVM) was employed in this work, which included three types of brain tumors. On the basis of the results of the tests that were conducted, the best accuracy results obtained in this study were 99.65 percent, with a comparison ratio of 80 percent for training data and 20 percent for testing data, oversampled with the SMOTE method, with the best accuracy results obtained in this study being 99.65 percent.

Keywords— Brain; Tumor; MRI; SVM; CNN; Classification; Smote

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Brain Tumor Identification Based on VGG-16 Architecture and CLAHE Method

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Abstract— Magnetic Resonance Imaging (MRI) in diagnosing brain cancers is widespread. Because of the variety of angles and clarity of anatomy, it is commonly employed. If a brain tumor is malignant or secondary, it is a high risk, leading to death. These tumors have an increased predisposition for spreading from one place to another. In detecting brain abnormality form such as a tumor, from a magnetic resonance scan, expertise and human involvement are required. Previous, the image segmentation of brain tumors is widely developed in this field. Suppose we could somehow use an automatic brain tumor detection technology to identify the presence of a tumor in the brain without requiring human intervention. In that case, it will give us a leg up in the treatment process. This research proposed two stages to identify the brain tumor in MRI; the first stage was the image enhancement process using Clip Limit Adaptive Histogram Equalization (CLAHE) to segment the brain MRI. The second one was classifying the brain tumor on MRI using Visual Geometry Group-16 Layer (VGG-16). The CLAHE was used in some instances, there were CLAHE applied in FLAIR image on green color, and CLAHE applied in Red, Green, Blue (RGB) color space. The experimental result showed the highest performance with accuracy, precision, recall, respectively 90.37%, 90.22%, 87.61%. The CLAHE method in RGB Channel and the VGG-16 model have reliably on predicted oligodendroglioma classes in RGB enhancement with precision 91.08% and recall 95.97%.

Keywords— *Brain Tumor; Magnetic Resonance Imaging; CLAHE; VGG-16; Deep Learning*

.:: Paper ID: 181 ::.

Cataract Classification Based on Fundus Images Using Convolutional Neural Network

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Abstract— A cataract is a disease that attacks the eye's lens and makes it difficult to see. Cataracts can occur due to hydration of the lens (addition of fluid) or denaturation of proteins in the lens. Cataracts that are not treated properly can lead to blindness. Therefore, early detection needs to be done to provide appropriate treatment according to the level of cataracts experienced. In this study, a comparison of cataract classification based on fundus images was carried out using the Convolutional Neural Network. The dataset used comes from primary datasets with a total of 1600 datasets. The architecture used is GoogleNet, MobileNet, and ResNet. Comparison of the three architectures using Adam Optimizer with a Learning Rate of 0.001. The best results were obtained from the GoogLeNet architecture with 90% accuracy, followed by the MobiLeNet architecture at 87% and the ResNet architecture at 85%. Researchers also make comparisons with previous research. Most of the previous studies only used two to three class categories. In this study, the system was improved by increasing the class category into four categories: Normal, Immature, Mature, and Hypermature. In addition, the accuracy obtained is also quite good compared to previous studies using manual feature extraction. This research is expected to help medical personnel in detecting cataracts better. In the future, researchers want to improve the accuracy of the cataract detection system to detect and classify cataracts more accurately.

Keywords— Cataract; Convolutional Neural Network (CNN); GoogLeNet; MobileNet; ResNet.

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Application of Reverse Engineering in CFD and Ansys Software to Determine the Rate of Heat Propagation in the Briquette Drying Oven

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Abstract—This final project presents the Reverse Engineering method to reconstruct the geometry of the oven machine. To obtain the geometry, CAD modeling techniques are used for basic metrology, surface scanning, 3D digitization, and design development. Modeling is based on measurements taken directly from the oven machine and matched against incomplete original drawings. The oven machine consists of two main components, namely, the frame support tray and the tray. The importance of the Reverse Engineering method for this reconstruction is that the resulting CAD geometry can be used in a) restoration and rehabilitation for system repair, b) simulation of fluid dynamics and construction behavior using CFD and Ansys simulations, c) estimating the remaining life of the oven engine using CFD simulation and Ansys.

Keywords—Reverse Engineering, oven machine, CAD, CFD, Ansys

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Multi-Temporal Factors to Analyze Indonesian Government Policies regarding Restrictions on Community Activities during COVID-19 Pandemic

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Abstract— Concerning the implementation of the Government Policy regarding the Restriction of Community Activities (PPKM) during the COVID-19 pandemic era, there are still discrepancies in the economic sector and population mobility. This issue emerges due to irrelevant data and information in one region of Indonesia. The data differences should be carefully solved when implementing the PPKM policy. Besides, the PPKM also must pay attention to some specific factors related to the real conditions of a region, such as the data on the epidemiology of COVID-19, economic situations, and population mobility (the three are called Multi Factors). Then, based on the data, the COVID-19 has a specific spreading period and it cannot be repeated, so it is called temporal. Therefore, it is important to use the Multi-Temporal Factors approach to identify its correlation with the PPKM policy by applying Machine Learning which includes the Multiple Linear Regression model and Dynamic Factors. This research aims to analyze the characteristics and correlations of the COVID-19 pandemic data and the effectiveness of the government's policy on community activities (PPKM) based on the data quality. The results show that the accuracy of the multiple linear regression models is 84%. The Dynamic Factor shows that the five most important factors are idr_close, positive, grocery_pharm, workplace, and death. Based on the ANOVA test, all independent variables have a significant influence on the dependent one. The linear multiple regression models do not display any symptoms of heteroscedasticity. Thus, based on the data quality, the implementation of PPKM by the government has an effective impact. However, there are still dilemmas regarding the economic sectors and people's mobility.

Keywords— *COVID-19, policy, PPKM, economic conditions, people's mobility, multiple linear regression, Machine Learning*

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Small Scale Aerial Monitoring for Human Body Temperature Measurement Using Rotary Wing Drone

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Abstract— In Indonesia, the COVID-19 pandemic has had an impact on a variety of sectors. Using all available technology for disaster mitigation is critical for pandemic prevention and control. Recent studies have uncovered the advantage of Unmanned Aerial Vehicle (UAV) or drones, particularly those with rotary wings, in dealing with the pandemic. Much effort has been devoted to develop a rotary wing drone system as a flying platform for aerial monitoring. However, several factors must be considered when visually watching a specific region i.e. the size of the given area, its geographic and topographic conditions, openness of the area, built-up ratio, locations of special interest inside the area, the approach points of the area and the timeframe of the observation. A major challenge is figuring out how to create a system that can provide accurate body temperature data, which is critical for fighting the pandemic. The purpose of this paper is to present a rotary wing drone application for aerial human body temperature measurements. The paper also proposed an alternative solution based on the use of a portable, low-cost Forward-looking Infrared (FLIR) thermal imaging camera. The FLIR thermal camera is incorporated into the drone's electronic system. Furthermore, thermal image data are transmitted into the ground station via radio telemetry transceiver to allow flexibility surveillance by the operator. Studies involving indoor and outdoor tests show that the system has been successfully implemented and provide a set of data for future study. The results show that the system can be used for small-scale area aerial monitoring.

Keywords— COVID-19; Drone; FLIR; Aerial; Temperature; Monitoring; Small Scale.

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Implementation of CRNN Method for Lung Cancer Detection based on Microarray Data

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Abstract— Lung Cancer is one of the types of cancer that has the highest rate of mortality. This happens due to the delayed detection of this disease. Therefore, it is important to detect this disease early. However, microarray has the main problem, named the curse of dimensionality. This problem is related to the characteristic of microarray data, which has small simple size yet a large number of attributes. Moreover, this problem could lower the accuracy of cancer detection systems. Various machine learning and deep learning methods have been approached, to overcome the issues. This paper implemented a deep learning method named Convolutional Recurrent Neural Network (CRNN) to build the Lung Cancer detection system. CRNN is a method that uses Convolutional Neural Network (CNN) to do the feature extraction and Recurrent Neural Network (RNN) to summarize the extracted features. CNN and RNN methods is combined in CRNN to derive the advantages of each of the methods. Furthermore, some different value of drop-out is compared to determine the best drop-out value to be used in the system. Thus, the result shows that CRNN gave a higher accuracy compared with the result of CNN and RNN. The CRNN method achieved the highest accuracy of 91%, while the CNN and RNN methods achieved the highest accuracy of 83% and 71%, respectively.

Keywords— Microarray Data; Cancer; Classification; Deep Learning.

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Chatbot for Diagnosis of Pregnancy Disorders using Artificial Intelligence Markup Language (AIML)

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Abstract—Artificial Intelligence has evolved in sophistication and widespread use. This study aims to create a chatbot application in the health sector regarding early diagnosis of pregnancy disorders. Based on basic health research, only 44 percent of pregnant women know the danger signs of pregnancy. The chatbot application is used to facilitate knowledge for pregnant women about the danger signs of pregnancy, especially early diagnosis of pregnancy disorders. The chatbot application was developed with artificial intelligence technology based on Artificial Intelligence Markup Language with the concept of question answer using the Pandorabots framework. The test is carried out in two stages, functional testing and pattern matching testing. The functional testing uses the blackbox testing method and the pattern matching test on the chatbot uses the sentence similarity and bigram methods based on the similarity of user input and keywords in the bot's knowledge base. The results of the functional testing show that the chatbot application runs well with the eligibility criteria reaching 81.4% and the results of the keyword similarity test (pattern matching) are zero to one, in the sense that the value of one has the same similarity between user input and pattern. Meanwhile, the zero value has no similarities, so the bot will respond to it as free input. So it can be concluded that the bot can respond to user questions when the pattern and input have the same level of similarity.

Keywords— AIML, Artificial Intelligence, Chatbot, Diagnosis

Exploring The Extended Configuration of Digital Eco-Dynamic Influence on Small E-Business' Product Innovation

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Abstract— This study comprehensively explores the factors affecting the performance of product innovation in small e-businesses. The effects of the broader composition of digital eco-dynamics on the performance of product innovation of small businesses are little understood. This study tries to fill in the gaps and investigate the interdependencies above. This study offers the novelty of using RICH as a construct that can improve innovation performance, expanding on digital eco-dynamic that has not been developed for ten years. Confirmatory factor analysis, descriptive statistics, construct reliability, average variance extracted, and the RMSEA model of fit test was used to analyse data from 300 useable responses. The test of reliability and validity of the empirical model was evaluated through linguist reviews and statistically tested with construct reliability coefficients and confirmatory factor analysis. The findings also suggest that IT capability, dynamic capability, environmental uncertainty, and resource induce coping heuristics to positively impact product innovation performance in small e-businesses.

Keywords— Digital Eco-Dynamic; RICH; IT Capability; Dynamic Capability; SME; Innovation Performance; e-business

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Exploring The Determinants of Supply Chain Social Sustainability Disclosure for Indonesian Banking

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Abstract— Supply chain transformation that focuses on sustainability encourages companies not only for business growth but also to improve the welfare of the people along the supply chain. The company considers business decisions to reduce environmental impacts arising from the supply chain and positively impact society. The purpose of this study was to identify and analyze the factors that influence a banking sector's disclosure of a sustainability report. This quantitative research uses data processing with multiple regression analysis by using SPSS. The research object is a company engaged in the financial services sector listed on the Indonesia Stock Exchange in 2017-2019 with a purposive sampling method. This study indicates that only foreign ownership has influenced sustainability report disclosure. In contrast, the variables of profitability, leverage, board of directors, and the audit committee have no effect. The results of this study are expected to provide knowledge and contribution that the company's involvement in the social and economic environment can build a better nation and become the company's market strategy to attract investors not only in terms of income.

Keywords— sustainability; disclosure; profitability; leverage; GCG; foreign ownership

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Development Of Early Startup Companies' Valuation Model Based on An Android Mobile Application: The Angel Investor's Perspective

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Abstract— The purpose of this research is to develop a valuation model for early startup companies, based on an Android mobile application (Valuasi app). This application aims to help early startups to evaluate their companies. This research method uses the research development method. The first stage is to develop a startup valuation model by determining the criteria using the multi-criteria decision making (MCDM) method and weighting the criteria using the simple additive weighting (SAW) method. The instrument and the weight determination of the valuation model have been validated from the perspective of angel investors, practitioners, and academics. The second stage is the development of an Android based startup valuation model application. The third stage is an evaluation by the users of the application. Using the Unified Theory of Acceptance and Use of Technology (UTAUT) model, the results show that a potential user's intent to use the application is affected by the performance expectancy and social influence toward the application. The development of this valuation model is expected to help early startup companies to conduct business valuations, so they can attract investors, especially angel investors. In addition, the results showed that there was a positive response from users in using the "Start Up Valuation App" application, which was indicated by the positive and significant effect of performance expectations on usage intentions, and a positive and significant influence on social influence and behavioral intentions on usage behavior. This research shows that "Start Up Valuation App" can be used to assess start up valuation. However, further improvements are needed to support application facilities so as to increase the ease of using the "Start Up Valuation App" application.

Keywords— valuation model; early startup; angel investor; Android based application

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A Blockchain-based Halal Certificate Recording and Verification Prototype

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Abstract— Halal certification is an assurance that a product or a service has been created, processed, and delivered according to Islamic laws. After a product or service is declared as halal by the religious council, a certificate is printed by the government-appointed agency. The certificate is printed on a security paper and includes a QR code that can be used to verify the certificate online. However, there are some problems with the ongoing certificate verification process. The verification site is centralized, as it creates a single point of failure. There is also a possibility that the content of the printed certificate is being modified, which cannot be detected by the current verification system. In this paper, we propose an alternative halal certificate recording and verification system using the blockchain. The proposed system is designed to record halal certificate data, and once recorded, the data is permanently saved and ready for the verification process. A smart contract prototype is deployed on the Ethereum network to confirm the proposed system, and the performance of the contract in terms of transaction fee and time needed is analyzed. The result shows that the proposed system provides a feasible alternative to the halal certificate recording and verification process. We also provide the discussion with the advantages and further considerations of the proposed system.

Keywords— Blockchain; Smart Contract; Halal Certificate.

Decentralized Children's Immunisation Record Management System for Private Healthcare in Malaysia using IPFS and Blockchain

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Abstract— In Malaysia, private healthcare providers keep the computerised records of vaccination data including personal information, diagnostic results, and vaccine prescriptions. However, such sensitive information is commonly stored using a centralised storage paradigm which subsequently brings about the issue of maintaining user privacy. In relation to this, unauthorized access to crucial information such as identity details and ailments that a patient is suffering from, as well as the misuse of patients' data and medical reports are found to be the common threats to user's (patient) privacy. To overcome this problem, the researchers suggest leveraging IPFS (Interplanetary File System) and blockchain technology to create a decentralized children's immunization record management system. While respecting patient privacy, the proposed system also allows authorised entities, such as healthcare professionals, as well as providing easy access to medical data (e.g. doctors and nurses). The proposed decentralized system integrating IPFS, blockchain and AES cryptography to ensures consistency, integrity, and accessibility. The use of a permissioned Ethereum blockchain allows hospitals and patients within private healthcare provider to connect. To provide secure storage and selective access of records, we utilise a combination of symmetric and asymmetric key encryption. The proposed system was analyze using Wireshark to evaluate the performance of the overall system in term of integrity and accessibility while sharing the patient records.

Keywords—**.** Blockchain; immunisation; IPFS; patient privacy; decentralised system

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Prototype of Integrated National Identity Storage Security System in Indonesia using Blockchain Technology

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Abstract— There are approximately 29 institutions in Indonesia that issue identifying numbers, such as ID cards, driving licenses, BPJS, etcetera. In general, the identity storage system is designed with a centralized system and managed by each government agency. However, there are some disadvantages to this system, like data replication and redundancy, as well as an increased risk of criminal activity involving citizen identity data. Furthermore, the Indonesian government is now undertaking a program through the Ministry of Home Affairs to use population data for public services by providing access to organizations that have cooperated for population data use. With a centralized database managed by a single entity, data abuse can occur and rely on third parties, which is the sole authority of the national identity data. The blockchain-based solution described in this paper to integrate a national identity system can provide the advantages of a population data utilization program. The system designed can facilitate convenience in sharing and updating population data while also ensuring the security and integrity of the population data. The citizens do not have to worry about the possibility of data misuse by user institutions. Blockchain technology offers decentralization through the participation of members across a distributed network. There is no single point of failure, and no single user may alter the transaction record. Our proposed approach will help the government of Indonesia secure citizens' private information and increase transparency in information management.

Keywords— national identity; integration; blockchain; storage system; security.

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A Review of Digital Home-Based Medical Monitoring Application

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Abstract— Due to the pandemic of Coronavirus Disease (COVID19) that started in 2019, social distance and quarantine are now standard practices around the world. Frequent contact visits to the hospital are not recommended as we fully embrace the above management practices. However, there are people who need to regularly monitor their need for physiological life to lead a healthier life. Interestingly, in this new era of digitalization, hospital visits are no longer considered mandatory. To this end, the digital home- based medical monitoring system has been proposed to monitor the health of patients, especially patients with heart issue and receive doctor's prescriptions while at home by integrating the Apple watch via HealthKit API. In addition, doctors can use data collected remotely from patients to perform disease diagnosis. Efficiency and real-time communication are the aspects of the web-based implementation between patients and doctors. The proposed system allows patients to be monitored from a distance from home and use some of the features of the system to enjoy more comfortable life. Hence, the primary significance of this research is that patients with Apple watch can utilize the new platform by sharing their daily health symptoms to the assigned doctor. This could help patients that could not go outside of their house due to quarantine and isolation. Thus, even in these difficult times of the 2019 COVID 19 pandemic, you can achieve a healthy life and a comfortable lifestyle improvement.

Keywords— Smart healthcare; COVID-19; Remote patient monitoring; Apple watch; HealthKit API

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Digital Experience Platform Adoption in The Banking Industry

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Abstract— As time goes by, technology continues to make changes to make human life more effective and sophisticated. The rapid growth of technology and the economy is accompanied by the need for companies to be more innovative in conducting business activities. Digitalization is the main thing that must be owned by companies today. In making changes, companies must have strong guidelines and pay attention to supporting factors. This study discusses the adoption of technology based on the business needs of digital products in the banking industry that can centralize information on all related applications related to customers. In analyzing the need for change, the research uses the theory of disruptive innovation to measure how important innovation is to technology adoption. The company is guided by the Gartner Hype Cycle and the Gartner Magic Quadrant in determining what the right solution is. The Gartner Hype Cycle provides information on technology trends based on specific categories, while the Gartner Magic Quadrant provides information on market trends for solutions providers based on the hype cycle. So that a solution is obtained in the form of a Digital Experience Platform which is the answer to a company solution based on the Gartner Hype Cycle and Gartner Magic Quadrant. The Digital Experience Platform is an operating system that can provide information on all related applications centrally along with the analysis results.

Keywords— Technology Trends; Disruptive Innovation Theory; Gartner Hype Cycle; Gartner Magic Quadrant; Digital Experience Platform.

Analysis of Topics and Sentiment Based on Omni-Channel E-Commerce Reviews in Indonesia

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Abstract— The purpose of this study is to use text mining to investigate the variables influencing satisfaction of customers in omni-channel customer feedback on Tokopedia. This study used frequency and LDA (Latent Dirichlet Allocation) analysis to examine social data in response to reviewers' reactions to Tokopedia purchase reviews. Furthermore, based on the topics discussed, sentiment analysis on purchase reviews are required, as well as an analysis of each topic's characteristics in terms of positive or negative omni-channel sentiments application users. The study indicated three main topics: delivery and quality, product quality and brand reputation, reviews, and user experience. It is hoped that each distributor will implement an omni-channel system to try to compensate for the decreasing offline transaction. Indonesia is clearly in the early stages of embracing Omni-channel. Big data technology can be assertively used in the distribution system to initiate products, transactions, and customer service management policies that can provide additional customer satisfaction via Omni-channels.

Keywords— Omni-channel; LDA (Latent Dirichlet Allocation*)*; Customer Satisfaction; Frequency Analysis; TOPIC.

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GoEkopz: An E-Koperasi and Marketplace Synergy of Koperasi MSMEs Model Platform

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Abstract— With a population of 273.5 million in 2020, the people economy is very important for Indonesia. The populist economic model has existed in Indonesia for a long time, which is locally known as "Koperasi". However, Koperasi could not keep up with information and technology in the industrial 4.0 era. When other industrial models adopt information technology massively, Koperasi seems to struggle to shift from the conventional model. Slowly but sure, Koperasi become less popular, especially by Generation Z who considers information technology to be part of their daily needs and lifestyle. The scope of Koperasi's business shrinks and becomes limited, along with their business capital. On the other hand, information technology provides opportunities for small and medium-sized entrepreneurs. The data shows that this sector contributes to 60.5% of the national GDP, absorbs 96.9% of the total workforce, and provides 99.9% of total employment. Unfortunately, many Micro, Small, and Medium Enterprises (MSME) have limited capital, and they tend to prefer fintech services that offer easy accessibility than Koperasi. In this paper, we proposed E-Koperasi and Marketplace Synergy of Koperasi MSMEs Model Platform. The platform is proposed as an answer to the Government's program to digitalize Koperasi and empower MSME in the Industrial 4.0 era.

Keywords— *Koperasi*; MSME; synergy; platform; empower

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The Best Malaysian Airline Companies Visualization Through Bilingual Twitter Sentiment Analysis: A Machine Learning Classification

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Abstract— Online reviews are crucial for business growth and customer satisfaction. There is no exception for the airlines' company, which places third as the biggest contributor to Malaysia's Gross Domestic Product. Customer opinions play an important role in maintaining the reputation and improving the quality of service of the airlines. However, there is no specific platform for online review. Most online ratings obtain English, leading to inaccurate results as not all reviews regarding different languages are considered. Airlines currently have no specific platform for online reviews despite being critical for business growth, performance, and customer experience improvement. Hence, this paper proposed implementing a web-based dashboard to visualize the best Malaysian airline companies. The airline companies involved are AirAsia, Malaysia Airlines, and Malindo Air. We designed and developed the proposed study through the bilingual analysis of Twitter sentiment using the Naïve Bayes algorithm. Naïve Bayes algorithm is a machine learning approach to do classification. The tweets extracted were analyzed as metrics that advance airline companies' online presence. Testing phases have shown that the classifier successfully classified tweets' sentiment with 93% accuracy for English and 91% for Bahasa. Every feature in the web-based dashboard functions correctly and visualizes a detailed analysis of sentiment. We applied the System Usability Scale to test the study's usability and managed to get a score of 94.7%. The acceptability score 'acceptable' result concluded that the study reflects a good solution and can assist anyone in understanding the public views on airline companies in Malaysia.

Keywords— Bilingual Model; Classification; Naïve Bayes; Twitter Sentiment Analysis; Web-Based Dashboard

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Karonese Sentiment Analysis: A New Dataset and Preliminary Result

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Abstract— An active user habit in social media was to use their local or national language to express thoughts, social conditions, ideas, perspectives, or opinions. Sentiment analysis research has been widely applied to non-English languages with the aim of obtaining an overview of the broader public opinion behind a particular topic. Good quality resources are needed to provide good sentiment analysis, and the lack of these resources is especially evident in the non-English language. Providing non-English dataset for sentiment analysis becomes a critical task and becomes specialized research. Karonese language is a non-English language which is the largest local language in North Sumatra, Indonesia. The society is active in expressing on social media, so there is an abundance of Karonese text on social media. It is very potential to be implemented Karonese sentiment analysis. However, Karonese's Dataset has never been provided or researched. This paper provides Karonese Dataset for Karonese Sentiment analysis which collected from Facebook, Twitter, Instagram, and YouTube. As a significant contribution, 1047 Karonese texts and the class (positive, negative, and neutral) provides in this work. The class was annotated manually by transcriber (community figure Karo tribe). As preliminary research, the dataset was implemented in Karonese sentiment analysis using machine learning methods, that is support vector machine, k-nearest neighbor, logistic regression, and naive bayes. Several scenarios were run based on various processes of training data and test data. The SVM algorithm gives best performance with 53, 55, 50 and 53 percent for accuracy, precision, recall, and F-1 scores.

Keywords— Karonese Sentiment analysis; support vector machine; k-nearest neighbor; logistic regression, naïve bayes.

.:: Paper ID: 11 ::.

Sentiment Analysis Classification on Movie Review Using Support Vector Machine Algorithm with Chi Square Feature Selection

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Abstarct— Film is an art that combines literature, acting, music, and visual arts. In general, films can be judged in various aspects, which will make the movie be liked. For example, in the presentation of stories, visual effects, etc. Assessment in these aspects can be described in a review or opinion. Currently, public opinion is essential in making a decision, for example, in movie reviews. The process of existing information can be done by using sentiment analysis. Sentiment analysis itself is a process to classify the dataset's contents, whether it is classified as positive or negative text. This study will use the TF-IDF technique to perform feature extraction in the review, the Chi-Square technique as the feature selection method, and SVM as the classification method. There were 5529 reviews on the http://movfreak.blogspot.com/, which consisting of 2884 positive reviews and 2645 negative reviews. The test results of the scenario without using the chi-square feature selection resulted in an accuracy value of 85.71%. In comparison, using the chi-square feature selection resulted in an accuracy value of 86.13%. The chi-square feature selection results get a higher accuracy value with a difference of 0.42% because it can choose features optimally. So it can be concluded that this result is good because there are differences in the accuracy values generated and higher using the Support Vector Machine by applying the Chi-Square feature selection.

Keywords— Classification; Sentiment Analysis; Movie Review; TF-IDF; Support Vector Machine; Chi Square.

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Omnichannel Question Classification Using the Support Vector Machine Method

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Abstract— Classification is very important functionally in answering questions in information retrieval systems, including NLP systems. You have to understand what the problem is. Classification of questions helps in finding or compiling answers correctly, thereby improving the quality of the answer system. After the question is asked, the question classification focuses on finding the right type of answer for the developed question. Classification of questions plays an important role in the question answering system. This cannot support finding or compiling the main answers of the answers, because it can increase the quality of the correct answers. The commonly used question classification methods are: rule-based, machine learning and matching. After successfully getting the model, then we create a website that contains a chatbox so that we can fill in the questions we ask to find out the classification of the questions The support vector machine algorithm or what we know as SVM is good at classifying problems related to omnichannel. TF-IDF helps the algorithm to weigh the occurrence of words or what we know as tokens that are used as features in the selected document. Multi-channel personal results, product availability, product comparisons, product specifications, and money, sales/promotions, and shipping. These results indicate a decent average of 0.98. Accuracy achieved is 98%. In the future, related research can use more questions, from various platforms and using Android devices to make it easier for users to access them on any Android.

Keywords— Data Mining; Classification; SVM*;* Omnichannel

.:: Paper ID: 59 ::.

Implementation of Data Mining Algorithm for Nowcasting Modeling of Total Domestic Traveler in Bali Using Indonesian Statistics and Google Trends Data

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Abstract— Indonesia is a country with the wealthiest natural resources, which is the tourism sector. As many have known, one of the favourite tourist destinations is the Bali Island. Tourism become the sector that contribute greatly to the Indonesian economy. In addition, the tourism sector also provides various jobs that can reduce the unemployment rate in Indonesia. Data is one of the things that can be used by business owners especially in the field of tourism as a consideration in every decision-making. Currently, data related to the number of tourist visits can be seen through the Central Statistics Agency (BPS) Bali Province website. But the data that is shown on the website is not real time because there is a data processing phase by the relevant agencies so that there is a lagging time between provided data and the realization. Nowcasting technique can be used to get a number of tourist visits based on Google Trend index indicators by using keywords related to Bali. The data used has a time span from 2017 to 2020, this data can be used to support the Nowcasting technique. From the processing results obtained the evaluation measure R2 where the linear regression and lasso Regression algorithm has a higher value when compared to ridge regression. Based on the results of the evaluation using data testing in 2020 obtained R2 Score value for linear regression and lasso regression is 0.88 and for Ridge Regression is 0.87. Based on MAPE Score evaluation the linear regression and lasso regression have 0.31 and the ridge regression have 0.35 as a score. That's mean these algorithm have reasonable forecasting.

Keywords— nowcasting; data mining; regression; algorithm; traveler.

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Early Disease Detection can Save Plant: Investigation of RGB to HSI conversion methods for early plant disease detection using Hierarchical Synthesis Convolutional Neural Networks

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Abstract— An early detection of disease can save plant. One of the ways is by using eye-observation that is really time consuming. Having a machine learning technology that can automate the early detection would be beneficial for the modern and as well as conventional farming. This study emphasizes the review of Hyperspectral Image (HSI) reconstruction by using the Hierarchical Synthesis Convolutional Neural Networks (HSCNN) based method in early plant disease detection. The ability of capturing hundreds spectral bands during image acquisition enables the HSI capturing devices to provide more detail information. Detection of disease with Red Green Blue (RGB) images need to be done when it shows a notable spot or sign. However, the disease can be spotted with the correct range of spectral bands on HSI before a notable spot or sign is shown. The usage of HSI image is significantly important as it is rich in information and properties needed for image detection. Although HSI device is significantly important in early plant disease detection, the devices are expensive and requires specialized hardware and expertise. Thus, the need to reconstruct the Reg Green Blue (RGB) image to HSI is required. Two types of HSCNN-based methods which are Densed network (HSCNN-D) and Rectified Linear Unit network (HSCNN-R), were implemented in this research for HSI reconstructions. The results show that HSCNN-D outperformed the HSCNN-R with less Mean Relative Absolute Error (MRAE) of 2.15%.

Keywords— Plant disease detection; Hierarchical Synthesis Convolutional Neural Networks; Machine learning, Flexible Rectified Linear Unit Network; Deep Learning

.:: Paper ID: 180 ::.

The Use of Image Processing and Sensor in Tomato Sorting Machine by Color, Size, and Weight

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Abstract— Tomato is a popular vegetable in Indonesia, where its production increases every year according to the market demand. The large production requires proper post-harvest handling both in quality and time. It has been well-known that sorting and grading are the first and foremost processes in the post-harvest process of tomatoes. Sorting tomatoes can be conducted by color, adjusted to the target marketing. The automation process in the post-sorting and grading process can save time and resources. This research proposes a sorting system that sorts tomatoes based on color, size, and weight. Tomatoes are sorted by red, yellow and green. The detection of color and size was carried out by image processing. At the same time, the measurement of weight was measured by a weight sensor. This system was implemented into a prototype sorting system with a conveyor, with the final part being a storage box used to accommodate tomatoes based on grading. This implementation has maximum results for detecting color and measuring weight. However, it still needs development for dimensional measurements.

Keywords— Tomatoes sorting; color detection; size measuring; load cell; image processing

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Design of Audio-based Accident and Crime Detection and its Optimalization

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Abstract— The development of transportation technology is increasing every day, this has an impact on the number of transportation and its users, this increase has a positive impact to the growth of the economy but also has a negative impact such as accidents and crime on the highway. In 2018, the number of accidents in Indonesia reached 109,215 cases with a death rate of 29,472 people, which mostly caused by the late treatment for the casualties. On the other hand, in the same year, there were 8,423 mugs and 90,757 snitches cases in Indonesia with only 23.99% cases were reported, this low reporting rate mostly caused by the lack of awareness and knowledge about where to report. Therefore, a quick response surveillance system is needed. In this study, an audio-based accident and crime detection system were built using a neural network. To improve the system robustness, we enhance our dataset by mixing it with certain noises which likely to occur in the road. The system was tested with several parameters of segment duration, bandpass filter cut-off frequency, feature extraction, architecture and threshold values to obtain optimal accuracy and performance. Based on the test, the best accuracy was obtained by convolutional neural network architecture using 200ms segment duration, 0.5 overlap ratio, 100Hz and 12000Hz as bandpass cut-off frequency, and a threshold value of 0.9. By using mentioned parameters our system gives 93.337% accuracy. In the future, we hope we could implement this system to the real environment.

Keywords— audio recognition; dataset manipulation; optimalization; neural networks; surveillance system

.:: Paper ID: 46 ::.

Modified LeNet-5 Architecture to classify high variety of Tourism Object. Case Study: Tourism Object for Education in Tinalah Village

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Abstract— This research aims to modify a CNN (Convolutional Neural Network) based on LeNet-5 to reduce overfitting in object detection of a Tinalah Tourism Village dataset. Tinalah Tourism Village has many objects that can be identified for tourism education and enhanced tourist experience. Whilst these objects, spread across the different sites of Tinalah do vary, some share similarities in their histogram patterns. Visually, if the size of a picture is reduced in the LeNet-5 'preferred size' feature, it will inevitably lose some of its information, making pictures become too similar, reducing its accuracy. In order to learn and classify objects, this research performs a modification on LeNet-5 architecture to provide a better performance geared toward larger input imaging. In the previous state-of-the-art architecture, the performance showed an overfitting performance where the training accuracy perform too much better than testing accuracy in our dataset. Additionally, we brought in a dropout layer to reduce overfitting, increase the size of dense layer and added a convolution layer. We then compared the modified LeNet-5 with other state-of-the art architecture, such as LeNet-5 and AlexNet. Results showed that a modified LeNet-5 outperformed other architectures, especially in performing accuracy for testing the Tinalah dataset, reaching 0.913 or (91,3 %). This research discusses further the dataset, the modified LeNet-5 architecture, and performance comparison between state-of-the-art CNN architecture. For further research, our CNN architecture can be developed by involving a transfer learning mechanism to provide greater accuracy.

Keywords— CNN; LeNet-5; Image Classification; Digital Tourism.

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A Multi-Agent Simulation Evacuation Model using The Social Force Model: A Large Room Simulation Study

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Abstract— Over the last few decades, research on evacuation simulation has gained substantial attention. Natural or man-made calamities that resulted in mortality also prompted the establishment of several evacuation studies. Numerous studies indicate a simulation evacuation using the Social Force Model (SFM) and a guiding person or leader, but without utilising the multi-agent architecture. This paper will explore the multi-agent architecture for crowd steering that we propose. The architecture will make use of the Social Force Model to ascertain how evacuees would move locally. After that, the model is simulated in NetLogo to see if the architecture is capable of modelling the evacuation scenario. To compare the original SFM to the message-passing model, we perform a simulation experiment. The outcome indicates the suggested architecture's ability to simulate pedestrian evacuation.

Keywords—Social force model; crowd evacuation simulation; NetLogo; microscopic simulation; crowd steering; agent steering

.:: Paper ID: 146 ::.

Avoiding Overfitting dan Overlapping in Handling Class Imbalanced Using Hybrid Approach with Smoothed Bootstrap Resampling and Feature Selection

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Abstract— The dataset tends to have the possibility to experience imbalance as indicated by the presence of a class with a much larger number (majority) compared to other classes(minority). This condition results in the possibility of failing to obtain a minority class even though the accuracy obtained is high. In handling class imbalance, the problems of diversity and classifier performance must be considered. Related to this, the Hybrid Approach method that combines the sampling method and classifier ensembles will give satisfactory results. The Hybrid Approach generally uses the oversampling method which is prone to overfitting problems. The overfitting condition is indicated by high accuracy in the training data but the testing data can show differences in accuracy. Therefore, in this study the oversampling method used in the Hybrid Approach is Smoothed Bootstrap Resampling which can prevent overfitting. However, in fact it is not only the class imbalance that contributes to the decline in classifier performance. There are also overlapping issues that need to be considered. The approach that can be used to overcome overlapping is Feature Selection. Feature selection can reduce overlap by minimizing the overlap degree. This research will combine the application of Feature Selection with Hybrid Approach Redefinition which modifies the use of Smoothed Bootstrap Resampling in handling class imbalance in medical datasets. The preprocessing stage in the proposed method will be carried out using Smoothed Bootstrap Resampling and Feature Selection. The Feature Selection method used is Feature Assessment by Sliding Thresholds (FAST). While the processing is done using Random Under Sampling and SMOTE. The overlapping measurement parameters use Augmented R-Value and Classifier Performance uses the Balanced Error Rate, Precision, Recall, and F-Value parameters. The Balanced Error Rate states the combined error of the majority and minority classes in the 10-Fold Validation test which gives each subset an opportunity to become training data. The results showed that the proposed method provides the better performance when compared to the comparison method.

Keywords— Class Imbalance; Overfitting; Hybrid Approach Redefinition; Overlapping; Feature Selection

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An Assessment Algorithm For Indoor Evacuation Model

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Abstract— The public buildings increased significantly with the economy's growth and the population's advancement. The complexity of indoor layout and involvement of many people cause the indoor evacuation wayfinding to the nearest exit more challenging during emergencies such as fire. In order to overcome the problem, each building is compulsory to follow the standard evacuation preparedness required by Uniform Building By-Law (UBBL). Researchers have also developed evacuation models to help evacuees evacuate safely during the evacuation from a building. However, building owners do not know which evacuation model is suitable for implementing in the chosen high-rise building. Two problems were identified in choosing a suitable evacuation model during the decision-making process. First, many developed evacuation models focus on studying different features of evacuation behavior and evacuation time. Second, the validation and comparison of the evacuation model is the missing process before applying the suitable evacuation model. Both validation and comparison procedures were made independently without any standard assessment that encapsulates the critical incident features during the indoor evacuation and virtual spatial elements. Therefore, this research proposed an indoor evacuation assessment algorithm to solve the problem. The assessment algorithm refers to the elements developed in our previous study. We determined attributes, executed simulations, and evaluated the cluster performance using the developed framework. The outcome can help the building owners assess and choose which suitable existing evacuation model is the best to implement at the chosen building.

Keywords— Assessment Algorithm; Evacuation Model; Indoor Evacuation; Integrated Assessment Model; Microscopic

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Evaluating Web Scraping Performance Using XPath, CSS Selector, Regular Expression And HTML DOM With Multiprocessing Technical Applications

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Abstract— Data collection has become a necessity today, especially since there are many sources of data on the internet that can be used for various needs. The process of retrieving data from the internet is also known as web scraping. There are various methods of web scraping that are commonly used. The amount of data scattered on the internet will be quite time consuming if the web scraping is done on a large scale. The multiprocessing approach, by applying the parallel concept can help complete a job. The purpose of this study was to determine the performance of the web scraping method with the application of multiprocessing. Testing is done by doing the process of scraping data from a predetermined target web. Four web scraping methods: CSS Selector, HTML DOM, Regex and XPath were selected to be used in the experiment measured based on the parameters of CPU usage, memory usage, execution time and badwidth usage. Based on experimental data, Regex method has the least CPU and memory usage compared to other methods. While XPath requires the least time compared to other methods. In terms of bandwidth usage, the CSS Selector method is the smallest compared to other methods. The application of multiprocessing techniques can save memory usage, reduce execution time and reduce bandwidth usage.

Keywords— Multiprocessing; Scraping; Web

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Developing Fire Evacuation Simulation Through Emotion-based BDI Methodology

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Abstract— Fire evacuation simulation is a tool to study human behaviour in dealing with fire. It has been used for safety policy management studies, building safety analysis and human safety understanding. To date, modelling the fire evacuation behaviour is paying much attention in which works have been done to design and develop building model, fire model, human decision model and human emotion decision model. As fire evacuation simulation is important, the BDI methodology is introduced by authors to ease modelling and simulation of human behaviour in a fire evacuation. Continue the success of capturing and modelling the human behaviour in fire evacuation, this paper presents the influence of human emotion in fire evacuation simulation. In this paper, the emotion-based BDI methodology is presented with a walkthrough example of how emotion can influence the human decision in a fire spreading scenario. The OCEAN model of personality is used to handle the emotional properties in the methodology. Different people have different types of personalities, which can affect both decision making and emotion in different situations. A fire evacuation simulation is developed by using the Unity3D game engine. The simulation is created based on the emotion-based BDI methodology presented. Hence, the emotion-based BDI methodology can be used to model human behaviour and emotional states in a fire evacuation. Overall, the paper introduces a new insight on how to model human behaviour in fire evacuation decision making in a systematic manner.

Keywords—Emotion-based BDI; Emotion Modelling; Unity3D; Fire evacuation simulation.

.:: Paper ID: 36 ::.

Data Visualization in Response to The Coronavirus: Socioeconomic Impact, Policy Response, and Opportunity

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Abstract— The COVID-19 outbreak has had a very significant impact on several sectors in various countries. One of the areas that have been quite affected by this outbreak is the Southeast Asia region. This study aims to analyze the development of COVID-19 cases in Southeast Asia and discuss some of the impacts in the socio-economic, health, and education fields. The methodology used in this research is narrative analysis. This research was conducted from March 2020 to early June 2020. This study discusses trend analysis for three months, socio-economic impacts, and policy responses in countries in Southeast Asia. This study shows that the number of COVID-19 cases in Southeast Asia is increasing every month. Countries that showed a relatively high rate of increase were Indonesia and Singapore from March to May. Although the COVID-19 outbreak has had several detrimental impacts, its existence can also be a valuable lesson for the community.

Keywords— *Data Visualization*; *Socio-economic impact; health; COVID-19 outbreak*

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Students Demography Clustering Based on The ICFL Program Using K-Means Algorithm

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Abstract— Independent Campus, Freedom to Learn (ICFL) Program is one of the manifestations of student-centered learning. This program can help students reach their full potential by allowing them to pursue their passions and talents. This research is based on survey responses from students who have participated in the ICFL program. The information will be preprocessed before being utilized and evaluated. To help produce better outcomes in data clustering, the K-Means clustering approach is used, which is processed using the Python computer language. The data is clustered using the K-Means clustering approach based on gender characteristics, Grade Point Average (GPA), university entrance selection, ICFL category, and year or semester when participating in ICFL. This study resulted in three clusters with each of its criteria. The dominant gender is found in cluster 2 (100% female) and cluster 3 (100% male). Software Development was the most popular ICFL category among students in cluster 1, accounting for 67%, while Design and Analysis Information Systems was the most popular in clusters 2 and 3. The most dominant ICFL program is found in three clusters. ICFL - Internship program in which at least 40% of participants come from each cluster.

Keywords— ICFL; independent campus freedom to learn; clustering; heigher education; k-means

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Comparison of Apache SparkSQL and Oracle Performance (Case Study of Data Cleansing Process)

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Abstract— Dataset with good quality are a valuable asset for a company. The data can be processed into information to help companies improve decision-making. However, the data will increase more and more over time so that the quality of data can decrease. Thus, good data management is important to keep data quality in meet company standards. One of the efforts that can be done is conducting data cleansing to clean data from errors, inaccuracies, duplication, format discrepancies, etc. Apache Spark is an engine that can be used to analyze large amounts of data. Oracle Database is a database management system used to manage databases. Both have their own reliability and can be used to analyze SQL-shaped data. In this study, Spark and Oracle performance will be compared based on query processing time. Both will be tested on queries used to perform data cleansing of millions rows dataset. The research focuses to find out the performance of Spark and Oracle through quantitative analysis. The results of this study showed that there were differences in query processing times on both tools. Apache Spark is rated better because it has a relatively faster query processing time than Oracle Database. It can be concluded that Oracle is more reliable in terms of storing complex data models than in conducting analysis of large data. For future research, it is suggested to add another comparison aspects such as memory usage and CPU usage. Other than that, researcher can consider using query optimization technique to enrich query experiment.

Keywords— Spark; Oracle; cleansing; processing time; comparison.

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Text Summarization on Verdicts of Industrial Relations Disputes Using the Cross Latent Semantic Analysis and Long Short-Term Memory

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***Abstract*—** The information presented in the documents regarding industrial relations disputes constitutes four types of legal disputes. However, too much information leads to difficulty for readers to find essential points highlighted in industrial relations dispute documents. This research aims to offer a summary of automated documents of court decisions over industrial relations disputes with permanent legal force. This research involved 35 documents of court decisions obtained from Indonesia's official Supreme Court website and employed an extractive summarization approach to summarize the documents by utilizing Cross Latent Semantic Analysis (CLSA) and Long Short-Term Memory (LSTM) methods. The two methods are compared to obtain the best results CLSA was employed to analyze the connection between phrases, requiring the ordering of related words before they were converted into a complete summary. Then, the use of LSTM is combined with the Attention module to decoder and encoder the information entered so that it becomes a form that can be understood by the system and provides a variety of splitting of documents to be trained and tested to see the highest performance that can be generated by the system. The research has found out that the CLSA method gave the precision of 79.1%, recall score of 39.7%, and ROUGE-1 score of 50.9% and the use of LSTM was able to improve the performance of the CLSA method with the results obtained 93.6%, recall score of 94.5 %, and ROUGE-1 score of 93.9% on the variation of splitting 95% training and 5% testing.

***Keywords*—** extractive summarization; cross latent semantic analysis; long short-term memory; legal document

Solar Powered Vibration Propagation Analysis System using nRF24l01 based WSN and FRBR

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Abstract— Prevention of the effects caused by natural disasters such as earthquakes and landslides requires analysis of vibration propagation. In outdoor applications, internet sources such as wifi are not always available, so it requires alternative data communications such as nRF24l01. The system also requires a portable power source such as solar power. This research aims to develop a vibration propagation analysis system based on the nRF24l01 wireless sensor network and solar power by implementing the fuzzy rule-based regression (FRBR) algorithm. The system consists of two piezoelectric and nrf24l01 vibration sensors. The system also uses a third node equipped with temperature and soil moisture sensors, air temperature and humidity, and light intensity as environmental variables. The evaluation results show the Quality of Services (QoS) results with a throughput of 99.564%, PDR 99.675%, and a delay of 0.0073s. The Fuzzy Association Rule (FAR) extraction results yield nine rules with average support of 0.319 and confidence of 1 for vibration propagation. The availability of solar power was evaluated with an average current value of 0.250A and a voltage of 3.266V. The results of FRBR are based on the propagation of the vibration that propagated and produced a mean square error (MSE) of 0.141 and a mean absolute error (MAE) of 0.165. The correlation matrix and FAR results show that only soil moisture has a major effect on the magnitude and duration of propagation. However, other variables can regress soil moisture with MSE 0.232 and MAE 0.287.

Keywords— Internet of Things; Fuzzy Association Rule Mining; Wireless Sensor Networks

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Tree-based Filtering in Pulse-Line Intersection Method Outputs for An Outlier-tolerant Data Processing

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***Abstract*—** Pulse palpation is one of the non-invasive patient observations that identify patient conditions based on the shape of the human pulse. The observations have been practiced by Traditional Chinese Medicine (TCM) practitioners since thousands of years ago. The practitioners measure the patient's arterial pulses in three points of both patient wrists called chun, guan, and chy, then make a diagnosis based on their knowledge and experience. Pulse-Line Intersection (PLI) method extract features of each pulse from the observed pulse wave sequence. PLI is performed by summing the number of intersections between the artificial line and the pulse wave. The method is proven in differentiating between hesitant with moderate pulse waves. As the method implemented in Clinical Decision Support System (CDSS) related to pulse palpation, some outlier data might emerge and affect the measurement result. Thus, outlier filtering is needed to prevent unnecessary prediction processes by machine learning (ML) models inside CDSS. This study proposed an outlier filtering model using a decision tree algorithm. This concept is designed by analyzing pulse features values and the chance of odd values combination, then inappropriate values are excepted using several rules. Every pulse feature list that did not pass the filtering rule is categorized as outliers and will not be included for further process. The proposed model works more efficiently than ML models dealing with outliers since this procedure is unsupervised learning with a small number of parameters. Overall, the proposed filtering method can be used in pulse measurement applications by eliminating outlier data that might decrease the performance of ML models.

***Keywords*—** Pulse Palpation; Outlier Filtering; Decision Tree; CDSS.

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Application of Gray Scale Matrix Technique for Identification of Lombok Songket Patterns Based on Backpropagation Learning

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Abstract— Songket is a woven fabric created by prying the threads and adding more weft to create an embossed decorative pattern on a cotton or silk thread woven background. While songket from many places share similar motifs, when examined closely, the motifs of songket from various regions differ, one of which is in the Province of West Nusa Tenggara, namely Lombok Island. To assist the public in recognizing the many varieties of Lombok songket motifs, the researchers used digital image processing technology, including pattern recognition, to distinguish the distinctive patterns of Lombok songket. The Gray Level Co-occurrence Matrix (GLCM) technique and Backpropagation Neural Networks are used to build a pattern identification system to analyze the Lombok songket theme. Before beginning the feature extraction process, the RGB color image has converted to grayscale (grayscale), which is resized. Simultaneously, a Backpropagation Neural Network is employed to classify Lombok songket theme variations. This study used songket motif photos consisting of a sample of 15 songket motifs with the same color theme that was captured eight times, four of which were used as training data and kept in the database. Four additional photos were utilized as test data or data from sources other than the database. When the system's ability to recognize the pattern of Lombok songket motifs is tested, the maximum average recognition percentage at a 0° angle is 88.33 percent. In comparison, the lowest average recognition percentage at a 90° angle is 68.33 percent.

Keywords— Songket, pattern recognition; Gray Level Co-Occurrence Matrix (GLCM); neural network Backpropagation.

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A Conversion of Signal to Image Method for Two Dimension Convolutional Neural Networks Implementation in Power Quality Disturbances Identification

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Abstract— An otorhinolaryngologists (ORL) or general practitioner generally diagnoses ear disease based on ear image information. However, general practitioners refer patients to ORL for chronic ear disease because the image of ear disease has high complexity, variety, and little difference between diseases. An artificial intelligence-based approach is needed to make it easier for doctors to diagnose ear diseases based on ear image information, such as the Convolutional Neural Network (CNN). This paper describes how CNN was designed to generate CNN models used to classify ear diseases. The model was developed using an ear image dataset from the practice of an ORL at the University of Mataram Teaching Hospital. This work aims to find out the best CNN model for classifying ear diseases applicable to android mobile devices. Furthermore, the best CNN model is deployed for an Android-based application integrated with the Endoscope Ear Cleaning Tool Kit for registering patient ear images. The experimental results show 83% accuracy, 86% precision, 86% recall, and 4ms inference time. The application produces a System Usability Scale of 76.88% for testing, which shows it is easy to use. This achievement shows that the model can be developed and integrated into an ENT expert system.

Keywords— Artificial intelligence; Convolutional Neural Network; ear disease; image classification; Android

Outage Probability Analysis by Implementing RIS to Cooperative NOMA Network on Channel with Ip-CSI condition

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Abstract— Current wireless technology is primarily aimed at boosting radio signal transmission in the context of creating 5G to 6G technology. Reconfigurable Intelligent Surface (RIS), Large Intelligent Surface (LIS), or Intelligent Reflective Surface (IRS) is a novel technology that uses electromagnetically controlled surfaces to integrate into current infrastructure. Because RIS passively reflects messages rather than amplification mechanisms like relays, RIS-assisted communication is more energy efficient than traditional delivery approaches. We will examine coverage performance, which is often expressed in terms of outage probability, if RIS is implemented on a radio access system using the Non-Orthogonal Multiple Access (NOMA) technique used in 5G network scheme, taking into account the condition of the Imperfect Channel State Information (ip-CSI) via Rayleigh fading channel, in this study. Because of channel estimate errors, perfect channel state information (p-CSI) conditions are difficult to achieve in realistic wireless systems.

Keywords— Wireless technology; Reconfigurable Intelligent Surface (RIS); Non-Orthogonal Multiple Access (NOMA); Imperfect Channel State Information (ip-CSI).

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Analyzing Coverage Probability of Reconfigurable Intelligence Surface-aided NOMA

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Abstract— This research aims to offer a down link cooperative non-orthogonal multiple access (NOMA) network employing theReconfigurable Intelligence Surface (RIS)-Aided with decodeand-forward relay. RIS is processed with a limited number of objects utilizing Rayleigh's fading channels. The scenario is created by users relaying without a direct link for users who are near from base station and with a direct link for users who are far away from base station. As major success metrics, we carefully create mathematical expressions of the chance of loss for different consumers as a function of perfect-channel statistical information (p-CSI) simply using a single input single-output (SISO) system with a finite number of RIS's elements under Nakagami-*m* fadin channels. The efficiency of the proposed RIS-assisted NOMA transmission mechanisms is evaluated through numerical data.

Keywords— Non-orthogonal multiple access (NOMA), outage probability (OP), p-CSI.

Solar Powered Vibration Propagation Analysis System using nRF24l01 based WSN and FRBR

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Abstract— Prevention of the effects caused by natural disasters such as earthquakes and landslides requires analysis of vibration propagation. In outdoor applications, internet sources such as wifi are not always available, so it requires alternative data communications such as nRF24l01. The system also requires a portable power source such as solar power. This research aims to develop a vibration propagation analysis system based on the nRF24l01 wireless sensor network and solar power by implementing the fuzzy rule-based regression (FRBR) algorithm. The system consists of two piezoelectric and nrf24l01 vibration sensors. The system also uses a third node equipped with temperature and soil moisture sensors, air temperature and humidity, and light intensity as environmental variables. The evaluation results show the Quality of Services (QoS) results with a throughput of 99.564%, PDR 99.675%, and a delay of 0.0073s. The Fuzzy Association Rule (FAR) extraction results yield nine rules with average support of 0.319 and confidence of 1 for vibration propagation. The availability of solar power was evaluated with an average current value of 0.250A and a voltage of 3.266V. The results of FRBR are based on the propagation of the vibration that propagated and produced a mean square error (MSE) of 0.141 and a mean absolute error (MAE) of 0.165. The correlation matrix and FAR results show that only soil moisture has a major effect on the magnitude and duration of propagation. However, other variables can regress soil moisture with MSE 0.232 and MAE 0.287.

Keywords— Internet of Things; Fuzzy Association Rule Mining; Wireless Sensor Networks

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SD-Honeypot Integration for Mitigating DDoS Attack Using Machine Learning Approaches

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Abstract— Distributed Denial of Services (DDoS) is still considered as the main availability problem in computer network. The development of programmable Intrusion Prevention System (IPS) application in Software Defined Network (SDN) may solve the specified problem. However, the deployment of centralized logic control can create a single point of failure on the network. This paper proposed an integration of Honeypot Sensor (Suricata) on SDN environment namely SD-Honeypot network for resolving the DDoS attack using machine learning approach. The application employed several algorithms (Support Vector Machine (SVM), Multilayer Perceptron (MLP), Gaussian Naive Bayes (GNB), K-Nearest Neighbours (KNN), Classification and Regression Trees (CART), and Random Forest (RF)) and comparatively analysed. The dataset used during the emulation utilized the extracted Internet Control Message Protocol (ICMP) flood data from the Suricata sensor. In order to measure the effectiveness of detection and mitigation modules, several variables were examined namely, accuracy, precision, recall, and the promptness of flow mitigation installation process. The flow rule modification message for blocking the attack was transmitted by the Honeypot server using the Representational State Transfer Application Programming Interface (REST API). The experiment results showed the effectiveness of CART algorithm for detecting and resolving the intrusion. Despite the accuracy score pointed at 69-70%, the algorithm could deploy the mitigation flow promptly within 31-49ms compared to the SVM which produced 93-94% in accuracy but the flow installation required 112-305ms. The developed module using CART can be considered a solution to prevent the attack effectively based on the analysed variable.

Keywords— DDoS; Intrusion Prevention System; Machine Learning; SD-Honeypot; Suricata

Public Protection and Disaster Relief Planning Using Terrestrial Trunked Radio in West Java

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Abstract— The purpose of this research is to implement Public Protection and Disaster Relief (PPDR) planning using Terrestrial Trunked Radio (TETRA) in the West Java area. This plan will work at frequencies 806-821 MHz and 851-866 MHz (bandwidth of 15 MHz). PPDR planning study using TETRA in West Java with a total area of 37,315 Km2. This TETRA planning study uses the simulation method. Simulation using ATOLL software using parameters used by the West Java Regional Police (Polda) because it follows the conditions of the province of West Java. This plan does three things, firstly plans the coverage area to determine the number of base stations by looking for the link power budget and MAPL, followed by finding the cell radius value, secondly planning the network capacity to be used by following the assumptions and predictions of the TETRA mobile station (ms), and the third is planning the frequency spectrum. The three methods are tested and validated using Atoll software simulation. The planning results for the West Java region required 58 sites (base station). The required channels are 94 channels, while from 15 MHz, TETRA digital radio trunking bandwidth provides 600 channels so that TETRA digital trunking radio can be implemented in West Java. In the future, this TETRA radio trunking plan can be implemented in other provinces in Indonesia and can even be expanded to all regions in Indonesia to handle disasters.

Keywords— PPDR; GRN; Frequency; TETRA.

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Security Awareness Strategy for Phishing Email Scams: A Case Study One of a Company in Singapore

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Abstract— Social Engineering and phishing procedures are a few of the procedures and issues that regularly happen of late, basically, through advanced media such as e-mail, an official communication instrument companies utilize. Phishing emails are as a rule related to Social Designing and can be submitted through joins and connections in these emails, both of which are unsafe. Proliferation can be hacked into personal/confidential data or indeed total control over computer/Email without the client knowing. A few thinks about have appeared that assaults of this sort are expanding and influencing populaces increasingly. The investigation portrayed in this article points to survey phishing anticipation measures. This thinks about employments the writing survey strategy and a recommendation that could be made to expect assaults such as preparing for representatives or mindfulness as early and as regularly as conceivable

Keywords— Social Engineering; Awareness; Problems; Control; Email Phishing; Prevention.

Gray Level Differences Matrix (GLDM) for Alcoholic EEG Signal Classification

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Abstract— The Electroencephalogram signal can describe brain activity and display information about abnormalities that occur in one's brain. Brain disorders can be in the form of diseases or brain damage. Brain damage can be due to trauma or the use of certain chemicals or medications such as alcohol. Based on literature studies, several methods have been developed to identify alcoholic EEG through event-related potential (ERP) testing. However, EEGs measured using ERP typically use a large number of channels. This research proposes the feature extraction method for alcoholic EEG signal classification based on texture analysis. In this paper, the performance for classification of the Alcoholic EEG system is described using the conversion of a 64-channel EEG signal into a grayscale image. Feature extraction was done using GLDM at a distance of d = 1. In this study, the process of analyzing images was done directly without prior image processing. This caused the converted image to have low contrast The highest accuracy reached 73.3% using five features of grey-level difference matrix (GLDM) and linear discriminant analysis as a classifier. Even though the resulting accuracy was still lower than the previous method, there was still an opportunity for increased accuracy by the use of image processing.

Keywords— Alcoholic, Classification Method, EEG, Gray-Level Difference Matrix.

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Defense in Depth Strategy from Phising Attacks in Using Instagram

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Abstract— Social engineering attack is a dangerous threat to information technology security. Social engineering attack is a technique that utilizes human physiology. So that this attack method will be targeted through social media which has a lot of users. One of them is Instagram, one of the social engineering methods that is often used to attack information technology security is to use the phishing method. Phishing activity is similar to fishing, attackers use bait to lure victims to share their personal information. This activity is usually carried out by sending a fake website address to the victim so that the victim has unknowingly shared their personal information through the fake site. Objective To analyze how Instagram is abused and turned into an attack platform, to obtain sensitive information that can be used to profile attacks against individuals. The research methodology consists of two stages. The first stage includes searching the relevant literature on social engineering and social engineering techniques. Another phase is to analyze the selected literature to identify social engineering. It contributes to the field of research by summarizing how social engineering attacks occur as well as increasing the overall level of awareness of social media users. Phishing attack using Instagram helps attackers steal sensitive personal information from unknown users. Using fake websites is one of the most frequently used techniques to carry out large-scale data retrieval attacks. Cyber criminals use Instagram as the main target for social engineering attacks by phishing methods, due to the number of users and its high popularity.

Keywords— Social Engineering Attack; Phishing; Instagram; Social Network; Data Privacy; Fake Situs; Attack on Personal Data.

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Entropy Based Method for Malicious File Detection

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Abstract— The threat from ransomware continues to grow both in the number of affected victims as well as the cost incurred by the people and organisations impacted in a successful attack. In the majority of cases, once a victim has been attacked there remain only two courses of action open to them; either pay the ransom or lose their data. One common behaviour shared between all crypto ransomware strains is that at some point during their execution they will attempt to encrypt the users' files. This paper demonstrates a technique that can identify when these encrypted files are being generated and is independent of the strain of the ransomware. Previous research has highlighted the difficulty in differentiating between compressed and encrypted files using Shannon entropy as both file types exhibit similar values. One of the experiments described in this study shows a unique characteristic for the Shannon entropy of encrypted file header fragments. This characteristic was used to differentiate between encrypted files and other high entropy files such as archives. The Shannon entropy of encrypted file header fragments has a unique characteristic in one of the tests discussed in this study. This property was used to distinguish encrypted files from other files with high entropy, such as archives. To overcome this drawback, this study proposed an approach for test case generation by enhancement of entropy based testing threat tree model, which would improve malicious file identification. The file identification was enhanced through combining three entropy algorithms and the test case is generated based on threat tree model. This approach was then evaluated using accuracy measurement which are True Positive, True Negative, False Positive, False Negative. Promising result are expected. This method solves the challenge of leveraging file entropy to distinguish compressed and archived files from ransomware-encrypted files in a timely manner.

Keywords— Entropy, Malicious, Ransomware

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The Reliability Analysis for Information Security Metrics in Academic Environment

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Abstract— Today, academic institution involves digital data to support the educational process. It has advantages, especially related to ease of access and process. However, the security problems appear related to the data. There were several information security incidents in academics environment. In order to mitigate the problem, the metrics identification is required to determine risk of incidents. There are many risks model and metrics to estimate the risk, but the specific metrics are required to obtain appropriate risk value. Therefore, this study has objective to define metrics for academic institution. The proposed metrics are obtained from the FERPA regulation. It consists of directory information, educational information, personally identifiable information, and risk of information leakage. In order to achieve the objective, this study involves survey and reliability analysis to result output. The Cronbach's alpha and Test-retest are method to determine the reliability in this study. According to reliability analysis, the Cronbach's alpha method results coefficients for the metrics between 0.730-0.911, while the Test-retest method results coefficients between 0.630-0.797. These coefficients have reliable category, so the proposed metrics are adequate to be used for determining risk of information security incidents in academic environment.

Keywords— information security; risk metrics; reliability analysis; cronbach's alpha; test-retest

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Identification of Mirai Botnet in IoT Environment Through Denial of Service Attacks for Early Warning System

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Abstract—The development of computing technology in increasing the accessibility and agility of daily activities currently uses the Internet of Things (IoT). The increasing number of users of IoT devices from time to time impacts increasing access and delivery of valuable data. This is the primary goal of cybercriminals to operate malicious software. One of the most dangerous cyberattacks in the IoT environment is the Mirai botnet malware. The malware turns the user's device into a botnet to carry out Distributed Denial of Service (DDoS) attacks. Therefore, this study proposes a k-nearest neighbor algorithm to classify the Mirai malware type DDOS attacks on the IoT device environment. The malware classification process is carried out using rapid miner machine learning by conducting four experiments using SYN, ACK, UDP, and UDPlain types of attacks. The classification results selected five parameters with the highest activity when the device was attacked. So that these five parameters become a reference in the event of a malware attack starting in the IoT environment, the results of the classification in the future can be used as a reference in making an early warning system as an early warning in the event of a Mirai botnet attack.

Keywords— Classification; DDOS; Internet of Things; K-Nearest Neighbor; Mirai Botnet

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Implementation of Wireless Sensor Network: A Review

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Abstract— There has been a surge in interest in wireless sensor networks in recent years (WSN). They are extensively utilized in a variety of applications, including border surveillance, underwater sensor networks, and monitoring of natural occurrences. The goal of this research is to analyze and explain some of the issues that occur in Wireless Sensor Network research situations, as well as the technology involved in the problem area. The goal of this research is to analyze and explain some of the issues that occur in Wireless Sensor Network research settings, as well as the technology involved in the problem area. This study was carried out by cross-referencing several papers and journal articles on the Wireless Sensor Network as Monitoring System. This study discovered that using WSN in monitoring systems not only provides various advantages, but also introduces new constraints. We categorize those restrictions in this research as Energy, Management, Design, Security, and Others. As a consequence, more researchers are encouraged to pursue solutions. Despite the fact that some of the contraindications we uncovered are not new, and that some of the treatments are currently accessible, some studies do not incorporate the solution as a standard in their design.

Keywords—Wireless Sensor Network; Monitoring System; Constraint

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Design of A Secured Electronic Voting System by Using Cross-Hash Validation Mechanism

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Abstract—One of the most critical aspects of the Electronic Voting (E-Voting) system is its confidentiality. A sound E-Voting system should be able to keep voters' votes secret. It means that the E-Voting system could not allow any person to analyze the vote of any specific voter. In this paper, we design a secure E-Voting system that systematically encrypts voters' ballots in the database that makes any person, including the E-Voting admin, unable to interpret the votes recorded in the database. We develop a cross-hash validation approach as our basis. In our approach, the votes from two different voters, even both voters who vote for the same candidate, will be recorded in two different values. We combine a voxter's data with their vote, adding extra parameters and keys, then hashing it with some specific algorithm. We also use timestamp information for our hashing parameter. By doing so, any voter will never have the same hashing output value. This approach makes recorded votes data unique and impossible to be decoded. We developed a cross-validation algorithm to count the election results to interpret the votes data because the hashed vote value cannot be decrypted to its original value. With this approach, the system can only retrieve the summary of E-Voting without analyzing the vote from any specific voter. Our method has been tested in a real-case scenario. We test our approach on the election of the Engineering Faculty Senate of the University of Mataram. In the experiment, we conclude that our system is practically secure and can be developed for a larger scale of E-Voting.

Keywords - Confidentiality system design; cross-hash validation; electronic voting; unique vote record; vote data security.

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Parallel Session 8 : Machine Learning

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Implementing Random Forest Algorithm In GEE: Separation And Transferability On Built-Up Area In Central Java, Indonesia

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Abstract— Measuring the status of achievement of the SDGs is the task and concern of many countries in the world, including Indonesia. Indicators for achieving the SDGs enclose three main pillars, namely environmental, economic, and social. The updated land use/land cover information is needed for environmental pillars. One imperative land cover information is built-up land, which acts as a detector for expanding urban areas and measuring SDGs' target indicators. Indonesia's cultural diversity affects the distribution pattern of built-up land, especially settlements. This is a challenge in the up-to-date and rapid mapping of built-up land. The purpose of this research is to analyze the ability and the transferability of the Random Forest model for built-up areas and settlements using Google Earth Engine (GEE) in Banyumas, Cilacap, and Tegal. Around 19 predictors from multi-sources satellites are integrated to identify four land cover classes. Discussion on predictor composition to improve model accuracy also carried on. The results showed that the algorithm separated four land cover classes, with the highest accuracy for separating water bodies and other classes (vegetation and open land), OA above 90%. Machine confusion regarding the separation between housing classes and other buildings was still found (F1 score 0.67 - 0.69). Applying the model to the other two areas resulted in a similar statistical trend to the trained model. However, the classification method developed in this paper can assist in the rapid description of land cover if up-to-date data from official sources are not available.

Keywords— Random Forest; Machine learning; Google Earth Engine (GEE); Settlement; Sentinel; Land Use/Land Cover (LULC).

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Implementation of Support Vector Regression for Polkadot Cryptocurrency Price Prediction

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Abstract— Cryptocurrency investment is an investment instrument that has high risk but also has a greater advantage than other investment instruments. To make a big profit, investors need to analyze cryptocurrency investments to predict the price of the cryptocurrency to be purchased. The highly volatile movement of cryptocurrency prices makes it difficult for investors to predict those prices. Data mining is the process of extracting large amounts of information from data by collecting, using data, the history of data relationship patterns, and relationships in large data sets. Support Vector Regression has the advantage of doing accurate cryptocurrency price predictions and can overcome the problem of overfitting by itself. Polkadot is one of the cryptocurrencies that are often used as investment instruments in the world of cryptocurrencies. Polkadot cryptocurrency price prediction analysis using the Support Vector Regression algorithm has a good predictive accuracy value, including for Polkadot daily closing price data, namely with a radial basis function (RBF) kernel with cost parameters C = 1000 and gamma = 0.001 obtained model accuracy of 90.00% and MAPE of 5.28 while for linear kernels with parameters C = 10 obtained an accuracy of 87.68% with a MAPE value of 6.10. It can be concluded that through parameter tuning, the model formed has an accuracy value and the best MAPE is to use a radial kernel basis function (RBF) with cost parameters C = 1000 and gamma = 0.001. The results show that the Support Vector Regression method is quite good if used for the prediction of Polkadot cryptocurrencies.

Keywords— Prediction; Cryptocurrency; Support Vector Regression; Time Series.

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Long-lived Learning Classification Model with Naïve Bayes Classifier in the Medical Dataset

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Abstract— The Classification model with the Naïve Bayes method can learn from the patient's medical record data. This is used probabilistic calculations to classify the data. It's a popular method and it's often used for classification. Naive Bayes works on both binary classification and multiclass classification. Classification in medicine has its obstacles. Patient medical data from a hospital does not necessarily have the same number of features as other hospitals. Its causes the classification results from patient medical data not necessarily to be applied to the classification of patient medical data from different hospitals even in the same disease. The classification results are not long-lived because they are only used on one dataset. The research challenge is how the classification results on training data can be long-lived learning so that it can be applied to the same case with different datasets. The dataset used in the initial classification is the Source Domain which will be applied to another dataset with the same case as the Target Domain. The number of features in the target domain can be more or less than the source domain used for classification. This study proposes a classification learning model using the Naive Bayes method based on Transfer Learning which accommodates the transfer learning process from the source domain to the target domain which is less or more in number. The proposed model is long-lived learning because it can apply classification results from Source Domain to other datasets in the same case.

Keywords— Classification; Naïve Bayes; Transfer Learning

.:: Paper ID: 98 ::.

Automatic Summarization of Court Decision Documents over Narcotic Cases Using BERT

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Abstract— Reviewing court decision documents for references in handling similar cases can be time-consuming. Departing from this perspective, we need a system that can allow the summarization of court decision documents to enable adequate information extraction. This study used BERT specific to IndoBERT to translate court decision documents over narcotic cases. The court decision document dataset was divided into two types, court decision documents with the identity of the defendant and court decision documents without the defendant's identity. The results have found out that IndoBERT pre-trained model had a better performance in summarizing court decision documents with or without defendant's identity with a 40% summarizing ratio, and the average ROUGE score obtained accounted for the highest ROUGE score among the other ratios and document types.

Keywords— court decision documents; BERT; document summarization; extractive summarization

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Text Summarization on Verdicts of Industrial Relations Disputes Using the Cross Latent Semantic Analysis and Long Short-Term Memory

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Abstract— The information presented in the documents regarding industrial relations disputes constitutes four types of legal disputes. However, too much information leads to difficulty for readers to find essential points highlighted in industrial relations dispute documents. This research aims to offer a summary of automated documents of court decisions over industrial relations disputes with permanent legal force. This research involved 35 documents of court decisions obtained from Indonesia's official Supreme Court website and employed an extractive summarization approach to summarize the documents by utilizing Cross Latent Semantic Analysis (CLSA) and Long Short-Term Memory (LSTM) methods. The two methods are compared to obtain the best results CLSA was employed to analyze the connection between phrases, requiring the ordering of related words before they were converted into a complete summary. Then, the use of LSTM is combined with the Attention module to decoder and encoder the information entered so that it becomes a form that can be understood by the system and provides a variety of splitting of documents to be trained and tested to see the highest performance that can be generated by the system. The research has found out that the CLSA method gave the precision of 79.1%, recall score of 39.7%, and ROUGE-1 score of 50.9% and the use of LSTM was able to improve the performance of the CLSA method with the results obtained 93.6%, recall score of 94.5 %, and ROUGE-1 score of 93.9% on the variation of splitting 95% training and 5% testing.

Keywords—extractive summarization; cross latent semantic analysis; long short-term memory; verdicts of industrial relations disputes

.:: Paper ID: 107 ::.

Predictive Maintenance in Oil and Gas Industry by using Naive Bayes and Gaussian Elimination Method

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***Abstract*—** Predictive Maintenance is the most common discussed topic in industry standard nowadays. Predictive Maintenance is built based on machine learning algorithm and data analysis to predict the necessary of maintenance to be carried out on a system. The main goal and objective of this paper is to develop an algorithm that can perform better than the existing available algorithm. In this research paper, researcher is aiming to improve the overall performance of predictive maintenance result by using Naives Bayes Classifier and Gaussian Distribution method. Researcher also carried out data pre-processing to improve the overall performance of the algorithm model. The pre-processing method include data filtering by carrying out zero elimination to remove noises and empty data which will create an unnecessary outlier. This will help the algorithm to perform better as there will be less extreme value when visualizing the data. To remove delta between each algorithm run, parallel execution is carried out, this is to ensure that all the testing is executed in same exact condition. Once data pre-processing is done, the data only will be classified using Naives Bayes classifier to filter based on two categories which is failing and passing run. Once filtered, the data will be used with Gaussian Elimination Method to produce a normal distribution graph. This is used to determine the percentage of a run to reach failure on a system and researcher is able to determine the necessity of maintenance to be carried out.

***Keywords*—** Naives Bayes Classifier; Gaussian Distribution; Oil and Gas; Predictive Maintenance; Maintenance

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Cluster Analysis of Japanese Whiskey Product Review Using K-Means Clustering

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Abstract— Since 2008, the Japanese liquor business has had a steady growth in revenue. Overall, it is expected that the liquor market (at factory price) would reach $2.95 billion in 2019, accounting for 8.6 percent of the entire alcoholic beverage industry. The rise in popularity of Japanese liquor is associated with the country's growing international reputation. Founded in 1985 as an independent bottler, Master of Malt was the first company to service clients who made orders for single malt liquor through the mail-order system. Master of Malt's omnichannel approach encompasses all channels that are available to the company. Known as their 'omnichannel,' this refers to the organization's capability to provide speed and precision from any place at any time. As their brand has grown over the years, they have used a variety of marketing strategies, including a website redesign and rebuild that involved the creation of all relevant content, in addition to the design and construction of landing pages for their website. Following a clustering technique, we discovered that the data is being divided into four distinct groups and that these clusters may serve as a recommender system based on the occurrence of terms in each of the categories. Our summarizing component worked by combining phrases that were related to the exact subtopics together and provided users with a succinct summary as well as sentiment information about the group of phrases.

Keywords— K-Means Clustering; Japanese Whiskey; Omnichannel

.:: Paper ID: 112 ::.

Arabic Character Recognition using CNN LeNet-5

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Abstract— The human handwriting pattern is one of the research areas of pattern recognition; it is very complex. Therefore, the research in this field has become quite popular. Moreover, human handwriting pattern recognition is needed for several things, one of them is character recognition. Recognition of Arabic handwriting is complex because everyone has different characteristics in writing and Arabic characters have quite abstract shapes and patterns. From previous research, Convolutional Neural Network (CNN), which is a deep learning-based algorithm, has a fairly high accuracy value when used for public datasets such as AHDB as well as private datasets. In this study, private datasets are used which have a fairly high level of complexity because the respondents who are appointed to write Arabic letters come from different age categories. The CNN architecture used in this research is the architecture developed by Yan LeCun known as LeNet-5. The local dataset used was 8400 images, with details of 6720 for training data (each letter has 240 images) and 1680 for testing data (each letter has 60 images). The total respondents who wrote Arabic script were 30 people, and each person wrote each letter ten times. The accuracy obtained is 81% higher than previous studies. The next research is to try several other CNN architectures to improve the accuracy of the classification results. In addition to accuracy, in this study it will also be calculated misclassification rate, root mean square error, and mean absolute error.

Keywords— Arabic; handwriting; pattern; deep learning; convolutional neural network

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Wireless Sensor Network Based Monitoring System: Implementation, Constraints, and Solution

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Abstract— Wireless Sensor Network (WSN) is a collection of sensors that communicate with each other at close range by forming a wireless-based network (wireless). Since 2015 research related to the use of WSN in various fields of health, agriculture, security industry and other fields has continued to grow. One interesting research case is the use of WSN for the monitoring process by collecting data using sensors that are placed and distributed in locations based on a wireless system. Sensors with low power, multifunction, supported by a combination of wireless network, microcontroller, memory, operating system, radio communication and energy source in the form of an integrated battery enable a monitoring process of the monitoring area to run properly. The implementation of the wireless sensor network includes 5 main parts, namely sender, receiver, wireless transmission media, data/information, network architecture/configuration, and network management. Network management itself includes: network configuration management, network performance management, network failure management, network security management, and network financing management. The main obstacles in the process of implementing a wireless sensor network include 3 things, namely: an effective and efficient data sending/receiving process, limited and easily depleted sensor energy/power, network security and data security that is vulnerable to eavesdropping and destruction. This paper presents a taxonomy related to the constraints in implementing Wireless Sensor Networks. This paper also presents solutions from existing studies related to the constrains to implementing the WSN. Furthermore, from the results of the taxonomy mapping of these constraints, new gaps were identified related to the development of existing research to produce better solutions.

Keywords— Wireless Sensor Network; Taxonomy; Configuration; Energy; Network Security; Optimization.

.:: Paper ID: 89 ::.

A Prototype of IoT- Based Infusion Monitoring and Notification Using Antares

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Abstract— Infusion monitoring is one of the activities carried out by nurses for inpatients at the hospital. The infusion monitoring system has been done manually by visiting each patient. However, this is not efficient in terms of energy and time. In this study, a monitoring and notification system was created that can inform the level of infusion fluid and the drip rate of infusion fluid to help nurses calculate the amount of fluid that has been flowed. The monitoring system for the level of infusion fluids is made using an ultrasonic sensor, while the infusion drip rate uses an optocoupler sensor. The monitoring application is made using a platform Antares which displays the infusion fluid level and the drip rate in each room. The device's system uses a sound buzzer as a notification. Notification on the web is displayed in the form of color changes and alert. The test results show that there is an error of 1,48% for level measurement and 2.61% for infusion drip-rate. The monitoring function in the application works well, which can display the measured value as sent by each device attached to the infusion. Likewise, buzzer and alert on application sound according to the specified threshold.

Keywords— Infusion liquid level; Infusion drip rate; Monitoring; Notification; IoT

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Sustainable Supplier Selection and Order Allocation: A Systematic Literature Review

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Abstract. Sustainable supplier selection and order allocation are important in carrying out an optimal procurement activity. Several methods have been proposed to address the problem of sustainable supplier selection. This systematic literature review's objective is to provide descriptive analysis of existing research and specify the most frequently applied methods in the context of sustainable supplier selection and order allocation. Using Denyer and Tranfield's five-step process method, the systematic literature review was conducted, including formulating the research question, locating studies, selecting and evaluating literature, analyzing the information and data, and the last is reporting and using the results. Following a preliminary search, 877 publications were published in the recent decade (2012-2021) including 311 papers on SSS and 566 on SSOA. In total, 53 papers were studied after a preliminary search by considered peer-reviewed academic journal, assessed titles, abstracts, and keywords, and skimmed introduction, study methods, and conclusions to identify valid articles. A prior study in SSS and SSOA problems found that 39% of tested approaches are hybrid MCDM-mathematical programming, which include TOPSIS, AHP, and BWM as the most frequently applied methods, also 39% of tested approach are mathematical programming. However, the approaches in SSSOA problem were also specified. We found that 65% papers were used hybrid MCDM-mathematical programming.

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Performance Experiment of An Ethereum Blockchain-based Degree Certificate Verification within IPTM-DLT Infrastructure

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Abstract— One of the major challenges faced by the university is to provide real-time verification of their student's degree certification upon requested by other parties such as employers or other universities. Conventional verification systems are typically time-consuming, costly, bureaucratic and struggle against certain classes of credential fraud. In addition, forgery of graduation degree certificate has become more efficient due to the presence of easy-to-use scanning, editing and printing technologies. Therefore, this research proposed an Ethereum blockchain-based degree certificate verification system for Universiti Tun Hussein Onn Malaysia (UTHM). The system is developed within Institusi Pendidikan Tinggi Malaysia Distributed Ledger Technology (IPTM-DLT) infrastructure. IPTM Database Tool is used to create, delete, insert or update UTHM graduate's degree certificate while IPTM Certificate Generator Tool is used to upload the degree certificate to IPTM Private Blockchain Nodes. All certificates are tagged with QR code, hence third-party can check the validity of these certificates by scanning the QR code. The proposed system promises to provide immutability, publicly verifiable and anti-counterfeited degree certificate.

Keywords— Blockchain; smart contract; ethereum; decentralized application; certificate verification.

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RULA-based Work Posture Evaluation for Indonesian Workers: A Comparison between Office and Manufacturing

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Abstract. The high number of use Indonesian workers for manufacturing and office will impact safety and health issues in the future. Human body posture in the work become one of factor influence that because in daily life human spends more time doing work with more than 1/3 portion. Using bad posture for a long duration will impact human performance in the work. Moreover, some musculoskeletal disorders (MSDs) problems are affected by improper working posture. Using the physiological approach evaluation for the posture will give information about the risk for workers with their current posture of work. RULA analysis was collected from 103 posture evaluations of office and manufacturing workers. The regression and analysis of variance were done to evaluate the significant impact of the human upper body segment for the RULA evaluation score. Comparing the office and manufacturing conditions of work will give information about the risk for Indonesian workers and their status. The result shows that manufacturing workers has a higher risk than office worker with 6 and 4 scores respectively. There is also a similar result for the office and the manufacturing worker for the body segment effect which mentions that trunk, neck, upper arm, lower arm, and neck had a significant effect.

.:: Paper ID: 179 ::.

Review on Information-Centric Networking for Internet of Things

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Abstract— Information-Centric Networking (ICN) is a new paradigm that considers the future of the Internet and emerging architectures, such as the Internet of Things. Due to the significant research efforts taking place around the world, there are still many challenges and open problems associated with ICN use. This study is to discover the problems and challenges in the use of ICN for IoT and its advantages by examining the existing literature on the use of ICN for IoT. By reviewing several related research articles published in the 2017-2020 period from several publishers, the sample size for the last 3 (three) years is expected to have shown the updates of the data taken from the research article. A new idea that will emerge from this discussion is ICN's use to be viewed in terms of challenges and advantages. The results obtained from this study can be used as reference material for ICN use for IoT in the future.

Keywords— ICN; IoT; protocol; Literature review; Information-Centric Networking.

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Android-based System Monitoring of Supporting Variables for Nursery-Plant Growth in Plantation Areas

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Abstract— In cultivating timber trees, farmers must pay attention to the seed selection with superior heredity, hormones, and the condition of plantation area that supports the growth of nursery plants properly. Several factors that support the growth of nursery plants are nutritional factors, sunlight, temperature, soil pH, water, and soil moisture. In terms of effectiveness and ease of access to have information in monitoring the supporting condition factors and facilitating the farmers, an Android-based monitoring system was built to monitor the growth of nursery plants. The system consists of several sensors such as a soil pH sensor, UV light sensor, and soil moisture sensor embedded with Raspberry pi and firebase. The proposed system was examined on a plantation area of 900 square meters. The testing is conducted by placing the combination of 4 to 8 sensors in the plantation area. Data from each sensor is processed by calculating the average, and the results are rounded to the nearest value. The test stated that to monitor an area of 900 square meters, the area with five sensors implanted can be used as the optimal implementation. Apart from economic reasons, the minor rounding error equals 8.25% compared to the number of other sensors. The results that are informed to the farmers are also within the appropriate range. There are no significant differences, and this approach can be used as a basis for the implementation in a broader area.

Keywords— nursery plant; android-based; supporting variables; nutrients; sensors; plantation area.

Simultaneous Hydroponic Nutrient Control Automation System Based on Internet of Things

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Abstract— Hydroponic is one of the solutions of gardening methods using water as a nutrition medium. Usually, maintaining hydroponic plant quality and water nutrients are done manually and require humans effort, such as the degree of acidity or wetness (pH), TDS (Total Dissolved Solids), and nutrient temperature. With the Internet of Things technology, we can automate hydroponic control by measuring the TDS, pH, and temperature values of nutrients and controlling water nutrition by pump nutrition needs for hydroponic plants. This research uses the NFT (Nutrient Film Technique) for the hydroponic system and uses lettuce as the nutrition parameter. The lettuce parameters are pH, TDS, and Water Temperature equal to the sensor we used in the proposed IoT system. The condition will have 27 classifications, and we use this classification as a reference in decision-making, using the K-Nearest Neighbor (KNN) algorithm to activate the actuator. To achieve ideal nutritional conditions, we improve the simultaneous actuator from previous research with specified intervals and duration. The other improvement is we collect more data and more testing times. The accuracy was 91.2%, with k = 3. From the evaluation results, the accuracy of KNN is quite high and has an advantage, which has better accuracy than the other algorithms and can activate actuator simultaneously. We conclude that the hydroponic nutrient automation system using the Internet of Things method is ready for real planting use with this improvement.

Keywords— Hydroponic; Internet of Things; K-Nearest Neighbor

Development of IoT Control System Prototype for Flood Prevention in Bandung Area

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Abstract— Underwater Visible light communication (UVLC) is a network communication wirelessly where information is transmitted bymeans of light through waves visible, in this case the light source comes from a light emitting diode (LED) as a transmitter for underwater. VLC has several advantages over radio frequency technology such as safer communication because light propagation can't penetrate the wall so it's difficult to do hacking, easy to get license, relatively build cost cheap and no side effects on health. But VLC has several limitations, one of which is the narrow bandwidth modulation. VLC undergoes a distribution of modulated bandwidth to allocate against each user. This bandwidth sharing has an impact on reduced system capacity. In this study, non-orthogonal multiple access (NOMA) was applied to increase system capacity. In this research, analyzing the performance the two best power allocation methods in water medium, including gain ratio power allocation (GRPA) and static power allocation (SPA). In the results obtained in the NOMA-UVLC system power allocation value GRPA is more stable than SPA power allocation. Then by applying residue in the successive interference cancellation (SIC) process will result in a decrease in system capacity when compared to no residue in the SIC process. In this study, it was found that the GRPA power allocation is more stable in capacity performance compared to the application of SPA power allocation. Average capacity increase of 48.5% in GRPA power allocation.

Keywords— Underwater Visible Light Communication; NOMA, GRPA; SPA; Successive Interference Cancellation.

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Smartphone-based Indoor Navigation for Guidance in Finding Location Buildings with WiFi-RSSI: A case study at the Politeknik Negeri Semarang

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Abstract— This study investigates a WiFi-based indoor navigation system to determine building locations. The system was developed using the fingerprint method from the Received Signal Strength Indication (RSSI) of each Access Point (AP). The main components of a smartphone-based system use data from WiFi and the Global Positioning System (GPS). The system developed for navigation is designed and implemented as an element of a dynamic seamless mobility planning and building location route guidance application. Building map data is collected from GoogleMap data enhanced by coloring the geographic location of buildings displayed on mobile devices. Navigational aids collected from sensors provide trip orientation and position updates. To measure the accuracy of the position displayed, the approach of measuring the distance between known positions is used compared to those displayed in the application with the haversine formula. A series of experiments were conducted in the Politeknik Negeri Semarang area, Indonesia. The experiment results showed that the WiFi-based indoor positioning system was accurate within 7.050 meters of the error for that location, thus proving the system's usefulness for determining the location of buildings in the campus area. The measurement has not adopted the maximum APs placement for signal coverage and strength, only using the existing APs positions. Neither the temperature and humidity were measured in each area where the AP was installed, which will be discussed later. This system can help visitors without having to ask even though they have only visited once.

Keywords— Navigation; RSSI; Positioning; Smartphone; Wireless technologies

.:: Paper ID: 184 ::.

Data Clustering for Identification of Building Conditions Using Hybrid Multivaritae Multinominal Distribution Soft Set (MMDS) Method

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Abstract--- Identification of building conditions for user safety is an urgent matter, especially in earthquake-prone areas. Clustering buildings according to their conditions in the categories of danger, vulnerable, normal, and safe is important information for residents and the government so that they can take further action. This study introduces a new method, namely hybrid multivariate multinomial distribution with the softest (MMDS) in working on the process of clustering building conditions into the most appropriate category and comparable to the condition data presented in the building data set. Research using the MMDS method is very important to do to map the condition of existing buildings in an area supported by available data sets. The results of the measurements carried out can provide information related to the building index and will be clustered based on the index value of the condition of the building. The dataset used in this study is data on school buildings in the West Java region. There are 286 school building data with 4 condition parameters, namely foundation, concrete reinforcement, easel pole and roof. From existing data and defined condition parameters, buildings can be classified accurately and in proportion to the facts on the ground. This study also carried out a classification comparison using the proposed method, MMDS, with the baseline method, namely Fuzzy Centroid Clustering (FCC) and Fuzzy k-means Clustering (FKC). The results show that the proposed method is superior to the baseline method with a faster processing time.

Keywords— Clustering; Soft Set; Multivariate Multinomial Distribution.

VaccineLand: Interactive Digital Board Game to Educate Public about Vaccines

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Abstract— The invention of the COVID-19 vaccines has resulted in various viewpoints and reactions from the public. The vaccines are guaranteed to be safe and clinically proven to enhance the human antibodies in preventing the virus from spreading. However, disseminating facts and truth about vaccines to the public is somehow challenging due to many factors, including vaccine hesitancy and scepticism. Besides, some individuals are still concerned about vaccines' adverse effects and safety. Plus, the presence of various misleading online discussions promoted by anti-vaccine activists that spread false information about vaccines has worsened the situation. Therefore, in this paper, we proposed a digital board game, the VaccineLand, that provides information about vaccines in terms of their history, reasons for taking them, and the adverse effects to the public. Thus, VaccineLand is established based on the Game-Based Learning (GBL) model by its goal, which is to provide the public with facts and knowledge about the vaccines in an interactive way. GBL is known as a type of gameplay with specific learning outcomes. Interactive GBL corresponds to the use of educational game applications for learning. This study investigates a usability evaluation consisting of four variables (usefulness, ease of use, ease of learning and satisfaction) involving a total of 40 respondents. The finding indicates the usability of this game was highly acceptable. We believe that VaccineLand can be a helpful tool to educate the public about vaccines.

Keywords— Interactive game; Game-based learning; vaccines; usability evaluation

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Student Engagement Mechanisms of Online Learning: The Effect of Service Quality of Learning Management System

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Abstract— Engagement is a significant concern in distance learning because students are inactively involved in discussions and collaborative and interactive learning, which are missing in traditional classes. Therefore, this study aimed to examine how the information, system, and service qualities improve students engagement and satisfaction in online learning in higher education. The data was collected using an online survey from 206 undergraduate students learning online. Structural Equation Modeling Partial Least Square was used to test the model. The model was tested with the application of SmartPLS program. The results showed a positive and significant effect between service quality and student engagements, both direct and indirect. These results are expected to help to improve online learning in higher education settings, specifically on students engagement and satisfaction, leading to perseverance and success.

Keywords— online learning; LMS; student; engagement; satisfaction; quality

.:: Paper ID: 38 ::.

A Cloud-Based Learning Management System for Senior High Schools

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Abstract— Before the COVID-19 pandemic happened, many schools on the senior high school education level have not implemented e-learning, which includes the use of a learning management system. Since the pandemic, the way people interact with other people has changed, with the popularity of online learning have increased. Since there are so many studies about the e-learning system implementation, e-library, online learning methodologies, IoT implementation, data analytics, machine learning, and AI Implementation; this paper was made to overcome the lack of IT infrastructure in schools, and to combine all of the technologies implemented on previous research. As a survey was conducted to 650 senior high school students in Indonesia, most students are using the video conferencing feature class schedule, assignment submission, the e-book reader, and to retrieve information from the school on the e-learning systems. Since the students have more enthusiast to use the system even after the pandemic, the authors proposed the new cloud-based LMS architecture that includes the figure that represents the cloud LMS architecture, use case diagram that represents the stakeholder of each module, domain model class diagram that represents the data structure of the app, and the mobile UI design that focuses to the features that students are mainly using. As the proposed model did not include the development process, the system should be developed to gain enthusiasm from schools, teachers, and students so that they can use the LMS on a daily basis.

Keywords— E-Learning; Learning Management Systems; System Design

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Analysis of Resilience of Education System in Higher Education Due to Covid-19 Pandemic in Indonesia, a Systematic Literature Review

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Abstract-- This study discusses learning strategies resilience that can be used to improve learning outcomes, during the current pandemic circumstances, which have limitations in face-to-face learning. Online learning has many limitations compared to offline one but must keep running because one of the strategies against the SAR-Cov2 virus is to inhibit its spread by limiting direct contact with other people. The literature review is carried out with a certain protocol, involving text mining tools to find out the most widely used keywords and their relationships, which is then carried out by a snowball literature review to deepen these keywords. There are several findings from this study, namely (1) There are 3 important components that play a very important role in improving learning outcomes in the distance learning method, namely the role of students, lectures, and technology. (2) There must be a framework that ensures the other three components perform their functions properly ore provides an effective learning environment. (3) Reward and punishment play an important role to ensure the framework is implemented as it should be. The integration of an effective learning environment with remuneration programs and teaching grants will be able to encourage improvements in the learning process as well as to increase the number of positive contents on the Internet. This learning environment can also be a model that supports independent learning activities - independent campus, the Ministry of Education and Culture of the Republic of Indonesia's flagship program as well as digital commercialization in the educational sphere.

Keywords-- online learning, technology; effective learning environment; framework; learning outcomes; roles; reward and punishment; resilience.

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The Implementation of EgameFlow Model in Educational Game to Increase Vaccine Knowledge

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Abstract— Vaccination should be taken as a prevention from the diseases spreading uncontrollably. Vaccines act by weakening and training our immune system to create antibodies. Number of unvaccinated children has risen due to the parents who rejected the vaccines for their children because of their disbelief in vaccination. This attitude may lead to the resurgence of vaccine-preventable diseases. However, there are also individuals who have contributed to vaccine refusal due to many factors including misinformation about vaccines, religious beliefs, and lack of knowledge. Therefore, this paper presents an implementation of the EgameFlow Model in educational games to increase the vaccine knowledge. The EGameFlow model is one of the adjustment models derived from the GameFlow model. It is created to measure enjoyment of educational games. The model has been chosen because it focuses on the educational game environment, which actively addresses learning components in the game. There are eight criteria to be considered to evaluate the enjoyment using this model, which are concentration, clear goals, feedback, challenge, control, immersion, player skills and social interaction. Eight of these criterias excluding social interaction are applied in game design to improve the user's experience while playing. The EgameFlow Model was adopted to measure the player's level of enjoyment while playing a knowledge game. Based on the evaluation done by 30 people who responded to the questionnaire provided, The overall average of the evaluation is at agreeable level which scores 81% which considered the goal were achieved. This paper also discusses the previous research on the vaccine hesitancy in East Malaysia (Sabah) and understanding Enjoyment in ARTé: Mecenas (educational tool to learn art history) with EGameFlow. For future game development enhancements, the game can be created in a 3D environment to provide deep immersion and autonomy to the player.

Keywords— EgameFlow Model; educational game; enjoyment evaluation; vaccination in Malaysia

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Factor Affecting Intention to Use E-Learning

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Abstract— The purpose of this study was to determine factors affecting intention to use E-Learning. The research method was carried out quantitatively with a survey using a questionnaire which was then distributed to all provinces in Indonesia with most of the samples having places of education located in the province of DKI Jakarta, West Java, and followed by the province of Banten. Researchers establish a theoretical background using Unified Theory of Acceptance and Use of Technology (UTAUT2) in addition to performance: Social Influence (SI), Hedonic Motivation (HM), Habit (HB), Facilitating Condition (FC), Perceived Risk (PR), variables that may affect Intention to Use E-Learning (IUE). The hypothesis in this study tested with Convergent Validity, Discriminant Validity, and Coefficient Path using SmartPLS application. And as the result it was found that Hedonic Motivation (HM), Habit (HB), and, Facilitating Condition (FC), and Perceived Risk (PR) have a significant effect on students' intent to use E-Learning. There are several impacts, one of which is to identify and discuss what factors can influence students' perception for using E-Learning. From this paper, researchers can discuss which factors affecting intention students to use E-Learning. Furthermore, researchers can find out and give view and consideration for other researchers for their research. Researchers also can share thoughts that can change and influence the perception of another researcher. Social Influence (SI) has no significant effect on Intention to Use E-Learning (IUE).

Keywords— E-Learning; intention to use; UTAUT2

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Constructive Alignment by Implementing Design Thinking Approach in Artificial Intelligence Course: Thematic and Learner's Sentiment Analysis

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Abstract— Constructive alignment is a student-centered teaching principle to support students in developing as much meaning and learning in achieving the intended learning outcomes. The 21st-century learning skills have been introduced to prepare learners for the mental processes required to adapt better in the modern working environment. This idea is rapidly implemented as part of the intended learning outcome in the educational curriculum globally. Artificial Intelligence (AI) is currently one of the high-demand courses to realize the Fourth Industrial Revolution (4IR), which requires re-aligning the syllabus with these 21st-century learning skills specifically in critical thinking and creative skill. Nevertheless, the learners from our previous AI course only performed moderately in projects and assignments reflecting just average problem solving and creative skills. Thus, this study proposed to implement Design Thinking as a systematic problem-solving approach to strengthen the learner's problem-solving skills in the AI course. Our course learning outcomes have been re-aligned and mapped with 21st-century learning skills and Design Thinking systematic phases to produce the improved learning design. As a result, we report the most positive opinion from our learners towards the Design Thinking approach in their AI project execution using thematic and sentiment analysis.

Keywords— constructive alignment; 21st century learning skills; Artificial Intelligence course; design thinking; sentiment analysis.

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3D Scanner using Infrared for Small Object

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Abstract— The study applied an a three-dimensional (3D) scanner using infrared and a motor to move upward the infrared to get Z- ordinate. The motor for rotating objects to get the (X, Y) ordinates. The purpose was to build a prototype of a 3D scanner scanning small objects. The maximum distance of the object from infrared was 20cm. The study applied the infrared to scan an object and visualise the result. The model uses infrared to measure the object's distance, collect the result for each object's height, and visualise it in the graphic user interface. In this research, we tested the scanner with the distance between object and infrared were 7 cm, 10 cm, 15 cm, and 20 cm. The best result was 80% accurate, with the distance between object and infrared was 10cm.

Keywords— 3D scanner; small object; distance measurement; infrared

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How to Deeply Analyze the Content of Online Newspapers Using Clustering and Correlation

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***Abstract*—** The increase in the number of visitors is one of the keys to increasing income for online newspapers, whether to increase the number of ads, Google AdSense, or customer trust. Therefore, finding which news categories increase the number of visitors needs to be analyzed more deeply. Because it is very common to add content to online newspaper sites, this pattern analysis is not the same as analyzing regular website content patterns. This study intends to add methods in the world of research on how to analyze website content, especially online news, by using the clustering method and then analyzing the correlation. A Batam-based online newspaper company is used as a case study for this research. Data is collected, processed, and analyzed. This analysis of the news contents readership suggests what news categories should be optimized. A summary of the analysis steps in this study is presented. We also provided some suggestions if other online newspaper owners or researchers are interested in a similar analysis of online news content

***Keywords*—** Clustering; Content Analysis; Correlation; Data Mining; News Category; Online Newspapers.

Smart Campus Governance Design for XYZ Polytechnic Based on COBIT 2019

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Abstract— Technological developments drive growth in the industrial revolution and digital transformation era. Technological developments in the period of the industrial revolution 4.0 affect characteristics, especially in works. In responding to the growth of technological developments in employment, the Ministry of Public Works has the task of carrying out public works affairs in the government environment in an orderly manner to support the president in administering state government. XYZ Polytechnic is a state university as a new pilot under the Ministry of Public Works, Republic Indonesia. As a basis for future development as well as towards a smart campus and then getting policy directions for the development of smart campus governance at the XYZ Polytechnic, it is necessary to design IT governance, especially in the reconstruction of adaptive and responsive policies and the development of structured governance with structured information systems. The COBIT 2019 framework was used for governance design in this study. With the method from the field preparation stage, interviews then assessed and evaluated existing policies and conditions of field activities to the design of governance designs according to COBIT 2019. The research results contained a technology governance management design with 17 processes for organizations. Based on the capability assessment and gap analysis results, recommendations were made for the XYZ Polytechnic, as discussed in the results section. The suggestions are in the form of recommendations related to people, processes, and the use of technology. The recommendations act as evaluation material to improve organizational performance by providing good smart campus governance to students and internal members of XYZ Polytechnic.

Keywords— COBIT 2019; Smart Campus; IT Governance

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An Effective Open ERP System for Automation in Financial Reporting for SMEs based on Service Oriented Architecture

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Abstract— Small-Medium Enterprises (SMEs) are currently in high demand and highly developed in many countries. However, there are still several SMEs that do not yet have an information system to support their business processes. This causes the absence of a system that helps the integration of data from each process and sector in SMEs. All data exchanges and transaction report generation are done manually and recorded using physical documents that reduce effectiveness and increases costs. This research focuses on designing ERP systems for general types of SMEs in the finance sector specific on sales and purchase process by using the accounting module in Open ERP or Odoo Version 11.0 software and Service Oriented Architecture (SOA) methods. The result of this research is the design of ERP systems in the finance section connected occurs especially in the financial recording of the purchase of goods, the sale of goods, and the creation of financial statements automatically. This system can help the finance sector in recording transactions and making automatic financial reports that can be generated in real-time.

Keywords— ERP; SOA; Finance; Accounting; Odoo/Open ERP; Smart SMEs

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Development of Automatic Object Detection and IoT for GarbagePickup Assignment Problem

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Abstract— Garbage collection is still a problem in some cities. The problem that occurs is the assignment of the fleet that is used to pick up garbage at temporary garbage sites. Misplanning can result in high piles of garbage. This paper aims to develop trucking assignment by considering the truck capacity and route of garbage collection. Assignment uses the basic concept of the transportation problem, namely, the north-west corner. The amount of garbage transported capacity is based on the number of residents or the number of industries in the service area. The generation of garbage capacity will determine the future fleet and the number of fleets. This will be one of the components of the resulting distribution channel. To ensure that the fleet has collected garbage, a monitoring system based on object detection and IoT has been developed. Cameras will be placed in several temporary dump sites and transmit images in real time. The system will evaluate the capacity of garbage collection using object detection which is executed using neural network training. The result of this research is the system can identify the level of piles of garbage and confirm the process of picking up garbage by the assigned fleet. For further research, a combination of assignment and scheduling in waste transportation is needed, so that the fleet can be assigned within a certain time span. In addition, it is also necessary to develop an object detection algorithm so that it can detect piles of garbage more accurately.

Keywords— IoT; Object Detection; Scheduling; Neural Network Training

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The IT Services Management Architecture Design for a Large and Medium-sized Companies based on ITIL4 and TOGAF Framework

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Abstract— The development of information technology occurs rapidly in almost all areas of life. All companies must immediately carry out a business transformation following the development of information technology to survive amid increasingly fierce competition. One of the keys to this business transformation's success is an enterprise architecture that is used as a reference in planning, developing, operating, and monitoring company information technology. Implementation of service management practices in state-owned enterprises need to be translated into IT Services Management Architecture Design, that match the IT Governance Principles as mandated in PER-03/MBU/02/2018. This research focuses on preparing an enterprise architecture design in IT service management by referring to ITIL 4 best practices. The resulting solution is a target architecture design in the business domain, data, and applications arranged according to the TOGAF framework. It was carried out in four stages: scope identification, which defines practices; preliminary phase, which resulted in 11 architecture principles; architecture vision that produces a value chain for IT service provider organizations; a business architecture which resulted in a business service/function catalog consisting of 13 business functions and 43 business services; and an information system architecture that produces a conceptual data model on the three main priority processes of IT service management and an application use-case diagram that describes the relationship between the four actors (users, service managers, service desks, and support groups) with their roles in applications. The enterprise architecture has been designed following the scope of IT service management practices commonly used as a reference for all large and medium-sized companies.

Keywords— Enterprise Architecture; ITIL 4; IT Service Management; TOGAF

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Intelligent Warehouse Picking Improvement Model for E-Logistics Warehouse Using Single Picker Routing Problem and Wave Picking

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Abstract— The development and use of technological innovations have changed people's behavior from an industrial society to an information society. It can be seen in the increase in people's consumption patterns from trading through physical stores (offline) to trading through electronic systems or often referred to as e-commerce. Logistics services are distribution actors in the downstream line which are tasked with delivering products from the fulfillment center from e-commerce to the end customer. The uncertainty of the number of requests is the biggest challenge for logistics service players. The growth of e-commerce has also led to an increase in sales volume in e-commerce which has given rise to a new generation of warehouses that are specifically tailored to the special needs of online retailers who directly serve the demands of end-customers in the business-to-consumer (B2C) segment. Traditional warehousing systems cannot handle orders that have the characteristics of many transactions but with a smaller size. In addition, warehouses that handle e-commerce are also required to have fast process in the warehouse, because shipments must be made on the same day. In this study, the author aims to perform calculations to find the optimal order picking time in the warehouse, so orders in e-commerce can be processed faster by comparing the picking process time using ordinary Single Picker Routing Problem (SPRP) and combined with the concept of wave picking using Genetic Algorithm (GA). Based on theoretical study in this paper, the combination between SPRP and wave picking, can reduce 42.28% picking time.

Keywords— E-commerce; Intelligent Warehouse; Order Picking; Wave Picking; Single picker routing problem (SPRP); Logistic.

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Managing Information Technology Risks to Achieve Business Goals: A Case of Pharmaceutical Company

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Abstract— The advancement of information technology (IT) has a significant impact on many facets of life, from the simple to the essential. Utilizing information technology as a strategic role in achieving the organization's vision and mission provides numerous solutions through opportunities. PT. Kimia Farma Plant Banjaran is a pharmaceutical company that manufactures and distributes medicinal products through pharmacies throughout Indonesia. At PT. Kimia Farma Plant Banjaran, the Quality Assurance Division is one of the divisions responsible for developing regulatory documents and risk assessments. Each process and the work instructions that accompany it contain risks that can become obstacles to executing existing business processes. This can be seen in the results of the assessment of the seven enablers' current state. The author's research design is a case study utilizing qualitative research methods. The analysis process begins with the collection of data, assessment, identification, design, and recommendations, and concludes with conclusions and recommendations. The focus of this research is on COBIT 5 For Risk's seven enablers and the risks that occur within the division under study. The result of this research is ten risks that could harm the operation of business processes classified as COBIT 5 processes. Risk is dominated by moderate risk, with most risks being taken in accordance with the Quality Assurance Division's existing SOPs. Internal actors are involved in all risks, with most events occurring as a result of rules and regulations.

Keywords—Business Value Creation; Information Technology Risks; Business-It Alignment; Pharmaceutical

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Development of Automatic Real Time Inventory Monitoring System using RFID Technology in Warehouse

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Abstract— RFID technology is one of the technologies in logistics as an important application in logistics operations and supply chain management. The application of RFID technology can be applied to the inventory control monitoring system in real time. The inventory monitoring information system can replace the manual system to a computerized system so that the processing of monitoring data is more efficient, effective, and can be controlled directly and with accurate information. This study presents a case study of a real stock monitoring system based on RFID technology. The design of a real time stock monitoring system is a transition from manual to technology by involving computerization in its implementation. This study aims to design an RFID-based real time stock monitoring system and integrate warehousing systems in the company. The real time inventory stock monitoring system is still at the development stage so that a simulation is carried out to compare the actual existing data with the data from the RFID system. We use existing warehouse layout to try the efficiency of the RFID stock monitoring. Based on the research results that the RFID system increases the efficiency and effectiveness of inventory control. Further research, it is necessary to integrate the inventory optimization model with real time inventory control with RFID. The integration of real time monitoring technology will be used as input to the inventory optimization model so that it can be more accurate in providing purchasing policies.

Keywords— RFID, Real Time Stock Monitoring, Inventory Control Monitoring System Application

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Enhanced Technology for Logistics Courier Delivery Using RFID Label to Minimize Processing Time

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Abstract— Courier services have become a sector that has experienced a growth spurt during the Covid-19 pandemic. The soaring growth of courier services is due to the growth of e-commerce in Indonesia. This is shown by the increase in people's digital activities during the pandemic, including online or online shopping. Based on data from the Indonesian Ministry of Finance, which shows that purchase transactions via e-commerce increased 18.1 percent to 98.3 million with a total transaction value of 9.9 percent to Rp20.7 trillion. Fast and efficient delivery and pick-up of goods is the core operation of courier services. The biggest challenge for courier service providers is how to compete with other companies that offer the same type of service, and service users are increasingly demanding the security and reliability of delivery services so that they can meet the expectations of service users. The expectations of service users used as targets for company achievement are (1) reliability (on time, accuracy, integrity), (2) convenience (collecting units, delivery coverage, operating hours), (3) services, and (4) cost. Based on the activities in courier services, the potential for errors or inefficiencies in processing time is in the pre-delivery activities. In the pre-delivery activity is also the initial activity used to input the data base, collect goods, distribute goods and so on. This research proposes RFID Label technology can be used to overcome errors and increase process time efficiency in shipping goods on courier services, especially in pre-delivery and delivery activities.

Keywords— Courier Services; RFID Label; Intelligent Technology; Logistics; IoT

Factors Influencing Readiness Towards Halal Logistics Among Food and Beverages Industry In The Era of E-Commerce In Indonesia

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Abstract— According to the Global Islamic Economy Indicator 2020/2021 report, Indonesia is in 4th position in world as a country that uses a sharia economic system. Seeing the opportunities that Indonesia has, it should be able to act as a regional and global halal hub. Efforts to encourage the halal industry through strengthening the halal value chain are one of the strategies to encourage Indonesia to become a global halal hub player. This study utilises the structural equation modelling to examine relationships among key factors affecting readiness towards halal logistics among food and beverages industry in Indonesia. 12 key factors are confirmed with measurement-model results, including (1) Cleanliness, (2) Safety, (3) Islamic Dietary Law, (4) Physical Segregation, (5) Material Handlings, (6) Storage and Transport, (7) Packaging and Labelling, (8) Ethical Practices, (9) Training and Personnel, (10) Resource Availability, (11) Innovative Capability, (12) Marketing Performance, (13) Financial Performance. Population in this study are food and beverage industries, especially in Semarang, Yogyakarta, Malang and Surabaya. The sampling technique used was cluster random sampling with a total sample of 150 respondents. Data collection method is a survey with an online questionnaire. The structural-model results reveal directions of relationships among key factors. Resource availability, training and personnel, and innovative capability are the most important factor to halal supply chain readiness. Further research can focus on other industrial sectors such as fashion and tourism, as stated in the 2019-2024 Indonesian Sharia Economic Masterplan.

Keywords— Halal Logistics; Structural equation modelling; Supply Chain Management; Food and Beverages Industry.

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Omni-Channel Service Analysis of Purchase Intention

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Abstract— The Covid-19 pandemic has caused a decline in various aspects of the economy, including the fashion sector. Many fashion retailers have closed, so sales have fallen. However, many retailers can also adapt and change using new communication channels. This change presents new challenges for fashion companies and retailers to integrate channels into omnichannel services. This study aims to analyze the factors that can influence customer behavior in omnichannel services through their intention to accept and use new technology in the shopping process. This study adopts the UTAUT2 model by adding two new variables: personal innovation and perceived security. This model was tested on 353 samples from Uniqlo customers residing in Indonesia. This research method uses a Quantitative PLS-SEM approach. . This study tested the outer model, inner model, and hypothesis t test with bootstrap procedure using SmartPLS software. The results showed that the performance expectation factor had no effect on the omnichannel purchase intention variable. Meanwhile, other factors such as effort expectation, social influences, habits, hedonic motivation, perceived security, and personal innovativeness affect omnichannel purchase intentions. The most positive and significant factor is personal innovativeness. It is recommended for further researchers to use the UTAUT2 research model on purchase intention by adding other factors such as facility conditions, suitability, and price value and for further researchers to conduct research by adding a larger sample using other fashion retail companies objects because it can affect the results study.

Keywords— omnichannel; omnichannel consumer behavior; webrooming; showrooming; UTAUT2; Purchase Intention.

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Omni-Channel Ordering Based on Customer Perspective

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Abstract— Whether there is the Covid-19 pandemic or not, evidently, consumers everywhere are spending more time online and do almost everything digitally, including their shopping. In order to keep growing, McDonald's Indonesia, as one of the biggest fast food retailers in the country, needs innovation on customer behavior and retention by providing various channels to make transactions. By comparing the task, procedure, main focus, integration, and final reports of multichannel and omnichannel, the latter is considered an evolutionary stage from the former because its operation and service are integrated in all sales and marketing channels in one overall system, leading to a single comprehensive report. The purpose of this research is to determine what channels McDonald's customers use and whether McDonald's can apply Omnichannel Ordering for their business. In this paper, 30 customers of age 20 - 30 were asked about the ways they order McDonald's products, and what they like about the channel. The result shows that the transactions were made through several ordering channels, suggesting that McDonald's has utilized a multichannel system good enough to stay on the top of the market and validate their online presence to the current generation or those who will come. However, in utilizing multichannel, McDonald's must set a unique and coordinated strategy with special and detailed attention from a dedicated team to put together partial reports. With omnichannel, this daily operation can be improved to be more effective and efficient as Omnichannel will be able to provide better insight of full report for a better decision making process.

Keywords— Sales; Marketing; Ordering Channel; Omnichannel.

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Design of Egg Quality Selection Tool Using ESP-Now at XYZ Company

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Abstract— Eggs are one of the staple foods for humans. In 2020, a Tempo report states that egg consumption in Indonesia will reach 28.16 kg per capita. This is an increase if you look at egg consumption in 2019 in Indonesia which reached 17.77 kg per capita. PT. XYZ is one of the egg distributors in South Sulawesi which is a distributor for several snack food companies that require eggs as raw material for their products. The demand for eggs at PT. XYZ recorded an average of 165,000 eggs per month. The main problem at the company is the difficulty in selecting egg quality, workers still have difficulty distinguishing the condition of chicken eggs (fit for consumption or not). Because the eggshell texture is not much different between viable eggs and rotten eggs. This course can harm consumers from the company if there are rotten eggs that pass the selection. The selection process carried out by workers is still done manually, namely by looking at the eggs in a light. This manual selection process on a large scale has a low level of accuracy. With the rapid development of automation, it is possible to overcome this problem using conveyors for egg quality selection using a light sensor to detect egg quality. In this study, this egg quality selection automation tool is based on ESP-Now. The results of the study obtained the accuracy value of this tool is 83%.

Keywords— Conveyor; light sensor; ESP-Now

Software Quality Measurement for Functional Suitability, Performance Efficiency, and Reliability Characteristic using Analytical Hierarchy Process

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Abstract— The objective of quality assurance is to determine whether a website or application can meet the demands and expectations of its users. ISO 25010 was used as the quality standard in this investigation. The ITS Academic Information System was employed as a case study, and the AHP (Analytical Hierarchy Process) approach was applied to calculate the basis. A questionnaire stage was undertaken with experts, students, and developers to collect questionnaire data. The AHP approach was used to analyze the results from the expert questionnaire to establish the weight that should be used when determining software quality. There are two types of measuring software used in this study: those that employ student questionnaires and developer questionnaires as input data, and those that perform automatic measurement or testing on the Time Behavior sub-characteristics, specifically Response Time Testing. This automated measurement determined the time required. on a one-to-one scale. The sum of the values obtained from these two types of measurements was processed through many equations to obtain the final value of the software under test. The findings of this study contribute to the field of software quality measurement by providing tools that can be utilized as a reference for developing and enhancing software quality. Functional Suitability refers to the ability of the ITS Academic Information System to provide features that meet user needs. The ITS System can deliver performance and performance under user needs via the Performance Efficiency element. Meanwhile, the ITS System can perform a function under particular conditions and times. Overall with adding AHP in ISO 25010 can accomadate the business to calculate software quality more better according to their needs.

Keywords— ISO 25010; Functional Suitability; Performance Efficiency; Reliability; AHP; Response Time Testing

.:: Paper ID: 201 ::.

Automation Reporting Design of Electric Usage Measurement Using Industrial Smart Metering at XYZ Company

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Abstract— The industrial sector is a sector that has a high level of energy consumption. The industrial sector consumes energy with a percentage of 58.9% with a value of 231,916,568 Barrel of Oil Equivalent (BOE), then in the household sector by 30.4% with a value of 119,967,525 BOE, and the commercial sector by 10.7% with a value 42,135,187 BOE. The most widely used energy in industry is electrical, so it needs attention so there is no waste. The implementation of Internet of Things (IoT) technology can monitor electricity usage online and real time. The system created for the above needs uses the industrial smart meter where measuring instruments are installed on each sub distribution panel. The tool designed is used to measure current, voltage, power, energy, number of units (pieces) and tonnage. The data obtained is sent via the internet network to be stored in the influxdb database and visualized online using the Grafana software. The software used are open source, so they do not require third party software. The designed system performance test is based on a predetermined equipment usage scenario. Each scenario becomes a guide to see the suitability between the required data collection and the data that can be presented by the designed system. The trial results show that this system can meet the need to measure current, voltage, power, energy, number of units (pieces (pcs) and tonnage) and is able to send data online and in real time to facilitate the monitoring of electrical energy usage.

Keywords— Electricity Monitoring; Real-time; Smart Meter

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Smart City Architecture Development Framework (SCADEF)

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Abstract— Smart City is a city that implements the latest technologies such as big data, IoT, Artificial Intelligence, and other new technologies. Smart City has different system characteristics than other systems. Smart City involves several independent stakeholders, so smart city development needs to be designed with a system of systems analysis and service-based planning. Smart City Architecture Development Methodology (SCADM) has been defined from the previous research. However, that existing Enterprise Architecture approach has not specified the artefact to complete the framework. This Study recommends the Smart City Architecture Framework (SCADEF) as Enterprise Architecture Framework to develop Smart City Architecture. The architecture produced by SCADEF becomes the reference architecture for realising Smart City. SCADEF consist of SCADM, Meta-model Smart City Architecture Development Methodology Artefact, and guidelines by the implementation SCADEF. The research uses observation, classification, and construction methodologies on Information System Design Methodology. In addition, this study also tested the framework by implementing it on city objects. This implementation is a practical test tool for the resulting enterprise architecture framework. This Study implemented SCADEF on the education and health field at Bandung Smart City. Testing on the implementation of SCADEF is to explain the implementation in Bandung Smart City and ask for an assessment from enterprise architecture experts. The results of the expert assessments were calculated statistically to assess the methodology, artefacts, and uses. The measurement results show that SCADEF can be accepted and used to develop enterprise smart city architecture.

Keywords-- Smart City Architecture; Enterprise Architecture Framework; Artefact Meta-model; Architecure Development Methodology

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Enhance Document Contextual using Attention-LSTM to Handle Sparse Rating Matrix For E-Commerce Recommender System

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Abstract—E-commerce is the most important service in last 2 decade. E-commerce service influence growth of economy impact in world wide. Recommender system is essential mechanism to calculate product information for e-commerce user. The successfulness in recommender system adoption influence target revenue of e-commerce company. Collaborative filtering (CF) is the most popular algorithm to create recommender system. CF applied matrix factorization mechanism to calculate relationship between user and product using rating variable as intersection value between user and product. However, number of ratings very sparse where the number of ratings only less than 4%. Product Document is the product side information representation. The document aims to advance effectiveness of matrix factorization performance. This research considers to enhancement document context using LSTM with attention mechanism to capture contextual understanding of product review and incorporate with matrix factorization based on probabilistic matrix factorization (PMF) to produce rating prediction. This study employs real dataset using MovieLens dataset ML.1M and Amazon information video (AIV) to observe our model called ATT-PMF. Movielens dataset represent of number sparse rating that only contains below 4% (ML.1M). According to our experiment report shows that ATT-PMF outperform than previous work more than 2% in average. Moreover, our model also suitable to implement on huge datasets. For further research, enhancement of product document context will be promising factor to eliminate sparse data problem in big data problem.

Keywords— sparsity data; recommender system; matrix factorization; e-commerce; attention mechanism; PMF.

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An Intrusion Detection System Using SDAE to Enhance Dimensional Reduction in Machine Learning

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Abstract—In the last decade, the number of attacks on the internet has grown significantly and the types of attacks vary widely. This causes huge financial losses in various institutions such as the private and government sectors. One of the efforts to deal with this problem is by early detection of attacks which are often called IDS (instruction detection system). The intrusion detection system was deactivated. An Intrusion Detection System (IDS) is a hardware or software mechanism that monitors the Internet for malicious attacks. It is capable of scanning an internetwork for potentially dangerous behavior or security threats. IDS is responsible for maintaining network activity in accordance with the Network-Based Intrusion Detection System (NIDS) or Host-Based Intrusion Detection System (HIDS). IDS works by comparing known normal network activity signatures with attack activity signatures. In this research, a dimensional reduction and feature selection mechanism called Stack Denoising Auto Encoder (SDAE) succeeded in increasing the effectiveness of Naive Bayes, KNN, Decision Tree, and SVM. The researchers evaluated the performance using evaluation metrics with a confusion matrix, accuracy, recall, and F1-score. Compared with the results of previous works in the IDS field, our model increased the effectiveness up to more than 2% in NSL-KDD Dataset including in binary class and multi-class evaluation method. Moreover, the use of SDAE also improved traditional machine learning with modern deep learning such as Long Short-Term Memory (LSTM) and Convolutional Neural Network (CNN). In the future, it is possible to integrate SDAE with a deep learning model to enhance the effectiveness of IDS detection.

Keywords—IDS detection; SDAE; naive Bayes; decision tree; SVM; auto encoder

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Mapping User Experience Information Overload Problems Across Disciplines

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Abstract— User Experience (UX) has been increasing with the increases system and digital media. UX concept describe as a human factor as an experience with the life cycle of the system and digital media. UX increase usability of the product in industry more than functionality. Interest in UX has produced huge amount of product and research article. Moreover, this interdisciplinary topic become increase significantly because of the wider applications. However, this benefit become a problem due the number of publications. Information overload problem is the result of the increasing UX topic. Several researchers solved this problem with qualitative analysis, but it can solve overload problem. In this paper, we purposed bibliometric analysis and research profiling to conduct interpretation of UX information in map. In this paper we used publication from 1998-2022, dataset compile as RIS format to provide article metadata. As a result, we provide UX information map from the topic related to UX with the four cluster. Moreover, to provide information of coherence of topic, we used coupling network. Related topic shown as link, direct link means high coherence between topics. We suggest that future research expand in full article to provide relevant information.

Keywords— User experience; information overload; bibliometric analysis; topic coherence

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Blockchain-based Smart Contract for Decentralized Marketplace

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Abstract— The advance of information technology is having a growing influence on one of the most popular social trends: online shopping. The rising popularity of online shopping among the public, as indicated by the growth in the number of online purchasers each year, has prompted business owners to pursue online ventures. The marketplace is intrinsically tied to online buying activity that connects merchants and customers that it allows customers to search for a variety of goods and services from a variety of providers. However, service failures are a vulnerability of centralized market systems that emerge frequently. When the company's services to customers fail to satisfy consumer expectations. A breakdown in the essential services of purchasing and selling, including both product delivery and customer support, is referred to as service failure. As a result, not only does this harm confidence, but it may also cause clients to migrate to an alternative marketplace. The marketplace's competitiveness is based on consumer confidence. The decentralized marketplace can address this security concern. A decentralized marketplace is meant to build a system that does not require the confidence of a third party using blockchain technology and smart contracts that can record all transactions clearly and consistently, allowing them to serve as a single point of truth between distrusting entities. The findings largely support the feasibility of Ethereum Smart Contracts to construct a decentralized marketplace. However, there are some places where further study and development are needed.

Keywords— Blockchain; Smart Contract; Decentralized Marketplace; Ethereum; Service of Failure.

Early Detection of Asymptomatic Covid-19 Infection with Artificial Neural Network Model Through Voice Recording of Forced Cough

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Abstract— Corona Virus 2019, often called COVID-19, is a disease transmitted by SARS-CoV-2. Based on data per March 15th, 2021, from the World Health Organization, Indonesia's cumulative total of cases is 1,419,455 cases. Indonesia's cumulative deaths are 38,426 cases, placing Indonesia in the third position with the highest number of deaths under India and Iran. The spread of COVID-19 happened very quickly and widely because it spread from direct human contact with droplets from the respiratory of an infected person. American Centers for Disease Control and Prevention says that asymptomatic people are likely to account for more than 50% of the transmission rate. The antigen tests are used as early detection of COVID-19, with an accuracy of results ranging from 80-90%. As of September 3rd, 2021, the price for the antigen test is renewed, with prices ranging from Rp 99.000 - Rp 109.000, but researchers are still tenaciously looking for the best alternative solutions for the early detection of COVID-19. MIT News Office reported that asymptomatic COVID-19 infection could be detected through a forced cough recording. This research purpose deep learning model, Artificial Neural Networks (ANN), detects asymptomatic COVID-19 patients through the voice recording of forced cough. Artificial Neural Network (ANN), equipped with oversampling data, has proven to work well in detecting asymptomatic people from forced cough recordings, which is indicated with an accuracy of 98% with a loss value of less than 3%. This model can be developed as an alternative solution for the early detection of COVID-19 infection.

Keywords— ANN; Asymptomatic; COVID-19; Forced Cough; Oversampling.

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The Design of E-Commerce System to Increase Sales Productivity of Households Industry in Indonesia

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Abstract—The household industry is the foundation of the existing home industry in Indonesia. It is categorized as a type of Small and Medium Enterprises (MSMEs) that significantly influence the Gross Domestic Product (GDP) ratio up to approximately 10%. Since the pandemic of Covid-19, the home industry has increasingly stretched, especially in culinary and home craft products. The use of the internet is one of the efforts to increase household industry sales. The household industry needs e-commerce to be a container for marketing its products. In this paper, we design an e-commerce system to support the sales productivity of the household industry in Indonesia. This study's e-commerce system or application is developed through some crucial stages. The stages are: analysis through a questionnaire that represents needs in the field, selection of business models, namely B2B models with Virtual Storefront, marketplace concentrators, and lastly, Information Broker. Our infrastructure is determined for e-commerce development, and then strategy analysis is done using portfolio analysis, SWOT analysis, and competitor analysis. Based on the proposed strategy, we made a prototype as a designed e-commerce system that can increase sales for household businesses in cities in Indonesia. Important features in our proposed e-commerce system are: able to accommodate many sellers or the household industry to establish relationships with many buyers based on geographical location; having product search features based on closest positions or by city; having product categorization by familiar categories with household products.

Keywords— E-Commerce System; Business Model; Household Industry; Prototype System.

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Design of Prediction Model for Segmentation and Classification Customer Churn in E-Commerce Mall in Mall

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Abstract— The churn classification is motivated by the threat to e-Commerce companies, such as the loss of customers who stop using the service or churn. Efforts made by marketing specialists to maintain market share have shifted from a focus on acquiring new customers to retaining existing ones to reduce customer churn. To find customer churn patterns is to create predictive models using data mining techniques. Therefore, this study proposes a data mining model that aims to predict customer behavior, and the results of processing are used as suggestions for improvements and company strategies in retaining customers by using segmentation and classification. There are several variables used in segmentation and classification, such as Session, Interaction with Application, Actions made in Interaction, Purchasing, Claim, and Discount. In addition, this study uses a clustering technique based on the Recency, Frequency, and Monetary (RFM) model, each of which is the period since the last visit, the number of visits, and the Total Amount issued by the customer. Based on the comparison of two classification algorithms, namely decision tree and Support Vector Machine, the decision tree algorithm is the most accurate classification algorithm. The best level of accuracy of the classification decision tree model is 87% in classifying customers.

Keywords— Customer Churn;Churn Prediction;Data Mining;E-Commerce;Decision Tree; SVM;

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The Design of Convolutional Neural Networks Model for Classification of Ear Diseases on Android Mobile Devices

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Abstract— An otorhinolaryngologists (ORL) or general practitioner generally diagnoses ear disease based on ear image information. However, general practitioners refer patients to ORL for chronic ear disease because the image of ear disease has high complexity, variety, and little difference between diseases. An artificial intelligence-based approach is needed to make it easier for doctors to diagnose ear diseases based on ear image information, such as the Convolutional Neural Network (CNN). This paper describes how CNN was designed to generate CNN models used to classify ear diseases. The model was developed using an ear image dataset from the practice of an ORL at the University of Mataram Teaching Hospital. This work aims to find out the best CNN model for classifying ear diseases applicable to android mobile devices. Furthermore, the best CNN model is deployed for an Android-based application integrated with the Endoscope Ear Cleaning Tool Kit for registering patient ear images. The experimental results show 83% accuracy, 86% precision, 86% recall, and 4ms inference time. The application produces a System Usability Scale of 76.88% for testing, which shows it is easy to use. This achievement shows that the model can be developed and integrated into an ENT expert system.

Keywords— Artificial intelligence; Convolutional Neural Network; ear disease; image classification; Android

Text Classification using Genetic Programming with implementation of Map Reduce and Scraping

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Abstract— Classification of text documents on online media is a big data problem and requires automation. Text classification accuracy can decrease if there are many ambiguous terms between classes. Hadoop Map Reduce is a parallel processing framework for big data that has been widely used for text processing on big data. The study presented text classification using genetic programming by pre-processing text using Hadoop map-reduce and collecting data using web scraping. Genetic programming is used to perform association rule mining (ARM) before text classification to analyze big data patterns. The data used are articles from science-direct with the three keywords. This study aims to perform text classification with ARM-based data pattern analysis and data collection system through web-scraping, pre-processing using map-reduce and text classification using genetic programming. Through web scraping, data has been collected by reducing duplicates as much as 17718. Map-reduce has tokenized and stopped-word removal with 36639 terms with 5189 unique terms and 31450 common terms. Evaluation of ARM with different amounts of multi-tree data can produce more and longer rules and better support. The multi-tree also produces more specific rules and better ARM performance than a single tree. Text classification evaluation shows that a single tree produces better accuracy(0.7042) than a decision tree(0.6892), and the lowest is a multi-tree(0.6754). The evaluation also shows that the ARM results are not in line with the classification results where multi-tree shows the best result (0.3904) from the decision tree (0.3588) and the lowest is single-tree (0.356).

Keywords— Text Classification, Genetic Programming, Web Scraping, Map-reduce

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COVID-19 Lung X-ray image Classification using CNN

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Abstract— In late 2019 in China, a disease outbreak called COVID-19. COVID-19 is a disease that spreads a novel coronavirus variant known as SARS-COV-2 or Severe Acute Respiratory Syndrome Coronavirus 2 that is related to SARS-CoV and the Middle East Respiratory Syndrome Coronavirus (MERS-COV). A rapid method of disease detection is critical for preventing further transmission and caring for infected patients. The real-time reverse transcription-polymerase chain reaction known as RT-PCR is the current method that is used as a golden standard, but several studies show that it has low sensitivity. Chest X-rays, one of the COVID-19 detection methods, can be used during the examination of suspected cases. In this study, the dataset is provided by Kaggle. The dataset itself was an imbalanced dataset containing three different classes as COVID-19, normal and viral pneumonia. Because the dataset was imbalanced, preprocessing is needed to be done to balance the dataset. Moreover, an augmented is needed to be done to enrich the variance of the dataset by rotating, zooming, and shearing the original image. LeNet5 and Inception ResNet V2 are used to classify COVID-19. The result shows that both LeNet5 and Inception ResNet V2 have a similar performance with 89.5% of accuracy, and it is outperformed KNN, SVM, and ANN. However, LeNet is better than Inception ResNet V2 because LeNet has fewer parameters than Inception ResNet V2. So the future work is to reduce the number of parameters of both LeNet and Inception ResNet V2 while maintaining the performance.

Keywords— COVID-19; LeNet5; Inception ResNet V2; Augmentation.

Implementation of 5G Telecommunication Network Services in Indonesia based on Techno-Economic Analysis

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Abstract— The 2300 MHz spectrum is a medium band that telco operators will not pay much attention to who will deploy 5G. They are more comfortable at 2.6 GHz, 3.5 GHz, 26 GHz, and 28 GHz, in addition to 700 MHz for the breadth of coverage. The performance of cellular telecommunications services based on 5G technology is very possible for new operators, although it will be carried out as stand-alone services. This opportunity will be taken by looking at internet subscriber data/data communication from existing operators as active internet users, which is quite large and has a potential of over 250 million users. There has been no previous study regarding the feasibility of deploying this 5G technology-based Broadband Wireless Access (BWA) Network. Based on the experience of implementing previous generations of telecommunication service technology, the government and operators need to be careful in determining the right moment to deploy this 5G technology service which is predicted to be able to provide broadband services with streaming capabilities of 10 to 100 times the streaming speed of 4G technology. It should be noted that the lack of success of 3G performances in 2006 from 2G, 2.5G and 2.75 G. Almost all operators who were expected to be very lucky, turned out to be not optimal, even now, only 4 operators are playing on 3G. where they have not been able to force users of the 2G generation to switch to 3G, including in big cities where the performance of the 3G network is not yet optimal and evenly distributed. There are still many areas that are blank spots from 3G networks and services. Learning from this experience, scientific studies are needed to ensure the feasibility of the upcoming 5G BWA business and or to identify business opportunities that can be implemented. The feasibility analysis must be viewed from various aspects, namely aspects of technical readiness, market aspects, and financial aspects in terms of techno-economics of the operators who will provide 5G telecommunications services by calculating several important parameters as a measure of business feasibility, namely Net Present Value (NPV), Internal Rate of Return (IRR), and Payback Period (PBP).

Keywords— 5G; Frequency 3.3 GHz; Techno-Economy

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PROGRAMME BOOK

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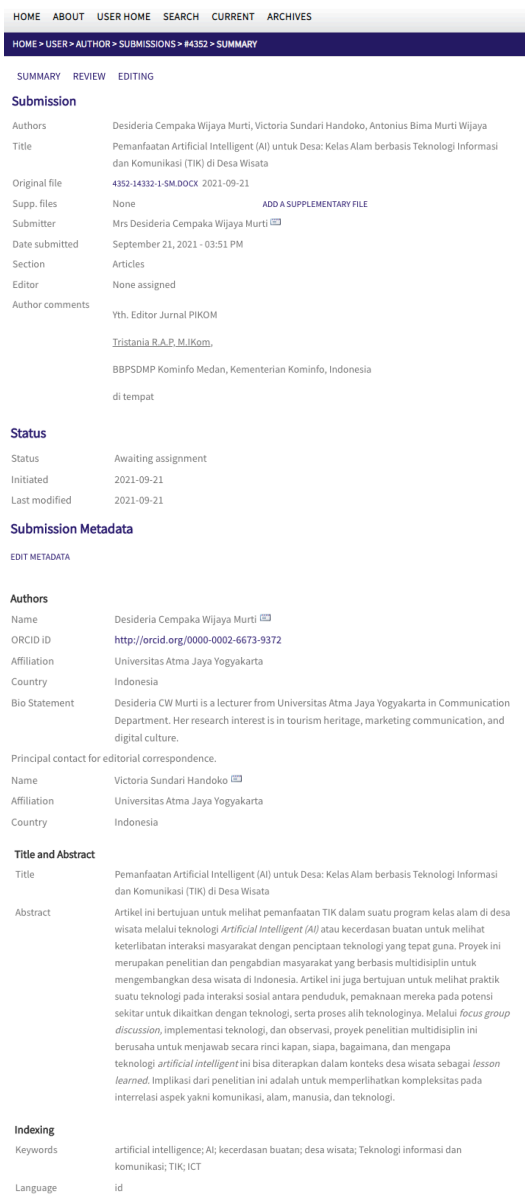

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Title and Abstract

Title	Pemanfaatan Artificial Intelligent (AI) untuk Desa: Kelas Alam berbasis Teknologi Informasi dan Komunikasi (TIK) di Desa Wisata
Abstract	Artikel ini bertujuan untuk melihat pemanfaatan TIK dalam suatu program kelas alam di desa wisata melalui teknologi *Artificial Intelligent (AI)* atau kecerdasan buatan untuk melihat keterlibatan interaksi masyarakat dengan penciptaan teknologi yang tepat guna. Proyek ini merupakan penelitian dan pengabdian masyarakat yang berbasis multidisiplin untuk mengembangkan desa wisata di Indonesia. Artikel ini juga bertujuan untuk melihat praktik suatu teknologi pada interaksi sosial antara penduduk, pemaknaan mereka pada potensi sekitar untuk dikaitkan dengan teknologi, serta proses alih teknologinya. Melalui *focus group discussion,* implementasi teknologi, dan observasi, proyek penelitian multidisiplin ini berusaha untuk menjawab secara rinci kapan, siapa, bagaimana, dan mengapa teknologi *artificial intelligent* ini bisa diterapkan dalam konteks desa wisata sebagai *lesson learned.* Implikasi dari penelitian ini adalah untuk memperlihatkan kompleksitas pada interrelasi aspek yakni komunikasi, alam, manusia, dan teknologi.

Indexing

Keywords	artificial intelligence; AI; kecerdasan buatan; desa wisata; Teknologi informasi dan komunikasi; TIK; ICT
Language	id

PEMANFAATAN *ARTIFICIAL INTELLIGENT* (AI) UNTUK DESA: PENGEMBANGAN KELAS ALAM BERBASIS TEKNOLOGI INFORMASI DAN KOMUNIKASI (TIK) DI DESA WISATA

UTILIZATION OF ARTIFICIAL INTELLIGENT (AI) FOR VILLAGE: THE DEVELOPMENT OF NATURE CLASS BASED ON TECHNOLOGY OF INFORMATION AND COMMUNICATION (ICT) IN TOURISM VILLAGES

ABSTRAK

Artikel ini bertujuan untuk melihat pemanfaatan TIK dalam suatu program kelas alam di desa wisata melalui teknologi *Artificial Intelligent (AI)* atau kecerdasan buatan untuk melihat keterlibatan interaksi masyarakat dengan penciptaan teknologi yang tepat guna. Proyek ini merupakan penelitian dan pengabdian masyarakat yang berbasis multidisiplin untuk mengembangkan desa wisata di Indonesia. Artikel ini juga bertujuan untuk melihat praktik suatu teknologi pada interaksi sosial antara penduduk, pemaknaan mereka pada potensi sekitar untuk dikaitkan dengan teknologi, serta proses alih teknologinya. Melalui *focus group discussion,* implementasi teknologi, dan observasi, proyek penelitian multidisiplin ini berusaha untuk menjawab secara rinci kapan, siapa, bagaimana, dan mengapa teknologi *artificial intelligent* ini bisa diterapkan dalam konteks desa wisata sebagai *lesson learned.* Implikasi dari penelitian ini adalah untuk

memperlihatkan kompleksitas pada interrelasi aspek yakni komunikasi, alam, manusia, dan teknologi.

Kata kunci: *artificial intelligent, AI, kecerdasan buatan, interaksi, desa wisata, teknologi informasi dan komunikasi (TIK)*

ABSTRACT

This article aims to look at the use of ICT in a nature class program in a tourist village through Artificial Intelligent (AI) technology to see the involvement of community interactions with the creation of appropriate technology. This project is multidisciplinary-based research and community service to develop tourism villages in Indonesia. This article also aims to look at the practice of technology in social interactions between residents, their meaning in the surrounding potential to be associated with technology, as well as the process of technology transfer. Through focus group discussions, technology implementation, and observation, this multidisciplinary research project seeks to answer in detail when, who, how, and why this artificial intelligence technology can be applied in the context of tourism villages as lessons learned. The implication of this study is to show the complexity of the interrelationships of aspects, namely communication, nature, humans, and technology.

Keywords*: artificial intelligence, AI, artificial intelligence, interaction, tourist village, information, and communication technology (ICT)*

1. PENDAHULUAN

Desa dan desa wisata adalah sebuah tempat yang secara konseptual menjadi pembicaraan dan perdebatan di kalangan akademisi mengenai dinamika perubahan transformatif yang terjadi karena waktu dan situasi. Sebagai contoh, desa dahulu merupakan sebuah tempat yang terabaikan (Askwith, 2012), terbengkalai dari urusan pembangunan (Geertz, 1980), hingga terpinggirkan karena urusan prioritas negara (Adams, 2004). Kemudian terjadi pergeseran, lalu desa menjadi tempat bagi perkembangan agroindustri (Dahles, 2013) karena adanya kebutuhan produksi pangan dan kebutuhan produksi bahan alam. Kini, banyak desa menjadi situs pelestarian tradisi (Guo & Sun, 2016) termasuk nilai-nilai sejarah, budaya dan arsitektur; dan sumber daya alam (da Silva et al., 2016) yang dalam konteks pariwisata sering dikategorikan sebagai desa wisata.

Label yang kuno, terlupakan, dan terabaikan ini justru yang menjadi peluang bagi desa. Geertz dalam bukunya Negara (1980) berpendapat bahwa desa (dan rakyat desa atau *wong ndeso*) telah diabaikan oleh negara, membuat mereka terbelakang dan terisolasi. Namun, manfaat dari tindakan pengabaian oleh negara ini adalah bahwa desa telah mampu menyelamatkan dan mencatat seperti apa sebuah Nagari atau negara atau *civilization,* sebelum "pembangunan" terjadi (Geertz, 1980). Geertz berpendapat bahwa memeriksa desa dapat membuka peluang untuk menemukan pola perubahan melalui orang-orang yang diselamatkan atau dihindarkan dari kemajuan modern

(1980). Dalam pengertian ini, desa menawarkan suasana yang mencerminkan realitas masa lalu berupa kegiatan sosial dan budaya, kebiasaan sehari-hari, bangunan kuno, dan pemanfaatan ruang tradisional yang terpelihara di wilayah tersebut (Yamashita, 2003).

Desa wisata sendiri memiliki konsep mendasar yang menggabungkan antara desa dan pariwisata sebagai sebuah industri dan wadah bagi berkembangnya suatu gerakan ekonomi masyarakat agraris. Desa wisata mengacu pada masyarakat yang telah melestarikan dan melindungi daerah pemukiman mereka, termasuk nilai-nilai sejarah, budaya dan arsitektur, sejak awal berdirinya (Guo & Sun, 2016). Di beberapa negara, konsep imaji masa lalu ini mengarah pada konsep seperti *furusato* di Jepang (Robertson, 1988; Siegenthaler, 2003; Valaskivi, 2013) atau *gucunluo* di China atau *countryside* di negara barat seperti USA (Roberts, Hall, & Morag, 2017). Peran khusus desa wisata ini juga untuk melestarikan alam, mempertahankan pertunjukan warisan (Crouch, 2016), dan sifat pedesaan yang indah (Halfacree, 2006). Mereka mempertahankan rasa tempat dan menawarkan pengalaman berdasarkan karakteristik pedesaan (Rye, 2006). Dengan demikian, kegiatan sehari-hari (Crouch, 2016), budaya yang dilembagakan (Gradén, 2016), kepentingan nasional, dan gerakan lokal (Robertson, 2016) semuanya membantu membentuk pembuatan situs warisan. Demikian pula, tiga faktor lain yakni wisatawan (Roberts, Hall, & Morag, 2017), sistem agro-pangan (da Silva et al., 2016), serta media (Chueh & Lu, 2018) turut membantu melestarikan konstruksi ini, dari pedesaan, dan narasi pedesaan, atau dalam istilah barat disebut *country side,* atau imaji tanah pastoral.

Sementara itu, teknologi informasi dan komunikasi menjadi salah satu bagian penting pula dalam siklus pariwisata terutama terkait dengan teknologi dalam telepon seluler (Sari&Yalia, 2019). Aplikasi seluler mampu menciptakan diskusi akademik tentang koneksi, hubungan, interaksi, serta inklusivitas, maupun sebaliknya terputusnya koneksi, hubungan, interaksi manusia dengan sekitarnya serta ekslusivitas individu/grup (Molz, 2012; Harahap, 2018; Budiman, 2018). Penelitian ini ingin melihat bagaimana aplikasi yang dikembangkan dalam penelitian ini menyediakan "ruang" bagi orang untuk berinteraksi (Budiman, 2018) dan membangun kembali lanskap alam di dalam konteks desa wisata dan desa yang memiliki teknologi (Dhahir, 2017). Dengan demikian, penelitian saat ini berkontribusi untuk menginterogasi nuansa dalam studi teknologi informasi dan komunikasi (Budiman, 2018) melalui aplikasi seluler melalui hubungan yang terjalin dari praktik sehari-hari wisatawan, penduduk setempat, dan aktivitas mereka (Harahap, 2018).

Secara spesifik, penelitian ini ingin melihat salah satu dari teknologi informasi dan komunikasi yang berupa *artificial intelligent* (AI) atau kecerdasan buatan yang diinjeksi dalam aplikasi seluler bagi desa wisata. Teknologi *AI* ini termasuk cukup baru tetapi saat ini

dikembangkan secara masif. Tetapi, di Indonesia sendiri belum banyak pengembangan *AI* pada desa wisata dan kemanfaatannya bagi masyarakat desa. Oleh sebab itu, penelitian ini menawarkan suatu kebaruan dalam tiga hal yakni: (1) penelitian ini akan meneliti teknologi informasi dan komunikasi pada desa wisata menggunakan aplikasi seluler yang dibuat sendiri oleh para penelitinya tetapi terjadi aksi partisipatif dimana warga desa sendiri yang menentukan konstruksi proses produksi dan konsumsi pada suatu tempat wisata. (2) Penelitian ini juga menawarkan investigasi pada unsur *artificial intelligent* atau kecerdasan buatan dalam konteks desa wisata. (3) Penelitian ini akan melihat unsur interaksi antara manusia dengan teknologi dalam konteks desa wisata yang memiliki narasi dekat dengan alam, tradisional, dan sekaligus masih memiliki budaya agraris yang kuat.

2. TINJAUAN PUSTAKA

2.1. Teknologi dan interaksi sosial

Perkembangan teknologi memunculkan terjadinya perubahan dalam interaksi sosial dan berbagai bidang kehidupan manusia. Teknologi komunikasi dan informasi membantu manusia dalam mempermudah interaksi jarak jauh dan juga interaksi sosial yang berjarak dalam kurun waktu dan tempat yang berbeda secara cepat, tepat, dan efisien. Perkembangan teknologi informasi dan komunikasi membantu dalam interaksi manusia ketika interaksi antar manusia harus berjarak seperti implikasi dari adanya pandemi covid 19 yang terjadi sejak tahun 2019.

Interaksi sosial yang dimediasi dengan teknologi komunikasi dan informasi memunculkan model kehidupan yang disebut dengan *cyberspace* , dimana fungsi alam menurut Pilliang (2011) bisa diambil alih melalui pengganti teknologinya, disebut dengan kehidupan artifisial (*artificial life*). Berbagai ruang sosial di kehidupan nyata dapat diciptakan substitusinya di dalam dunia informasi digital melalui bentuknya yang artifisial yaitu yang disebut dengan simulasi sosial (*social simulation*).

Simulasi merupakan simulakrum dalam bentuknya yang khusus (Baudrillard, 1999). Selanjutnya Baudrillard menjelaskan bahwa simulasi adalah kelanjutan dari tahap simulakra itu sendiri. Simulakra bentuknya seperti menduplikasi atau mengkopi sebagai modelnya. Sementara itu, realitas tidak memliki eksistensinya di era simulasi ini. Realitas melebur dalam citra model-model reproduksi yang tidak mungkin lagi menemukan referensi nyata, melakukan adanya pembedaan antara citra dan kenyataan, tanda dan ide, yang campur aduk (Medhy, 2012). Pengembangan Teknologi Artificial Intelligence untuk *image recognitian* merupakan bentuk simulasi untuk menduplikasi atau mengkopi realitas alam yang kemudian bisa dilihat melalui smart phone.

2.2. Teknologi *image recognition* menggunakan *Artificial Intelligent*

Teknologi *image recognition* yang dipakai untuk program ini adalah *Convolutional Neural Network* (CNN). Teknologi ini masuk dalam kategori *deep learning* yang sudah dipakai dalam berbagai aspek pengolahan data *non-structural* seperti pada gambar, video maupun suara (Suherman et al., 2021). Penggunaan teknologi CNN ini akan jauh lebih ringan ketika proses klasifikasinya berlangsung dibandingkan saat proses pembelajarannya. Untuk meningkatkan kecepatan eksekusi proses pembelajarannya, sistem akan memanfaatkan teknologi Tensorflow dan Keras dari bahasa pemrograman Phyton (Suherman et al., 2021). Agar teknologi ini mampu belajar dengan baik maka diperlukan banyak foto sebagai bahan untuk pembelajaran atau feed bagi CNN.

CNN saat ini banyak dipakai dalam pengenalan dengan cara mengklasifikasikan obyek citra bahkan dalam bentuk *multi-class* dan menghasilkan performa yang menjanjikan (Mehmood et al.., 2020; Xie et al., 2020). Bahkan penerapannya dapat digunakan untuk mengklasifikasikan obyek gambar dalam bentuk gambar detail atau mikrokopik, seperti dalam penerapan dalam mendeteksi matriks makanan (Liu et al., 2021).

Teknologi *image recognition* menggunakan *Artifical Intelligent* diintegrasikan dengan *desain apps* Dewi Tinalah. Peserta kelas alam dapat melakukan foto pada benda alam dan secara otomatis, informasi akan muncul pada *apps* Dewi Tinalah. Teknologi akan membaca data foto benda alam (batu, burung, atau flora) tersebut, dan mengintegrasikan informasinya dengan aplikasi yang telah dibuat. Dengan demikian, peserta Kelas Alam dapat melaksanakan wisata edukasi dengan belajar secara mandiri untuk mengeksplorasi alam Dewi Tinalah.

3. Pertanyaan Penelitian

Penelitian ini hendak melakukan tiga tujuan yakni meninventarisasi potensi desa untuk dapat merumuskan teknologi yang tepat, mengimplementasikan teknologi, dan mencatat *lesson learned* dari prosesnya. Oleh sebab itu, riset ini menarik sebab menawarkan beberapa hal yang baru yakni:

1. Riset ini mencoba untuk bereksplorasi dengan teknologi informasi dan komunikasi yakni menggunakan *artificial intelligent*
2. Riset ini sekaligus menjadi sebuah paradox karena menempatkan AI pada konteks desa yang cenderung jauh dari teknologi
3. Riset ini tidak hanya mencari jawaban atas suatu pertanyaan riset tetapi sekaligus menawarkan solusi berupa penciptaan teknologi yang dapat menunjang paket wisata dan mendokumentasikan potensi desa.
4. Artikel ini sendiri, menjelaskan proses kreatif hingga pelaksanaan dan

catatan penting seputar kapan, siapa, bagaimana, dan mengapa teknologi AI bisa diterapkan di desa dan mampu membawa keterlibatan masyarakat.

Melihat dari signifikansi yang ditawarkan pada riset ini, maka pertanyaan yang ingin digali dan dicatat dalam proses penelitian ini adalah:

1. Bagaimana warga menginventarisasi potensi desa untuk dapat masuk dalam aplikasi teknologi?
2. Bagaimana keterlibatan warga dalam proses pembuatan teknologi AI untuk desa ini?
3. Apa *lesson learned* yang didapat selama rangkaian prosesnya terkait dengan kapan, siapa, bagaimana, dan mengapa teknologi AI bisa diterapkan di desa wisata?

4. Metodologi

4.1. Jenis Penelitian

Penelitian ini menggunakan tradisi studi fenomenologis. Creswell menyebutkan bahwa: *"Where as a biography reports the life of a single individual, a phenomenological study describes the meaning of the live experiences for several individuals about a concept or the phenomenon"* (Creswell, 1998:51). Dengan demikian, studi dengan pendekatan fenomenologis berupaya untuk menjelaskan makna pengalaman hidup sejumlah orang tentang suatu konsep atau gejala, termasuk di dalamnya konsep diri atau pandangan hidup mereka sendiri. Dalam hal ini, potensi desa menjadi sebuah makna yang dialami oleh warga dan menjadi fenomena dalam kehidupan mereka sehari-hari. Desa wisata sendiri memiliki potensi obyek dan pengalaman wisata yang bersumber dari kehidupan agrikultur yang dialami dan dilakukan oleh warga desa. Menurut Moleong (1999), fenomenologi tidak berasumsi bahwa peneliti mengetahui arti sesuatu bagi orang-orang yang sedang diteliti oleh mereka. Inkuiri fenomenologis memulai dengan diam.

Dalam proses studi fenomenologi ini peneliti ingin berusaha untuk masuk ke dalam dunia konseptual para subjek yang ditelitinya sedemikian rupa sehingga mereka mengerti apa dan bagaimana suatu pengertian yang dikembangkan oleh mereka di sekitar peristiwa dalam kehidupan sehari-hari. Hal ini sesuai dengan pengalaman untuk menjabarkan potensi desa dan pendapat warga apabila dilihat dari keterlibatan mereka dalam teknologi aplikasi itu sendiri. Warga desa wisata Tinalah, terutama yang terlibat dalam proyek ini memiliki familiaritas pada penggunaan gadget dan aplikasi lainnya. Fenomenologi menjadikan pengalaman hidup yang sesungguhnya sebagai data dasar dari realita sebuah potensi desa dan interaksi warga pada teknologi.

4.2. Lokasi Penelitian

Desa Wisata Tinalah di Samigaluh Kulon Progo Yogyakarta adalah salah satu tempat wisata yang berada di Desa Purwoharjo, Kecamatan Samigaluh, Kabupaten Kulon Progo, Daerah Istimewa Yogyakarta, Indonesia (Rahajeng, 2015). Secara khusus alamat

lokasi Pokdarwis di Jalan Persandian km 5, Sendang Sari, Purwoharjo, Samigaluh, Kabupaten Kulon Progo, Daerah Istimewa Yogyakarta (Rizki, 2020). Ini memungkinkan jarak perjalanan dari Universitas Atma Jaya Yogyakarta ke Dewi Tinalah hanya berkisar kurang dari dua jam saja dengan mobil.

Secara geografis desa wisata Tinalah terletak di sekitar kawasan pegunungan menorah. Terbelah oleh sungai Tinalah, Dewi Tinalah memiliki total 14 dusun yang terlibat dalam kawasan destinasi Dewi Tinalah yakni (Puyang, Taman, Plarangan, Tukharjo, Bangunrejo, Dukuh, Kedungrong, Duwet, Junut, Pagutan, Besole, Sendangrejo, Kalinongko, Sendangmulyo) (Rizki, 2020). Kawasan Dewi Tinalah memiliki berbagai jenis potensi alam yakni pegunungan, persawahan, perkebunan, dan wilayah sungai. Hal ini yang kemudian dimanfaatkan oleh *Pokdarwis* Dewi Tinalah.

Dari sisi kependudukan, Dewi Tinalah masuk dalam Pedesaan Purwoharjo. Desa ini dihuni oleh 1088 keluarga dengan jumlah penduduk sekitar 3537 jiwa (Rizki, 2020). Mata pencaharian penduduknya adalah bertani, berdagang, berkebun, dan bertukang. Tingkat pendidikan di desa ini sebagian besar adalah lulusan Sekolah Dasar yakni 2915 orang, diikuti dengan lulusan SMP yakni 274 orang, SMA kurang lebih 250 orang dan beberapa yang lulus perguruan tinggi yakni 126 orang (Rizki, 2020). Sementara itu, masih banyak masyarakat yang hidup di bawah garis kemiskinan di desa tersebut misalnya dilihat dari masih banyak yang memiliki rumah belum layak huni (berlantai tanah), berpenghasilan kurang dari Rp 5.000 per hari, dan makan kurang dari tiga kali. Pariwisata menjadi salah satu cara untuk mendapatkan penghasilan tambahan yang cukup signifikan jika mendapatkan tamu-tamu untuk *camping* atau *outbound.* Tetapi selama pandemi, pariwisata ditutup sehingga otomatis tidak ada pendapatan tambahan.

Secara historis, pendirian Dewi Tinalah dan *Pokdarwis* didasari dari keinginan warga lokal untuk memanfaatkan sisi alam dan sejarahnya. Kawasan Dewi Tinalah yakni Dusun Duwet, Dukuh, dan Suwelo sebenarnya merupakan zona perjalanan lima tahun sejarah Perang Jawa yang mana Pangeran Diponegoro sering bergerilya di kawasan ini. Sementara pada jaman kemerdekaan, Museum Sandi di desa tersebut menjadi saksi bagi perjuangan pahlawan yang melacak kode, informasi, dan komunikasi untuk melawan penjajahan.

4.3. Teknik Pengumpulan Data

4.3.1. Focus Group Discussion

Focus Group Discussion menurut Walliman (2006) merupakan jenis pengumpulan data dengan cara melakukan wawancara secara kelompok, yang berkonsentrasi secara mendalam pada tema atau topik tertentu dengan unsur interaksi. Kelompok yang diundang untuk melakukan FGD terdiri dari orang-orang yang memiliki pengalaman atau pengetahuan tertentu tentang subjek penelitian, atau mereka yang memiliki minat tertentu di dalamnya.

Gambar 1. Pelaksanaan FGD di Desa Wisata Tinalah
Sumber: Dok. Peneliti, 2021

Penelitian di Desa Wisata Tinalah mengundang tokoh-tokoh pengelola Desa Wisata Tinalah yaitu terdiri dari pengurus, pemandu, dan pemasaran. Selain jumlah ideal untuk FGD maksimal adalah 10 0rang, juga karena kondisi masa pandemi covid 19 sehingga pertemuan *offline* (tatap muka) dibatasi jumlahnya dan dengan protokol kesehatan yang ketat.

Gambar 2. Diskusi Warga untuk mencari potensi di Desa Wisata Tinalah untuk pembuatan aplikasi teknologi berbasis *Artificial Intelligent*
Sumber: Dok. Peneliti, 2021

FGD dilakukan selama 3 kali pertemuan, dimana pertemuan pertama, membahas tentang kebutuhan terkait pelatihan-pelatihan yang akan diadakan; pertemuan kedua membahas tentang kurkulum kelas alam, dan pertemuan ketiga membahas tentang penulisan feature. FGD menghasilkan kurikulum kelas alam dan tulisan anggota kelompok tentang cerita alam di sekitar mereka, seperti capung, pohon-pohonan, binatang, bebatuan, destinasi wisata di Dewi Tinalah akan memperkaya kemampuan penduduk dalam mengeksplore kekayaan dan menuliskannya dalam suatu cerita yang menarik. Hasil FGD selanjutnya akan membantu penyusunan aplikasi *image recognition*.

Gambar 3. Tim Peneliti menjelaskan aplikasi teknologi pada rencana program Kelas Alam Desa Wisata Tinalah
Sumber: Dok. Peneliti, 2021

4.3.2. Observasi

Observasi menurut Walliman (2006) merupakan metode pengumpulan data untuk merekam kondisi, peristiwa, dan aktivitas melalui melihat daripada bertanya. Sebagai suatu kegiatan, observasi tentu saja diperlukan dalam banyak situasi penelitian, misalnya mengamati hasil eksperimen, perilaku model bahkan mengamati reaksi orang terhadap pertanyaan dalam wawancara.

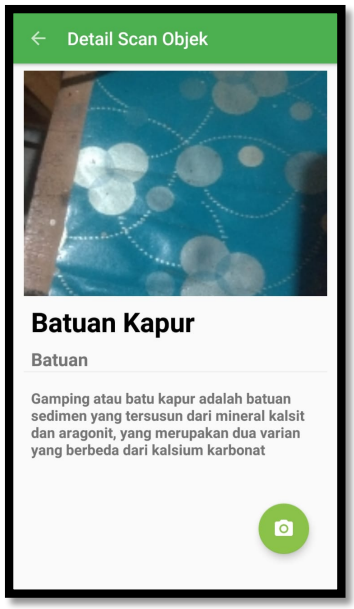
Kegiatan observasi dipergunakan dalam penelitian ini untuk merekam sifat atau keadaan suatu objek atau peristiwa

secara visual, misalnya dalam penelitian ini dengan mengobservasi secara langsung ke Desa Wisata Tinalah untuk mengamati jenis-jenis tanaman, bebatuan, dan binatang. Kemudian melakukan pemotretan dan analisis terkait hasil gambar yang diperoleh apakah sesuai dengan kondisi yang sesungguhnya. Walliman (2006) menyatakan bahwa cara observasi seperti ini disebut sebagai etnografi visual. Materi visual dapat menjadi sumber data untuk analisis, atau dapat digunakan sebagai pemicu reaksi orang yang diwawancarai. Observasi dapat digunakan untuk merekam data kualitatif.

4.4. Implementasi Teknologi

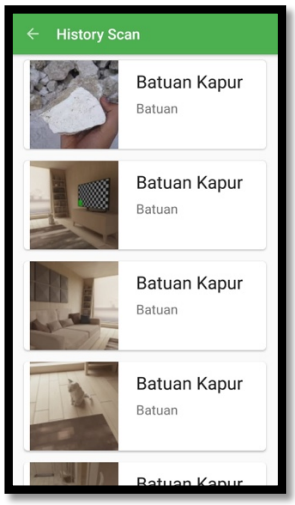
Jaringan syaraf tiruan merupakan basis teknologi yang digunakan untuk pengenalan obyek obyek pembelajaran pada desa wisata tinalah. Lebih lanjut, algoritma Convolution Neural Network dengan arsitektur LeNet digunakan karena memiliki kemampuan rekognisi yang tinggi (Suherman et al., 2021). Algoritma ini dijalankan menggunakan Bahasa pemrograman python, yang kemudian diintegrasikan ke aplikasi android melalui web service flask (Ilmawan, 2018). Algoritma dibangung dengan menggunakan bantuan library *tensorflow* untuk meningkatkan kemampuan kecepatan belajar.

Secara garis besar algoritma ini dibagi menjadi dua fase yakni fase belajar dan fase rekognisi atau sering juga disebut fase evaluasi. Sistem akan belajar dari gambar gambar dari obyek obyek yang ada di desa wisata tinalah yang dipilih. Pemilihan obyek yang akan direkognisi ini berdasarkan nilai historis terhadap masyarakat desa wisata tinalah, obyek yang mampu meningkatkan dinamika selama proses pembelajaran alam dilakukan, dan tentunya obyek yang mampu membantu meningkatkan nilai paket paket wisata pada desa wisata tinalah.



Gambar 4. Fase Belajar pada Aplikasi Desa Wisata Tinalah
Sumber: Dok Pribadi peneliti, 2021

Fase kedua adalah fase evaluasi atau fase rekognisi. Pada fase ini sistem akan memberikan pengetahuan yang diperoleh dari fase pembelajaran ke pada aplikasi android melalui webservice flask. Proses evaluasi ini dalam konteks pembelajaran alam ini di wujudkan dalam bentuk gamifikasi. Semakin banyak obyek rekognisi yang diperoleh maka peserta akan mendapat poin lebih tinggi.



Gambar 5. Fase rekognisi pada Aplikasi Desa Wisata Tinalah
Sumber: Dok. Peneliti, 2021

Proses gamifikasi ini bertujuan untuk memberikan pembelajaran mengenai obyek terpilih dari aplikasi tentang kearifan lokal masyarakat yang ada terkait obyek tersebut. Selain itu gamifikasi ini berusaha untuk menarik konsumen atau peserta untuk mengambil keseluruhan paket Desa Wisata Tinalah dengan membuka seluruh obyek rekognisi. Hal ini diwujudkan dengan tersebarnya seluruh obyek rekognisi di seluruh destinasi Desa Wisata Tinalah.

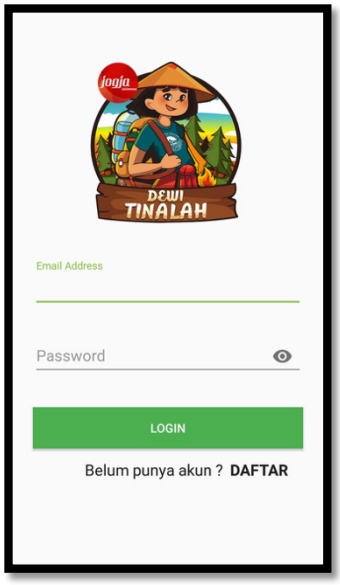
Aplikasi yang dikembangkan saat ini masih memiliki kekurangan pada ruang lingkup perangkat yang baru bisa pada smartphone android. Selain itu aplikasi ini belum mampu membedakan objek acak atau objek yang ditentukan, karena menggunakan konsep klasifikasi. Pada konsep klasifikasi setiap obyek yang diambil harus dikelompokkan pada kelas kelas yang telah ditentukan, sehingga jika terdapat obyek diluar kelas yang dimiliki akan di baca tetap sebagai salah satu obyek rekognisi.

4.5. Kelas Alam Desa Wisata Tinalah

Melalui rapat bersama, Pokdarwis Dewi Tinalah berinisiatif untuk dapat membuka kembali paket di desanya terutama dengan mengembangkan pasar sekolah yang ingin belajar Ilmu Pengetahuan Alam (IPA) secara langsung di alam. Program ini adalah edukasi alam berbasis teknologi. Misalnya dengan pengamatan bebatuan, flora, dan burung yang ada di sekitar desa tetapi bisa mengintegrasikan pengamatan dan edukasi tersebut dengan teknologi. Oleh sebab itu, Desa Wisata Tinalah sudah mengembangkan Apps Dewi Tinalah yang dapat didownload di *google apps store*. Ini adalah sebuah inovasi desa yang dilakukan oleh pemuda-pemudi yang tergabung dalam Pokdarwis di sana.

Dari hasil diskusi dengan warga sekitar, Dewi Tinalah berharap agar *apps* yang mereka buat secara sederhana bisa dikombinasikan dengan acara *outbound* yang kerap diselenggarakan di desa tersebut. Dewi Tinalah membutuhkan mahasiswa dari perguruan tinggi dari berbagai bidang yakni bidang ilmu sosial, ilmu komunikasi, dan ilmu teknologi informasi untuk secara multidisiplin dapat meng-upgrade apps tersebut dan menyatukannya dengan edukasi alam. *Design thinking* untuk membuat informasi Apps menjadi menarik dan mengemasnya menjadi games dimana ada kompetisi, tantangan, hingga kolaborasi tim serta menunjang kelas alam sangat diperlukan.

Sementara itu dengan kondisi COVID-19, Desa wisata Tinalah berharap dapat membuka kembali paket di desanya terutama dengan mengembangkan pasar sekolah yang ingin belajar Ilmu Pengetahuan Alam (IPA) secara langsung di alam. Misalnya dengan pengamatan bebatuan, flora, dan burung yang ada di sekitar desa. Oleh sebab itu, Desa Wisata Tinalah sudah mengembangkan Apps Dewi Tinalah yang dapat didownload di *google apps store*. Ini adalah sebuah inovasi desa yang dilakukan oleh pemuda yang tergabung dalam Pokdarwis di sana. Tetapi, Dewi Tinalah tetap membutuhkan ahli dari perguruan tinggi yakni bidang ilmu sosial, ilmu komunikasi, dan ilmu teknologi informasi untuk dapat meng-upgrade apps tersebut sehingga dapat menunjang kelas alam.



Gambar 6. Tampilan Pendaftaran Aplikasi Desa Wisata Tinalah
Sumber: Dok. Peneliti, 2021

Setelah melalui diskusi dengan Pokdarwis Desa Wisata Tinalah, dipilihlah teknologi *image recognition* yang menggunakan *Artifical Intelligent* untuk diintegrasikan dengan *desain apps* Dewi Tinalah. Melalui teknologi ini, peserta kelas alam dapat melakukan foto pada benda alam dan secara otomatis, informasi akan muncul pada *apps* Dewi Tinalah. Teknologi akan membaca data foto benda alam (batu, burung, atau flora) tersebut, dan mengintegrasikan informasinya dengan aplikasi yang telah dibuat. Untuk dapat menunjang teknologi ini, diperlukan Sumber daya manusia yang dapat melakukan pengambilan foto (pelatihan fotografi), menulis konten (penulisan naskah feature), dan penggunaan aplikasi dan kurikulum kelas alam (pelatihan penggunaan apps dan desain kurikulum).

5. Hasil Penelitian

5.1. *Pemetaan Potensi Desa*

Objek Desa Wisata Tinalah di Samigaluh Kulon Progo Yogyakarta adalah daerah yang menjadikan sektor wisata sebagai andalannya, beragam potensi dan jenis wisata. Sebutan Dewi (Desa Wita) Tinalah ini menjadikan keindahan alam yang ada di daerahnya sebagai andalan. Aliran sungai Tinalah menjadikan desa ini memiliki keindahan alam yang mempesona. Deretan bukit yang hijau, area persawahan, dan aliran sungai berbatu berpadu menjadi bentang alam yang sangat memanjakan mata. Ada juga potensi wisata alam berupa gua Sriti yang memiliki kedalaman sekitar 70 meter. Panggeh Widodo, selaku Ketua Desa Wisata Tinalah, menjelaskan bahwa berbekal potensi yang ada pada

tahun 2013 masyarakat Tinalah merintis desa wisata.

Sejumlah fasilitas telah disediakan pengelola, mulai dari dua buah area camping ground, dua buah pendopo, kamar mandi, permainan outbond, musala, hingga tenda. Biasanya wisatawan yang datang ke Dewi Tinalah adalah rombongan baik mahasiswa, pelajar, ataupun rombongan instansi. Ada beragam kegiatan yang disiapkan bagi para pengunjung, seperti susur sungai Tinalah, tracking bukit, outbond, dan beberapa kegiatan lainnya Letaknya berada di Kawasan Bukit Menoreh yang kaya akan keindahan alam dan budaya. Wilayah Dewi Tinalah dulunya pernah dijadikan tempat persembunyian Pangeran Diponegoro dan mengatur strategi perang. Di bukit Talun Miri, yang saat ini menjadi salah satu lokasi camping ground dulunya adalah tempat Pangeran Diponegoro berlatih berkuda. Ditempat ini juga terdapat museum sandi, yang dulu menajdi tempat penyerahan informasi dalam bentuk sandi pada masa perang gerilya Jenderal Sudirman.

Mitra kegiatan pengabdian ini adalah Kelompok Sadar Wisata (Pokdarwis) Dewi Tinalah. Kelompok Sadar Wisata (Pokdarwis) menurut Kementerian Pariwisata dan Ekonomi Kreatif merupakan kelembagaan di tingkat masyarakat yang anggotanya terdiri dari para pelaku kepariwisataan yang memiliki kepedulian dan tanggungjawab serta berperan sebagai penggerak dalam mendukung terciptanya iklim kondusif bagi tumbuh dan berkembangnya kepariwisataan dan memanfaatkannya bagi kesejahteraan masyarakat sekitar. Fungsi Pokdarwis dalam kegiatan kepariwisataan menurut Kementerian Pariwisata dan Ekonomi Kreatif adalah sebagai: Pertama, penggerak Sadar Wisata dan Sapta Pesona di lingkungan wilayah di destinasi wisata; Kedua, sebagai mitra pemerintah dan pemerintah daerah (kabupaten atau kota) dalam upaya perwujudan dan pengembangan Sadar Wisata di daerah.

Dalam proses pemetaan potensi alam desa, peneliti melakukan beberapa rangkaian FGD untuk pengumpulan hasil.

Tabel 1. Deskripsi aktivitas pelaksanaan diskusi

Proses	Deskripsi aktivitas
FGD 1	Dimulai dengan penjelasan mengenai teknologi yang ingin dikembangan serta potensi pasar, diskusi ini melibatkan warga masyarakat, pemangku kebijakan, dan pengurus Pokdarwis. Peneliti bertanya dan melakukan *brainstorm* umum mengenai apa yang menjadi potensi alam dan budaya yang dapat masuk dalam teknologi.
FGD 2	Peneliti melakukan diskusi lebih intensif dengan pokdarwis yang melibatkan ketua, sekretaris, dan marketing. Diskusi ini untuk membahas harapan dan pemetaan dalam pemanfaatan paket kelas alam yang mengidentifikasi potensi lokal dan teknologi.
FGD 3	Peneliti melakukan diskusi dengan melakukan pemetaan yang lebih intensif dengan melihat paket-paket outbound apa saja yang sudah ada. Kemudian dilakukan diskusi mengenai paket kelas alam wisata apa yang secara spesifik dapat dibangun dari kelas alam ini.

FGD 4	Peserta melakukan diskusi mengenai materi spesifik yang berhubungan dengan kelas alam dan menulis deskripsi sederhana mengenai benda-benda alam yang teridentifikasi dapat masuk dalam teknologi.

Sumber: Peneliti, 2021

Melalui proses pemetaan ini terdapat setidak-tidaknya tiga zona alam yang akan dieksplorasi dalam teknologi. (1) Daerah persawahan dan perkemahan, (2) Daerah sungai Tinalah, (3) Daerah hutan area *trekking* ke Puncak Kleco. Melalui tiga zona ini, warga berdiskusi mengenai benda alam apa yang dapat masuk dalam teknologi, paket apa yang dapat dibuat, dan obyek pengamatan apa yang dapat dijadikan bahan untuk teknologi maupun yang bisa digunakan untuk penjelasan pemandu wisata.

Tabel 2. Inventarisasi jawaban dan pertanyaan untuk pemetaan potensi

Pertanyaan untuk pemetaan potensi	Inventarisasi jawaban
Benda alam apa informasinya dapat masuk dalam teknologi?	Warga melakukan diskusi, observasi pada obyek dilakukan, dan pengambilan gambar dilakukan. Benda itu antara lain batu karang, kelapa, padi, pisang, singkong, generator mikrohidro, dan lain-lain.
Paket apa yang dapat dibuat?	Warga melakukan diskusi, inventarisasi pada acara outbound dan aktivitas dilakukan, serta catatan tentang potensi cerita dilakukan. Paket itu antara lain paket partisipatif bertema "singkong," paket partisipatif bertema "kelapa," paket partisipatif "mikrohidro," paket partisipatif "sungai," paket partisipatif "nasi dan persawahan." Paket partisipatif yang dimaksud melibatkan aktivitas penjelasan, penggunaan teknologi dengan pengambilan gambar, hingga aktivitas misalnya membuat makanan ringan, memasak, bermain air, berkunjung ke rumah warga, hingga penanaman pohon.
Obyek pengamatan apa yang dapat dijadikan bahan untuk teknologi maupun yang bisa digunakan untuk penjelasan pemandu wisata?	Warga melakukan inventarisasi dan penceritaan mengenai obyek-obyek alam yang dapat masuk melalui teknologi, acara reflektif, maupun penjelasan pemandu wisata. Misalnya: stalagtit, stalagmite, padi, instalasi mikrohidro, embung, dan bebatuan

	sungai, ritual wiwitan, dan baritan.

Sumber: Peneliti, 2021

Melalui proses pemetaan ini, warga dilibatkan dan terlibat aktif dalam melakukan konstruksi terhadap tempat yang merupakan wilayah mereka sendiri. Warga desa juga terlibat aktif dalam hal produksi konten, paket, dan gambaran benda di sekitarnya yang bisa dimanfaatkan untuk paket, teknologi, aktivitas wisata, hingga penjelasan tur guide. Selain itu, warga juga terlibat aktif dalam konstruksi proses konsumsi atau *place consumption* dimana warga menentukan hal apa yang dapat dilihat, dinikmati, dipelajari, dan dipahami oleh orang luar mengenai desa mereka. Tindakan partisipatif ini akan mencegah eksotisisme atau aksi yang mana membuat desa menjadi obyek pasif dalam *place consumption* yang kerap terjadi. Desa menjadi tidak punya kekuatan untuk menolak materi apa yang bisa "ditonton," "dipertunjukkan," atau *gazing of others*.

5.2. Teknologi dan Masyarakat

Secara umum, masyarakat menerima usulan teknologi informasi dan komunikasi yang akan diaplikasikan di desa mereka. Beberapa hal yang muncul dalam catatan penelitian ini adalah bahwa usulan pengembangan kelas alam yang digagas oleh warga dapat didukung oleh teknologi ini dan bahwa teknologi ingin mengembangkan apps yang memang sudah lebih dahulu dimiliki oleh warga. Poin *existing* ini menjadi penting sebab ini menentukan kepemilikan atas teknologi dan keinginan warga untuk terlibat, daripada semua usulan berasal dari peneliti atau pelaksana abdimas yang notabene adalah orang luar atau *outsider*.

> "Kami menyambut baik pembuatan teknologi ini karena ini dapat diintegrasikan dengan rencana kami mengenai kelas alam dan mengembangkan potensi di desa yang sudah ada"- Pernyataan A001

Selain itu, keterlibatan masyarakat dalam proses penciptaan teknologi juga memberikan dampak dari kemauan warga untuk berkomitmen menyelesaikan program maupun tugas yang diberikan. Masyarakat dilibatkan dalam berbagai proses diskusi untuk mengidentifikasi dan menginventarisasi potensi di desanya. Selain itu, masyarakat juga dilibatkan dalam proses memberikan makna dan narasi pada potensi benda maupun non benda yang ada di desanya. Proses memaknai dan membuat narasi baik lisan maupun tertulis ini merupakan bagian dari keterlibatan warga untuk ikut memproduksi tidak hanya konten tetapi alur pengalaman yang nantinya akan dirasakan oleh warga maupun pengunjung.

> "Ada banyak potensi di sini. Bisa cerita macam-macam. Ada cerita mengenai kelapa, ada cerita dan membuat singkong, ada cerita tentang mikrohidro, ada cerita tentang sungai tinalah, ada cerita

soal batu juga bisa. Banyak yang bisa diceritakan untuk belajar adik-adik sekolah"-Pernyataan A002

Dalam proses pengambilan gambar, masyarakat dan terutama yang pernah berpengalaman sebagai *guide,* juga terlibat dalam menunjukkan benda-benda alam di sekitar desa wisata. Melalui pengalaman trekking, warga menceritakan obyek-obyek alam spesifik di sepanjang jalur *trekking* selama dua jam tersebut. Hal ini memberikan kesempatan pada warga untuk bisa membayangkan mengenai isi dan fungsi teknologinya. Selain itu, obyek-obyek yang ditemui secara langsung bisa memberikan wawasan tambahan bagi bahan konten untuk teknologi.

6. Pembahasan

Pembahasan ini akan membahas implikasi teoritis dan praktis dalam beberapa pertanyaan reflektif seputar *lesson learned* dalam pemanfaatan teknologi TIK berbasis AI dalam pengembangan program kelas alam di desa wisata. Pertanyaan itu antara lain mengenai kapan, siapa, bagaimana, dan mengapa teknologi AI ini bisa dan mungkin diterapkan di desa wisata secara inovatif tanpa menghilangkan interaksi dan keterlibatan masyarakat dalam pembuatan dan penggunaan teknologinya.

6.1. *Kapan Teknologi AI dalam TIK bisa diterapkan di desa wisata?*

Teknologi informasi dan komunikasi khususnya perangkat media seluler memiliki potensi untuk memberikan simulasi (*simulacrum)* ke ruang publik yang membentuk praktik sosial dan spasial yang berlangsung secara simultan (Humpherys, 2007) di desa wisata. Potensi dalam muncul dalam perangkat aplikasi untuk media seluler adalah dapat memperkuat keterkaitan tempat dan mobilitas serta pengembangan produksi dan konsumsi tempat (*place production and consumption).*

Desa wisata dalam hubungannya dengan TIK seharusnya bisa menjadi produsen sekaligus konsumen konten media tersebut (Groote & Haarsten, 2016; Reijnders, 2016). Dengan demikian, proses produksi dan konsumsi ini tidak hanya melibatkan komoditas tempat, tetapi juga narasi sejarah dan warisannya (Foster et al., 2017; Groote & Haarsten, 2016). *Artificial intelligent* dalam aplikasi desa wisata Tinalah ini merupakan bentuk implementasi teknologi informasi dan komunikasi untuk mengembangkan sebuah desa wisata. Teknologi AI banyak dianggap sebagai pengganti pekerjaan manusia. Anggapan bahwa teknologi mampu membuat manusia mengalami kerugian dan terpinggirkan banyak muncul sebab kemampuan teknologi yang bisa melebihi manusia. Tetapi, apabila *AI* dipergunakan untuk keuntungan manusia, teknologi justru dapat memberikan keuntungan, memberdayakan, dan mengedukasi masyarakat. Dalam proses penelitian ini, penerapan AI menggunakan konsep *human centered empowerment* dimana pemberdayaan berpusat pada manusia di sekitarnya. Ini berarti bahwa teknologi hanya sebagai alat atau instrumen komunikasi untuk memfasilitasi manusia

dan hanya demi kebaikan manusia di sekitarnya.

Aplikasi teknologi informasi dan komunikasi seperti AI sangat memerlukan keterlibatan masyarakat atau *pro human*. Masyarakat terlibat dalam proses produksi tempat, konsumsinya, dan narasinya. Hal ini juga memberikan implikasi pada isu ownership atau kepemilikan dalam pengelolaan suatu tempat. Masyarakat yang terlibat dalam proses ini menggunakan sumber daya untuk melestarikan nilai-nilai budaya (Beel et al., 2017), menarik wisatawan (Edelheim, 2015), meningkatkan pengeluaran wisatawan (Luscombe, Walby, & Piché, 2018), dan memperkuat lokasi (dirasakan/diproyeksikan) "identitas budaya" (McDowell, 2016). Dengan demikian, media – baik offline maupun online – memainkan peran penting dalam membentuk representasi tempat (Groote & Haarsten, 2016), berpartisipasi dalam membangun makna komunikasi pada suatu tempat wisata (De Groot, 2016). Aplikasi seluler berfungsi untuk membentuk representasi tempat melalui konsep koneksi, mobilitas sosial, dan kedekatan virtual dalam ranah siklus pariwisata.

6.2. *Siapa yang bisa menerapkan AI untuk kebutuhan TIK desa wisata?*

Manusia, tempat, dan teknologi memiliki relasi yang menarik sebab teknologi dapat memicu proses mobilitas yang terjadi pada suatu tempat. Mobilitas adalah konsep yang sangat menonjol untuk memahami pariwisata dan teknologi seluler, ruang fisik dan virtual, pengalaman di tempat dan online (Molz, 2012). Melalui mobilitas teknologi mobile, pariwisata menjadi sebuah konsep yang menghubungkan, menghubungkan kembali, dan memutuskan tempat (Bauman, 2003).

Manusia dalam hal ini perlu memahami potensi teknologi dalam membentuk hubungan sosial, serta kesenjangan sosial, yang tampaknya hadir dalam aspek eksklusif dan inklusif dari dunia fisik dan virtual ini (Urry, 2007). Praktisi pariwisata, akademisi, industri pariwisata, konsultan melalui teknologi informasi dan teknologi yang dimediasi dengan *Artificial Intelligent* akan mampu bergerak melampaui kehadiran fisik hingga dapat meningkatkan potensi wisata di suatu tempat, interaksi online maupun offline, dan identitas suatu tempat (Molz, 2012).

6.3. *Bagaimana menerapkan AI di Desa Wisata untuk kebutuhan TIK?*

Studi ini menemukan bahwa untuk menerapkan AI di desa wisata untuk kebutuhan teknologi informasi dan komunikasi diperlukan proses identifikasi yang melibatkan warga di desa wisata. Proses keterlibatan ini dapat melalui proses pengumpulan materi dalam proses pengaturan paket wisata maupun narasi. Studi ini menemukan bahwa setidaknya ada tiga hal mengenai desa wisata yang diidentifikasi sebagai hal yang dapat diangkat dalam teknologi yakni– budaya misalnya arsitektur rumah tradisional, ritual, dan benda bersejarah, aktivitas masyarakat lokal, dan alam sekitarnya. Materi nyata seperti ini penting dalam menjual tempat

pedesaan di media seluler populer, serta imajinasi untuk mengkonstruksi *place making* desa wisata (Wang & Sandner, 2019; Oreglia, 2015; Carnegie, 2010).

Gaya hidup yang dekat dengan alam, menelusuri alam, dan menggunakan teknologi dapat menjadi bagian dalam pembuatan teknologi informasi dan komunikasi ini. Sebagaimana dipahami dalam benak konsumen mengenai desa wisata yakni mereproduksi imajinasi dan stereotip dominan tentang tempat-tempat pedesaan, pedesaan dan desa-desa (Milbourne, 1997).

6.4. *Mengapa menerapkan AI di Desa Wisata?*

Penelitian ini juga menemukan alasan mengapa AI bisa dan dapat diterapkan di desa wisata. Penggambaran desa wisata sebagai ruang pedesaan berimplikasi pada duplikasi lanskap. Duplikasi lanskap adalah proses dimana suatu tempat terduplikasi dalam bentuk gambar atau video atau realitas virtual yang menggunakan teknologi (Halfacree, 2003; Milbourne, 1997). Tentu, ini akan berimplikasi pada cara melihat dan cara berinteraksi dari tempat ini secara berbeda. Tetapi, teknologi ini dikembangkan justru dengan mengandalkan interaksi dan tidak dapat dilakukan oleh wisatawan tanpa bantuan penduduk sekitar. Hal ini menyebabkan teknologi menjadi alat bantu terjadinya interaksi sosial yang dimediasi oleh aplikasi seluler (Couldry & Hepp, 2018; Vásquez, 2012; Carter, 2016). Masyarakat termediasi ini mengandalkan pengalaman antarmuka para pengguna (Couldry & Hepp, 2018). Selain itu, produsen dan konsumen juga mengikuti batasan, pengelolaan konten, dan pengalaman pengguna dari masuk hingga keluar, hingga proses membaca dan menulis ulasan. Wisatawan tidak hanya mengalami aplikasi, tetapi juga dalam menceritakan dan akhirnya mengalami tempat itu sendiri (Vásquez, 2012; Carter, 2016). Narasi yang melingkupi desa wisata kemudian dihasilkan juga melalui foto dan cerita pengalaman dan aktivitas. Akhirnya, desa wisata ini melalui cara aplikasi seluler dan proses AI yang mekanis dan sistematis menghasilkan narasi-narasi ini melalui fitur-fiturnya sendiri.

Teknologi AI menciptakan fasilitas interaksi baru bagi wisatawan yang berkunjung di Dewi Tinalah karena penerapan protokol kesehatan yang harus dijaga ketat selama pandemi covid 19. Gamifikasi menggunakan mobile phone menjadi media pembelajaran alam yang aman bagi wisatawan dengan interaksi yang berjarak antar wisatan. Teknologi memiliki fungsi “extension”, dimana gamifikasi ini akan terintegrasi dengan kehidupan wisatawan sebagai pengguna dan penduduk yang menjadi subjek yang mengembangkannya. Penduduk sebagai subjek pengembang gamifikasi akan berinteraksi dengan teknologi tersebut secara terus menerus sehingga bisa menjadi bagian dari kehidupan mereka.

Gamifikasi melalui teknologi AI yang dikombinasikan dengan kegiatan alam lainnya yang memungkinkan wisatawan masih tetap bisa berinteraksi

dengan wisatawan lain, penduduk, dan alam meminimalisir ketergantungannya. Wisatawan tidak akan terjebak kedalam realitas tiruan (hiperialitas) dan membentuk kehidupannya karena realitas yang riil (sesungguhnya) dihadirkan melalui interaksi dan permainan lainnya yang mempertemukan dengan orang lain meskipun tetap dengan protokol kesehatan.

7. Simpulan dan Keterbatasan

Pandemi covid 19 mengharuskan pelaksanaan penelitian dan pengabdian pada masyarakat dilakukan dengan menggunakan protokol kesehatan yang ketat untuk meminimalisir resiko terpapar covid 19. Oleh karena itu, metode pengumpulan data yang inovatif perlu dikembangkan bersama masyarakat. Masyarakat diajak memikirkan cara menggali masalah sampai dengan solusi atas permasalahan yang dihadapi dengan menggunakan metode pengumpulan data yang inovatif seperti melalui zoom meeting, atau menggunakan media sosial yang lainnya.

Saran untuk penelitian selanjutnya adalah menganalisis bagaimana implikasi dari pemanfaatan teknologi kelas alam tersebut dipergunakan dalam membangun kurikulum kelas alam. Hasil dari pemakaian apps tentu saja akan membantu dalam pembangunan pariwisata yang berkelanjutan pada waktu -waktu yang akan datang.

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