



PROCEEDING

#3rd

ISRITI 2020

Yogyakarta - Indonesia
10 December 2020

**ARTIFICIAL INTELLIGENCE
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IEEE
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2020 3rd International Seminar on Research of Information Technology and Intelligent Systems (ISRITI) took place 10 December 2020 in Yogyakarta, Indonesia

IEEE catalog number:	CFP20AAH-PRT
ISBN:	978-1-7281-8404-3

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Darari, Fariz	2D.2	457	<i>Benchmarking Explicit Rating Prediction Algorithms for Cosmetic Products</i>
Delfianti, Rezi	3E.3	716	<i>Energy Management Efficiency and Stability Using Passive Filter in Standalone Photovoltaic Sudden Cloud Condition</i>
Dewantara, Mahardira	2C.1	400	<i>Minimization of Power Losses through Optimal Placement and Sizing from Solar Power and Battery Energy Storage System in Distribution System</i>
Dirgantoro, Burhanuddin	2E.4	514	<i>Speaker Recognition For Digital Forensic Audio Analysis Using Support Vector Machine</i>
Djawas, Faizah	2F.6	562	<i>Measuring Instagram Activity and Engagement Rate of Hospital: A Comparison Before and During COVID-19 Pandemic</i>
Dwijayanti, Suci	3A.1	621	<i>Facial Expression Recognition and Face Recognition Using a Convolutional Neural Network</i>
Dwiputra, Richard	1E.6	203	<i>Network Attack Detection System Using Filter-based Feature Selection and SVM</i>
E A B C D E F G H I J K L M N O P Q R S T U V W X Y Z			
Eka Sari, Wahyuni	1B.1	42	<i>Papaya Disease Detection Using Fuzzy Naïve Bayes Classifier</i>

Ekaniza, Raki	1A.5	21	<i>PSO-Learned Artificial Neural Networks for Activity Recognition</i>
Eko Sulisty, Meiyanto	2C.6	428	<i>Design and Development of Bit Error Measurement using FPGA for Visible Light Communication</i>
El Khalyly, Badr	3A.4	638	<i>A Kubernetes Algorithm for scaling Virtual Objects</i>
Elsa, Corry	2G.1	577	<i>Case Study: AppDynamics Application as Business Intelligence to Support Digital Business Operations at PT PGD</i>
Emanuel, Andi Wahyu Rahardjo	1C.3	100	<i>Influence Distribution Training Data on Performance Supervised Machine Learning Algorithms</i>
Engel, Ventje	1E.6	203	<i>Network Attack Detection System Using Filter-based Feature Selection and SVM</i>
F A B C D E F G H I J K L M N O P Q R S T U V W X Y Z			
Fachrie, Muhammad	2G.1	583	<i>Guided Genetic Algorithm to Solve University Course Timetabling with Dynamic Time Slot</i>
Fadhilah, Amanda	1D.8	170	<i>Measurement of Information Security Awareness Level: A Case Study of Online Transportation Users</i>
Fahmi, Fahmi	2B.4	371	<i>Development of The Personnel Monitoring System Using Mobile Application and Real-Time Database During the COVID19 Pandemic</i>
Fahrudin, Tresna	2A.7	344	<i>Indonesian Stock Price Prediction including Covid19 Era Using Decision Tree Regression</i>
Fanani, M.	1C.7	117	<i>Implementation of Maximum Power Point Tracking on PV System using Artificial Bee Colony Algorithm</i>
Faraby, Muhira	2C.4	418	<i>The Single Tuned Filter Planning to Mitigate Harmonic Pollution in Radial Distribution Network Using Particle Swarm Optimization</i>
Fardan, Fardan	1D.3	140	<i>Experimental Security Analysis for Fake eNodeB Attack on LTE Network</i>
Farrell, Mochammad	2E.3	505	<i>Combined Firefly Algorithm-Random Forest to Classify Autistic Spectrum Disorders</i>
Fatichah, Chastine	3C.2	661	<i>The Use of Pre and Post Processing to Enhance Mandible Segmentation using Active Contours on Dental Panoramic Radiography Images</i>
Ferdiansyah, Indra	1C.7	117	<i>Implementation of Maximum Power Point Tracking on PV System using Artificial Bee Colony Algorithm</i>

	2C.3	412	<i>Design and Implementation of SVPWM Inverter to Reduce Total Harmonic Distortion (THD) on Three Phase Induction Motor Speed Regulation Using Constant V/F</i>
	2C.2	406	<i>Three Phase Induction Motor Dynamic Speed Regulation Using IP Controller</i>
Firdaus, Diash	1D.7	164	<i>DDoS Attack Detection in Software Defined Network using Ensemble K-means++ and Random Forest</i>
Firdaus, Diaz	2D.6	476	<i>Topic-Based Tweet Clustering for Public Figures Using Ant Clustering</i>
Fitria, Irma	1G.8	306	<i>Ship Heading Control Using Nonlinear Model Predictive Control</i>
Fitriati, Andi	2C.4	418	<i>The Single Tuned Filter Planning to Mitigate Harmonic Pollution in Radial Distribution Network Using Particle Swarm Optimization</i>
Frannita, Eka	2E.2	499	<i>Supervised Deep Learning for Thyroid Nodules Classification Based on Margin Characteristic</i>
G A B C D E F G H I J K L M N O P Q R S T U V W X Y Z			
Ginting, Ishak	1D.3	140	<i>Experimental Security Analysis for Fake eNodeB Attack on LTE Network</i>
Gitakarma, Made Santo	1F.1	221	<i>Designing Wireless Sensor Network Routing on Agriculture Area Using The LEACH Protocol</i>
Gumilar, Langlang	3E.2	711	<i>Variations in the Placement of DFIG in the Power System to Changes of Short Circuit Current</i>
Gunawan, Dadang	1E.2	182	<i>Initial Access in 5G mmWave Communication using Hybrid Genetic Algorithm and Particle Swarm Optimization</i>
Gupta, Anju	2C.9	445	<i>Robust Control Design Procedure and Simulation of PRES Controller having Phase-Locked Loop(PLL) control technique in Grid-Tied Converter</i>
H A B C D E F G H I J K L M N O P Q R S T U V W X Y Z			
Hadikurniawati, Wiwien	1C.1	83	<i>Performance Comparison of Data Mining Techniques for Rain Prediction Models in Indonesia</i>
Halim, Arwin	2A.4	326	<i>Optimization of SV-kNNC using Silhouette Coefficient and LMKNN for Stock Price Prediction</i>
Hamed, Fatima	1B.7	68	<i>Risk Prediction of Major Depressive Disorder using Artificial Neural Network</i>

Hamka Ibrahim, Muhammad	2C.6	428	<i>Design and Development of Bit Error Measurement using FPGA for Visible Light Communication</i>
Hanifa, Annisa	2C.6	428	<i>Design and Development of Bit Error Measurement using FPGA for Visible Light Communication</i>
Harintaka, Harintaka	2G.5	604	<i>Comparison of the Latest DTM with DEM Pleiades in Monitoring the Dynamic Peatland</i>
Hartanto, Rudy	2B.1	354	<i>The User Experience effect of Applying Floating Action Button (FAB) into Augmented Reality Anatomy Cranium Media Learning Prototype</i>
	2G.3	593	<i>Multi-Point Travel Destination Recommendation System In Yogyakarta Using Hybrid Location Based Service-Floyd Warshall Method</i>
Hasibuan, Siti	1B.3	52	<i>Speaker Recognition Using Mel Frequency Cepstral Coefficient and Self-Organising Fuzzy Logic</i>
Hasim, Sitronella	1F.8	262	<i>Performance Evaluation of Cell-Edge Femtocell Densely Deployed in OFDMA-Based Macrocellular Network</i>
Hastuti, Puji	2G.4	599	<i>Application For Detection Of Pedestrian Position On Zebra Cross</i>
Hermawan, Tofan	1F.3	233	<i>Android Forensic Tools Analysis for Unsend Chat on Social Media</i>
Hermawati, Hermawati	3A.1	621	<i>Facial Expression Recognition and Face Recognition Using a Convolutional Neural Network</i>
Herumurti, Darlis	3C.2	661	<i>The Use of Pre and Post Processing to Enhance Mandible Segmentation using Active Contours on Dental Panoramic Radiography Images</i>
Hery, Hery	1C.1	89	<i>Website Design for Locating Tuna Fishing Spot Using Naïve Bayes and SVM Based on VMS Data on Indonesian Sea</i>
Hidayat, Firhat	1E.6	203	<i>Network Attack Detection System Using Filter-based Feature Selection and SVM</i>
Hidayat, Risanuri	3B.1	642	<i>Comparison of Feature Extraction for Speaker Identification System</i>
	1F.5	245	<i>Single Snapshot-Spatial Compressive Beamforming for Azimuth Estimation and Backscatter Reconstruction</i>
	1B.3	52	<i>Speaker Recognition Using Mel Frequency Cepstral Coefficient and Self-Organising Fuzzy Logic</i>
Hidayat, Taufik	2G.7	615	<i>Validation of Information Technology Value Model for Petroleum Industry</i>

	2G.6	609	<i>Model Development of Information Technology Value for Downstream Petroleum Industry</i>
	2F.1	534	<i>Effect of Android and Social Media User Growth on the Financial Technology Lending Borrowers and its Financing</i>
Hikmah, Awaliyatul	1C.2	94	<i>The Best Parameter Tuning on RNN Layers for Indonesian Text Classification</i>
Hikmarika, Hera	3A.1	621	<i>Facial Expression Recognition and Face Recognition Using a Convolutional Neural Network</i>
Hikmaturokhman, Alfin	1G.3	278	<i>5G New Radio (NR) Network Planning at Frequency 2,6 GHz in The Gold Triangle Area of Jakarta</i>
	1G.2	272	<i>Techno-Economic 5G New Radio Planning at 26 GHz Frequency in Pulogadung Industrial Area</i>
Hilmizen, Naufal	1A.6	26	<i>The Multimodal Transfer Learning for Diagnosing COVID-19 Pneumonia from Chest CT-Scan and X-Ray Images</i>
Hindrayani, Kartika	2A.7	344	<i>Indonesian Stock Price Prediction including Covid19 Era Using Decision Tree Regression</i>
Husin, Zaenal	3A.1	621	<i>Facial Expression Recognition and Face Recognition Using a Convolutional Neural Network</i>
Hutami, Augustine	2E.2	499	<i>Supervised Deep Learning for Thyroid Nodules Classification Based on Margin Characteristic</i>
I A B C D E F G H I J K L M N O P Q R S T U V W X Y Z			
Iftadi, Irwan	2C.6	428	<i>Design and Development of Bit Error Measurement using FPGA for Visible Light Communication</i>
Indriawati, Katherin	1G.6	295	<i>Particle Filter Based Speed Estimator for Speed Sensorless Control in Induction Motor</i>
	1G.7	301	<i>Disturbance Observer-Based Speed Estimator for Controlling Speed Sensorless Induction Motor</i>
Irawan, Arif	2B.8	394	<i>Smart Safe Prototype Based Internet of Things (IoT) with Face and Fingerprint Recognition</i>
Irnawan, Roni	2C.1	400	<i>Minimization of Power Losses through Optimal Placement and Sizing from Solar Power and Battery Energy Storage System in Distribution System</i>
Iskandar, Nur Muhamad	1G.1	267	<i>A Combination of Defected Ground Structure and Line Resonator for Mutual Coupling Reduction</i>
Isnandar, Suroso	2C.5	423	<i>Analysis of Performance Index in Transmission Expansion Planning of Sulawesi's Electricity System</i>

Istikmal, Istikmal	1D.3	140	<i>Experimental Security Analysis for Fake eNodeB Attack on LTE Network</i>
	1D.6	158	<i>Performance Analysis FSR and DSR Routing Protocol in VANET with V2V and V2I Models</i>
	2B.8	394	<i>Smart Safe Prototype Based Internet of Things (IoT) with Face and Fingerprint Recognition</i>
J A B C D E F G H I J K L M N O P Q R S T U V W X Y Z			
Jati Anggoro, Wisang	1E.7	209	<i>Development of Smart Energy Meter Based on LoRaWAN in Campus Area</i>
Jatmiko, Wisnu	2E.5	520	<i>Indonesian Traffic Sign Recognition For Advanced Driver Assistent (ADAS) Using YOLOv4</i>
Julzarika, Atriyon	2G.5	604	<i>Comparison of the Latest DTM with DEM Pleiades in Monitoring the Dynamic Peatland</i>
K A B C D E F G H I J K L M N O P Q R S T U V W X Y Z			
Kamirul, Kamirul	1G.4	284	<i>Modification of 2.2 GHz S-Band Rectangular Patch Microstrip Antenna using Truncated Corner Method for Satellite Applications</i>
	1G.5	289	<i>Design of Optimal Satellite Constellation for Indonesian Regional Navigation System based on GEO and GSO Satellites</i>
Karna, Nyoman	1D.3	140	<i>Experimental Security Analysis for Fake eNodeB Attack on LTE Network</i>
Karo, Ferdinanta	1G.3	278	<i>5G New Radio (NR) Network Planning at Frequency 2,6 GHz in The Gold Triangle Area of Jakarta</i>
Khairunnisa, Syifa	2D.5	471	<i>Removing Noise, Reducing dimension, and Weighting Distance to Enhance k-Nearest Neighbors for Diabetes Classification</i>
Komarudin, Udin	2F.5	551	<i>Development of Temperature and Humidity Control System in Internet-of-Things based Oyster Mushroom Cultivation</i>
Kouty, Shreyus	2C.8	439	<i>Multilayer Secure Hardware Network Stack using FPGA</i>
Krisnadi, Dion	1C.1	89	<i>Website Design for Locating Tuna Fishing Spot Using Naive Bayes and SVM Based on VMS Data on Indonesian Sea</i>
Kristiani, Eveline	2G.1	577	<i>Case Study: AppDynamics Application as Business Intelligence to Support Digital Business Operations at PT PGD</i>

Kunang, Yesi	1D.4	146	<i>Improving Classification Attacks in IOT Intrusion Detection System using Bayesian Hyperparameter Optimization</i>
Kurniawati, Yulia Ery	1B.1	42	<i>Papaya Disease Detection Using Fuzzy Naïve Bayes Classifier</i>
Kusnandar, Kusnandar	2F.5	551	<i>Development of Temperature and Humidity Control System in Internet-of-Things based Oyster Mushroom Cultivation</i>
L A B C D E F G H I J K L M N O P Q R S T U V W X Y Z			
Lagunov, Alexey	3E.1	705	<i>Features of the Use of Solar Panels at Low Temperatures in the Arctic</i>
Lee, HoonJae	1E.3	187	<i>TwoChain: Leveraging Blockchain and Smart Contract for Two Factor Authentication</i>
Lee, Sang-Gon	1E.3	187	<i>TwoChain: Leveraging Blockchain and Smart Contract for Two Factor Authentication</i>
Lin, Haitao	1A.2	12	<i>Distributed Alternating Direction Multiplier Method Based on Optimized Topology and Nodes Selection Strategy</i>
Lubis, Ainul	2B.3	365	<i>Proximity-based COVID-19 Contact Tracing System Devices for Locally Problems Solution</i>
Lukas, Samuel	1C.1	89	<i>Website Design for Locating Tuna Fishing Spot Using Naïve Bayes and SVM Based on VMS Data on Indonesian Sea</i>
M A B C D E F G H I J K L M N O P Q R S T U V W X Y Z			
Mahamad, Abd Kadir	2B.4	371	<i>Development of The Personnel Monitoring System Using Mobile Application and Real-Time Database During the COVID19 Pandemic</i>
Mahardiko, Rahutomo	2G.7	615	<i>Validation of Information Technology Value Model for Petroleum Industry</i>
	2G.6	609	<i>Model Development of Information Technology Value for Downstream Petroleum Industry</i>
	2F.1	534	<i>Effect of Android and Social Media User Growth on the Financial Technology Lending Borrowers and its Financing</i>
Mahersatillah, Andi	3D.2	688	<i>Unstructured Road Detection and Steering Assist Based on HSV Color Space Segmentation for Autonomous Car</i>
Mahfiz, Syiti	2D.8	488	<i>Aspect-based Opinion Mining on Beauty Product Reviews</i>

Manik, Lindung	3A.2	627	<i>Stemming Javanese: Another Adaptation of the Nazief-Adriani Algorithm</i>
Mardhotillah, Rinda	2E.4	514	<i>Speaker Recognition For Digital Forensic Audio Analysis Using Support Vector Machine</i>
Masngut, Ibnu	2B.2	360	<i>Development and Implementation of Kalman Filter for IoT Sensors: Towards a Better Precision Agriculture</i>
Maulana, Eka	1E.7	209	<i>Development of Smart Energy Meter Based on LoRaWAN in Campus Area</i>
Mawaldi, Ikkal	1D.3	140	<i>Experimental Security Analysis for Fake eNodeB Attack on LTE Network</i>
Mootha, Siddartha	3E.4	721	<i>A Stacking Ensemble of Multi Layer Perceptrons to Predict Online Shoppers' Purchasing Intention</i>
Mubarok, Husein	2B.5	377	<i>Prototype Design of IoT (Internet of Things)-based Load Monitoring System</i>
Muchtar, Akhyar	2C.4	418	<i>The Single Tuned Filter Planning to Mitigate Harmonic Pollution in Radial Distribution Network Using Particle Swarm Optimization</i>
Muchtar, Kahlil	2E.3	509	<i>Convolutional Network and Moving Object Analysis for Vehicle Detection in Highway Surveillance Videos</i>
Muflikhah, Laïlil	1A.8	37	<i>Prediction of Liver Cancer Based on DNA Sequence Using Ensemble Method</i>
Muharram, Muh.	2D.4	467	<i>Firefly Algorithm-based Optimization of Base Transceiver Station Placement</i>
Mujahidin, Irfan	1A.2	7	<i>Blackbox Testing Model Boundary Value of Mapping Taxonomy Applications and Data Analysis of Art and Artworks</i>
Muladi, Muladi	2B.4	371	<i>Development of The Personnel Monitoring System Using Mobile Application and Real-Time Database During the COVID19 Pandemic</i>
Mulyanto, Agus	2E.5	520	<i>Indonesian Traffic Sign Recognition For Advanced Driver Assistent (ADAS) Using YOLOv4</i>
Munadi, Rendy	1D.7	164	<i>DDoS Attack Detection in Software Defined Network using Ensemble K-means++ and Random Forest</i>
Mungkasi, Sudi	2A.2	321	<i>Some Numerical and Analytical Solutions to an Enzyme-Substrate Reaction-Diffusion Problem</i>
Mursanto, Petrus	2E.5	520	<i>Indonesian Traffic Sign Recognition For Advanced Driver Assistent (ADAS) Using YOLOv4</i>

Murwantara, I Made	1C.1	89	<i>Website Design for Locating Tuna Fishing Spot Using Naive Bayes and SVM Based on VMS Data on Indonesian Sea</i>
Mustika, I Wayan	1E.5	198	<i>Roadside Unit Power Saving using Vehicle Detection System in Vehicular Ad-hoc Network</i>
	1E.8	215	<i>Performance Enhancement in Macro-Femto Network Using a Modified Discrete Moth-flame Optimization Algorithm</i>
	1E.7	209	<i>Development of Smart Energy Meter Based on LoRaWAN in Campus Area</i>
	1D.2	135	<i>Interference Mitigation in Cognitive Radio Network Based on Grey Wolf Optimizer Algorithm</i>
	2G.4	599	<i>Application For Detection Of Pedestrian Position On Zebra Cross</i>
Muthchamy Sellamuthu, Karthika Devi	3E.4	721	<i>A Stacking Ensemble of Multi Layer Perceptrons to Predict Online Shoppers' Purchasing Intention</i>
Muttaqin, Didik	2D.3	463	<i>Speech Emotion Detection Using Mel-Frequency Cepstral Coefficient and Hidden Markov Model</i>
N A B C D E F G H I J K L M N O P Q R S T U V W X Y Z			
N. Fathee, Hala	3B.4	655	<i>A Robust Iris Segmentation Algorithm Based on Pupil Region for Visible Wavelength Environments</i>
Nafi'iyah, Nur	3C.2	661	<i>The Use of Pre and Post Processing to Enhance Mandible Segmentation using Active Contours on Dental Panoramic Radiography Images</i>
Nagy, Adam	3A.3	632	<i>A bio-motivated vision system and artificial neural network for autonomous UAV obstacle avoidance</i>
Najmurokhman, Asep	2F.5	551	<i>Development of Temperature and Humidity Control System in Internet-of-Things based Oyster Mushroom Cultivation</i>
Nam, Andrew	1A.1	1	<i>Resource-Aware Pareto-Optimal Automated Machine Learning Platform</i>
Nasaruddin, Nasaruddin	2E.3	509	<i>Convolutional Network and Moving Object Analysis for Vehicle Detection in Highway Surveillance Videos</i>
Nashiruddin, Muhammad Imam	1F.6	251	<i>Performance Evaluation of XGS-PON Optical Network Termination for Enterprise Customer</i>
	1F.4	239	<i>Performance Evaluation of IPTV Multicast Service Testing for XGS-PON Optical Line Termination</i>
Nasr-Azadani, Mohamad	1A.1	1	<i>Resource-Aware Pareto-Optimal Automated Machine Learning Platform</i>

Nasri, Muhammad	2B.1	354	<i>The User Experience effect of Applying Floating Action Button (FAB) into Augmented Reality Anatomy Cranium Media Learning Prototype</i>
Nguyen-Quoc, Huy	2D.1	451	<i>Gender recognition based on ear images: a comparative experimental study</i>
Nivaan, Goldy Valendria	1C.4	106	<i>Analytic Predictive of Hepatitis using The Regression Logic Algorithm</i>
Noer, Astriany	1G.4	284	<i>Modification of 2.2 GHz S-Band Rectangular Patch Microstrip Antenna using Truncated Corner Method for Satellite Applications</i>
	1G.5	289	<i>Design of Optimal Satellite Constellation for Indonesian Regional Navigation System based on GEO and GSO Satellites</i>
NQ, Mohammad Arifin	3A.2	627	<i>Stemming Javanese: Another Adaptation of the Nazief-Adriani Algorithm</i>
Nugraha, Syechu	2C.3	412	<i>Design and Implementation of SVPWM Inverter to Reduce Total Harmonic Distortion (THD) on Three Phase Induction Motor Speed Regulation Using Constant V/F</i>
	2C.2	406	<i>Three Phase Induction Motor Dynamic Speed Regulation Using IP Controller</i>
Nugroho, Hanung	2E.2	499	<i>Supervised Deep Learning for Thyroid Nodules Classification Based on Margin Characteristic</i>
Nugroho, Lukito	2G.3	593	<i>Multi-Point Travel Destination Recommendation System In Yogyakarta Using Hybrid Location Based Service-Floyd Warshall Method</i>
	2G.4	599	<i>Application For Detection Of Pedestrian Position On Zebra Cross</i>
Nur, Darfiana	2A.1	310	<i>On Parameter Estimation of Stochastic Delay Difference Equation using the Two m-delay Autoregressive Coefficients</i>
Nurdewanto, B.	1A.2	7	<i>Blackbox Testing Model Boundary Value of Mapping Taxonomy Applications and Data Analysis of Art and Artworks</i>
Nurfadillah, Raditya	2D.2	457	<i>Benchmarking Explicit Rating Prediction Algorithms for Cosmetic Products</i>
Nurlina, Elin	2F.5	551	<i>Development of Temperature and Humidity Control System in Internet-of-Things based Oyster Mushroom Cultivation</i>

Nurmaini, Siti	1D.4	146	<i>Improving Classification Attacks in IOT Intrusion Detection System using Bayesian Hyperparameter Optimization</i>
Nurtiyasari, Devi	3C.3	667	<i>COVID-19 Chest X-Ray Classification Using Convolutional Neural Network Architectures</i>
Nurwarsito, Heru	1E.1	176	<i>Performance Analysis of Temporally Ordered Routing Algorithm Protocol and Zone Routing Protocol On Vehicular Ad-Hoc Network in Urban Environment</i>
Nusantara, Damai	2C.5	423	<i>Analysis of Performance Index in Transmission Expansion Planning of Sulawesi's Electricity System</i>
O A B C D E F G H I J K L M N O P Q R S T U V W X Y Z			
Octarina, Sisca	2A.1	315	<i>The N-Sheet Model in Capacitated Multi-Period Cutting Stock Problem with Pattern Set-Up Cost</i>
Oktian, Yustus	1E.3	187	<i>TwoChain: Leveraging Blockchain and Smart Contract for Two Factor Authentication</i>
Osman, Safaa	1B.7	68	<i>Risk Prediction of Major Depressive Disorder using Artificial Neural Network</i>
P A B C D E F G H I J K L M N O P Q R S T U V W X Y Z			
Perkasa, Gregorius	1D.2	135	<i>Interference Mitigation in Cognitive Radio Network Based on Grey Wolf Optimizer Algorithm</i>
Permana, Indra	2F.1	534	<i>Effect of Android and Social Media User Growth on the Financial Technology Lending Borrowers and its Financing</i>
Permanasari, Adhistya	2B.1	354	<i>The User Experience effect of Applying Floating Action Button (FAB) into Augmented Reality Anatomy Cranium Media Learning Prototype</i>
Petho, Mate	3A.3	632	<i>A bio-motivated vision system and artificial neural network for autonomous UAV obstacle avoidance</i>
Prakoso, Rahardi	1D.8	170	<i>Measurement of Information Security Awareness Level: A Case Study of Online Transportation Users</i>
Pramono, Subuh	2C.6	428	<i>Design and Development of Bit Error Measurement using FPGA for Visible Light Communication</i>
Prasetya, Suisbiyanto	1G.4	284	<i>Modification of 2.2 GHz S-Band Rectangular Patch Microstrip Antenna using Truncated Corner Method for Satellite Applications</i>
Prasetyawan, Purwono	2E.5	520	<i>Indonesian Traffic Sign Recognition For Advanced Driver Assistent (ADAS) Using YOLOv4</i>

Prasetyo, Wisnu	2A.8	348	<i>Students Academic Performance Prediction with k-Nearest Neighbor and C4.5 on SMOTE-balanced data</i>
Prasojo, Radityo Eko	2D.2	457	<i>Benchmarking Explicit Rating Prediction Algorithms for Cosmetic Products</i>
Pratama, Denni	1A.4	17	<i>Comparison of PSO, FA, and BA for Discrete Optimization Problems</i>
Pratama, Gilang	2B.2	360	<i>Development and Implementation of Kalman Filter for IoT Sensors: Towards a Better Precision Agriculture</i>
Pratama, Raditya	2G.3	593	<i>Multi-Point Travel Destination Recommendation System In Yogyakarta Using Hybrid Location Based Service-Floyd Warshall Method</i>
Pratama, Yogaswara	2G.1	577	<i>Case Study: AppDynamics Application as Business Intelligence to Support Digital Business Operations at PT PGD</i>
Pratiwi, Melati	3C.4	677	<i>Classification of Customer Actions on Digital Money Transactions on PaySim Mobile Money Simulator using Probabilistic Neural Network (PNN) Algorithm</i>
Priyadi, Ardyono	3E.3	716	<i>Energy Management Efficiency and Stability Using Passive Filter in Standalone Photovoltaic Sudden Cloud Condition</i>
Priyadi, Yudi	2A.5	332	<i>Extraction Dependency Based on Evolutionary Requirement Using Natural Language Processing</i>
Priyambodo, Tri	1F.1	221	<i>Designing Wireless Sensor Network Routing on Agriculture Area Using The LEACH Protocol</i>
	1D.1	129	<i>Real-time Testing on Improved Data Transmission Security in the Industrial Control System</i>
Prutphongs, Ponsuda	2G.2	588	<i>Decision Support System for Power Plant Improvement Investment Using Life-Cycle Cost</i>
Pujianto, Utomo	2A.8	348	<i>Students Academic Performance Prediction with k-Nearest Neighbor and C4.5 on SMOTE-balanced data</i>
Purnomo, Hindriyanto	1F.7	257	<i>Detection of Sensor Node-less Area Using A Genetic Algorithm for Wireless Sensor Network</i>
	3D.4	700	<i>A Modified Deep Convolutional Network for Covid-19 detection based on chest X-ray images</i>
Purwanto, Era	2C.3	412	<i>Design and Implementation of SVPWM Inverter to Reduce Total Harmonic Distortion (THD) on Three</i>

			<i>Phase Induction Motor Speed Regulation Using Constant V/F</i>
	2C.2	406	<i>Three Phase Induction Motor Dynamic Speed Regulation Using IP Controller</i>
Purwanto, Yudha	1D.7	164	<i>DDoS Attack Detection in Software Defined Network using Ensemble K-means++ and Random Forest</i>
Puspita, Fitri Maya	2F.5	556	<i>Modification of Wireless Reverse Charging Scheme with Bundling Optimization Issues</i>
Puspitasari, Novianti	2D.7	482	<i>Dayak Onion (<i>Eleutherine palmifolia</i> (L) Merr) as An Alternative Treatment in Early Detection of Dental Caries using Certainty Factor</i>
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W 5 A B C D E F G H I L M N O P Q R S T U V W

Website Design for Locating Tuna Fishing Spot Using Naïve Bayes and SVM Based on VMS Data on Indonesian Sea

Influence Distribution Training Data on Performance Supervised Machine Learning Algorithms

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Abstract—Almost all fields of life need Banknote. Even particular fields of life require banknotes in large quantities such as banks, transportation companies, and casinos. Therefore Banknotes are an essential component in carrying out all activities every day, especially those related to finance. Through technological advancements such as scanners and copy machine, it can provide the opportunity for anyone to commit a crime. The crime is like a counterfeit banknote. Many people still find it difficult to distinguish between a genuine banknote and counterfeit Banknote, that is because counterfeit Banknote produced have a high degree of resemblance to the genuine Banknote. Based on that background, authors want to do a classification process to distinguish between genuine Banknote and counterfeit Banknote. The classification process use methods Supervised Learning and compares the level of accuracy based on the distribution of training data. The methods of supervised Learning used are Support Vector Machine (SVM), K-Nearest Neighbor (K-NN), and Naïve Bayes. K-NN method is a method that has the highest specificity, sensitivity, and accuracy of the three methods used by the authors both in the training data of 30%, 50%, and 80%. Where in the training data 30% and 50% value specificity: 0.99, sensitivity: 1.00, accuracy: 0.99. While the 80% training data value specificity: 1.00, sensitivity: 1.00, accuracy: 1.00. This means that the distribution of training data influences the performance of the Supervised Machine Learning algorithm. In the KNN method, the greater the training data, the better the accuracy.

Keywords—Banknotes, Supervised Machine Learning, Support Vector Machine, K-Nearest Neighbor, Naïve Bayes

I. INTRODUCTION

A banknote is an essential component and becomes an asset valuable to a country. Almost all field of life in a country needs a banknote [1]. Start from the areas of life involving big companies to small companies. The Banknote is becoming essential to the field of life that have high needs, such as banks, transportation companies, and casinos [2]. Along with the development of technology, many are a crime that also appeared in it. One of these is a counterfeit banknote. That crime, of course, will harm many people. Technologies that have used in making counterfeit banknotes such as a scanner and copy machine. Through the technology can allow anyone to commit process counterfeit banknote [3]. The level of similarity from counterfeit Banknotes that have produced is very high, so that can complicate many people to distinguish genuine and counterfeit banknotes [1].

Problem-solving counterfeit Banknote can be done with various technologies such as the utilization of development

from a sensor [4] and hardware. The weakness of the techniques is they are expensive, inaccurate, and not easy to carry anywhere [5]. To overcome the vulnerability that can use one of the methods which are developing is Machine learning [3]. The techniques in machine learning can be used to overcome various problems like classification, clustering, association rule mining, and prediction. The accuracy in an election the method becomes the primary key to overcome the problem is happening [6]. The type of machine learning used by authors is supervised Learning that aims to overcome the classification problem.

Based on the background, the Supervised Learning methods being analyzed are Support Vector Machine (SVM), K-Nearest Neighbor (K-NN), and Naïve Bayes to process classification to the problem counterfeit banknotes. Each method of supervised Learning has a different level of accuracy. Many factors can influence the different levels of accuracy in each supervised method, such as the amount of data that used, the method selected to the distribution of data training, and data testing. The aim of authors besides doing process classification to distinguish counterfeit banknotes and genuine banknotes is to compare the level of accuracy of the third method supervised Learning that has mentioned based on the distribution of training data.

II. LITERATURE REVIEW

In this section, the authors will explain previous research related to the research being carried out by the authors. Recently methods in machine learning are being discussed. One problem that is often considered is classification. Classification is dividing classes into the data used to analyze data. The methods used are Artificial Neural Network, Support Vector Machine and K-Nearest Neighbours classifiers. Through the machine learning methods used for breast cancer classification [7], crime prediction [8], and banknotes are generally divided into two classes. Then make the supervised learning method comparison to measure the level of accuracy in each method [9]. Some paper has the same goal to measure accuracy in each method used for classification, especially classification for banknotes. These methods are *Naïve Bayes and Multilayer Perceptron* [6]; *Probabilistic neural network (PNN), Multi-layer Perceptron (MLP), Radial Basis Function (RBF), Decision Tree (DT), and Naïve Base* [3]; *Backpropagation Neural Network (BPN) and Support Vector Machine (SVM)* [1].

In addition to comparing the accuracy of some of the machine learning methods used, some studies only use one method then compute its accuracy. For instance, using the

Convolutional Neural Network method [2] For classification banknote, then calculate its accuracy. Banknotes used are Indian Currency Rupee notes, where the classification process base on color [10]. Another example that uses only one method is classification banknotes from Banglades, which consist of two types are 500 and 1000 BDT. There are three extracted features, which are watermark, latent image dan micro-text. Then use the Support Vector Machine (SVM) method to do the classification base on the extracted features [5].

The level accuracy of each method is used differently. In the Naïve Bayes method and Multilayer Perceptron method, the accuracy rate is 95% and 97%, so the Multilayer Perceptron method outperforms the Naïve Bayes method [6]. Whereas in the comparison of the Probabilistic neural network (PNN), Multi-layer Perceptron (MLP), Radial Basis Function (RBF), Decision Tree (DT), and Naïve Bayes method, the best accuracy of the method is Decision Tree (DT) method. The DT method has accuracy of 99%, followed by Multi-layer Perceptron (MLP) method with accuracy 98.7%, the Probabilistic neural network (PNN) method with accuracy 98.3%, Naïve Bayes method which accuracy method is 85.9% and last Radial Basis Function (RBF) which accuracy rate is 57% [3]. Then Backpropagation Neural Network (BPN) and Support Vector Machine (SVM) method have a level of accuracy in a row of 100% and 98.9% [1].

Source of data that is gotten used in the machine learning method most of the website UCI machine learning repository [1][7][6][3]. Some sources of data came from the result of the extra image that is used for classification [9][4][5]. Then the machine learning methods are implemented in GNU Octave [1], scikit-learn machine learning library on anaconda distribution [7], MATLAB (version 8.4.0 (64bit)) [5], and Python [11]. In this paper, the authors classify Banknote with machine learning methods. Then compare the level of accuracy. The machine learning method used is supervised learning methods, namely Support Vector Machine (SVM), K-Nearest Neighbor (K-NN), and Naïve Bayes. Authors use data that came from the website UCI machine learning repository and implemented in Python. The novelty in this research is to prove the influence of training data on the performance of Supervise Machine Learning algorithm. This is done with categorizing training data to three-part, namely 30%, 50%, and 80% of the total data used in this research.

III. MATERIALS AND METHOD

A. Materials

The data used in this paper comes from the UCI machine learning repository website. Where the total data is 1372, this data has five attributes. More details can be seen in table 1.

TABLE I. ATTRIBUTES ON BANKNOTE DATA

Attributes	Type
Variance	Continuous
Skewness	Continuous
Curtosis	Continuous
Entropy	Continuous
Class	Integer

Based on table 1, banknote data has 4 features and 1 class. These four features are obtained by extracting an original and counterfeit banknote image using the Wavelet Transform

tool. Data class is a target data that has two choices, integer numbers 0 and 1. Number 0, shows genuine note while number 1, shows a counterfeit note

B. Method

In classifying the authors use the Cross-Industry Standard Process for Data Mining (CRISP-DM) methodology [12]. The method arranged at the end of 1996 and has six phases. The six steps are shown in the following figure.

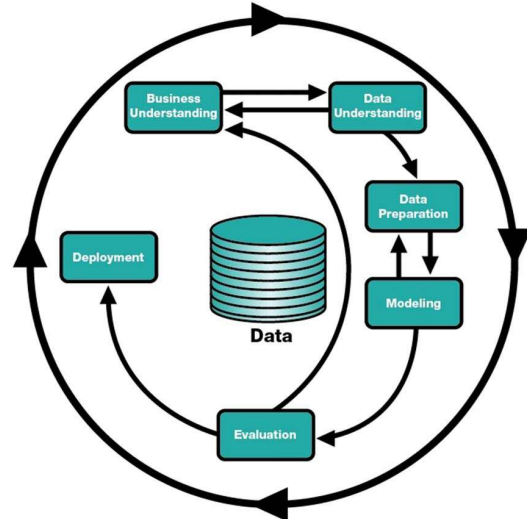


Figure 1 The stages of CRISP-DM

The following will be explained in detail related to the six phases shown in Figure 1.

1. Business Understanding

This phase has the purpose of determining business goals. Here the researcher must know the meaning of the research to be conducted. In this phase, the authors have understood the purpose of the study. The research objective is to classify genuine and counterfeit Banknotes use supervised learning methods. Then compare the accuracy of each technique. The classification base on the distribution of training data.

2. Data Understanding

This phase has the purpose of collecting data. Here the researcher collects the preliminary data that will be used. In addition, it must understand the data so that the classification goes well. In this phase, the authors get data that will be used in the next step. Whereas data is obtained from the website UCI machine learning repository. From the data, we have known that the sum of all data is 1372 and has 5 attributes. The attribute consists of 4 features and 1 class.

3. Data Preparation

This phase has the purpose of select data, clean data, construct data, and integrate data. The data will be used by the authors and have been observed from corrupted data and missing data, so that in this phase that authors do not perform the preparation process.

4. Modeling

This phase has the purpose of selecting the method that will be used when implementing the method and evaluating the method that has been used. In this phase, the authors have determined the method has been used

for classification banknote. The method to be used is Supervised Learning, namely *Support Vector Machine (SVM)*, *K-Nearest Neighbor (K-NN)*, and *Naïve Bayes*. Then the authors compare each method that has been used.

5. Evaluation

This phase has the purpose of evaluating the result, evaluate the process, and determine the next step. In this phase, the authors will determine the results obtained. Then review the result in seeing the level of accuracy of each method. Besides, the authors provide conclusions and recommendations for further classification.

6. Deployment

This phase has the purpose of Plan deployment, plan monitoring and maintenance, final report, and review project. In this phase, the authors make reports and reviews these methods.

C. Algorithm Used

1. K-Nearest Neighbor (K-NN)

KNN is one of the learning methods in carrying out the classification process. From its name, it can be seen that the classification process using KNN is based on the closest distance from its neighbors [13][14]. In the process of classification KNN uses training data and testing data. The workings of the KNN method are based on the level of similarity of the data formed in the training data. Training data will be used as a reference for testing data. The closest distance can be calculated using Euclidean distance. Where the closer the Euclidean distance is, the degree of similarity is higher [15][16].

2. Support Vector Machine (SVM)

Support Vector Machine (SVM) have become one of the effective methods in carrying out the process of classification and regression [17]. The working principle of SVM is to find a hyperplane using the principle of Structural Risk Minimization. The goal is to get the best hyperplane. The hyperplane will divide it into two classes [18]. The advantage of SVM is that it can handle semi-structured data and structures. Using the SVM method can reduce overfitting. However, the performance of SVM will decrease if the data is too large. The presence of missing in the data also affects the performance of the SVM [17]. The implementation of SVM in classification is done by dividing the data into training data and predictive data. Data will be predicted based on training data that has been trained in advance [19].

3. Naïve Bayes

In 1970, two groups developed the NB method. The two groups each consist of two people. The first group consisted of CT Yu and G Salton. The second group consists of S. Roberson and K. Spark [20]. Naïve Bayes is an algorithm based on Bayes Theory. The Naïve Bayes method has strong assumptions about the independence of each feature. This method can handle large data and can reduce the risk of overfitting [21][22].

4. Measuring Classification Algorithms

In conducting the evaluation process of each method used in this study, the authors used six variables. The six variables are specificity, sensitivity, accuracy, precision, recall, and F1-score. The calculation of the six variables is based on table 2 matrix confusion.

TABLE II. CONFUSION MATRIX

	Classified Positive	Classified Negative
Actual Positive	True Positive (TP)	False Negative (FN)
Actual Negative	False Positive (FP)	True Negative (TN)

TP is the amount of genuine note classified correctly. FN is the amount of genuine note that is classified incorrectly. FP is the amount of counterfeit money classified incorrectly. TN is the amount of counterfeit note which is classified correctly. The formula specificity, sensitivity, accuracy [19], precision, recall, and F1-score [18] in a row can be seen in the following equations:

1. Specificity

Specificity is a process to count counterfeit note. The process is done by the amount of counterfeit note which is classified correctly is divided into the amount of counterfeit note.

$$\text{Specificity \%} = \frac{TN}{TN+FP} \times 100\% \quad (1)$$

2. Sensitivity

Sensitivity is a process to count genuine note. The process is done by the amount of genuine note classified correctly is divided into the amount of genuine note.

$$\text{Sensitivity \%} = \frac{TP}{TP+FN} \times 100\% \quad (2)$$

3. Accuracy

Accuracy describes the closeness between the predicted value and the actual value. *Accuracy* is done by the amount of genuine and the amount of genuine note classified correctly note is divided into the amount of money.

$$\text{Accuracy \%} = \frac{TP+TN}{TP+TN+FP+FN} \times 100\% \quad (3)$$

4. Precision

Precision describes the level of accuracy expected by the user with the answer from the system. *Precision* is done by the amount of genuine note classified correctly is divided into the amount of genuine note classified correctly plus the amount of counterfeit money classified incorrectly.

$$\text{Precision \%} = \frac{TP}{TP+FP} \times 100\% \quad (4)$$

5. Recall

Recall is the system process rate the information rediscovered. The process to count *recall* the same with the process to count *sensitivity*.

$$Recall \% = \frac{TP}{TP+FN} \times 100\% \quad (5)$$

6. F1 – Score

F1 – Score is a harmonic mean of precision and recall gives a score.

$$F1 - Score \% = 2 \cdot \frac{Precision \cdot Recall}{Precision + Recall} \quad (6)$$

IV. RESULT AND DISCUSSION

In this section, the authors will present the results of the study and then discuss it. The authors have followed the stages of CRISP-DM. Banknote data has class 0 for genuine banknotes and class 1 for counterfeit banknotes. The amount of data is 762 and 610, respectively. Both classes have data that are sufficiently balanced to carry out the process of comparing performance using supervised machine learning methods. The data used by the author does not have missing, so the authors do not do the preparation process. Then the authors will analyze the performance of supervised learning methods, namely: K-Nearest Neighbor (K-NN), Support Vector Machine (SVM), and Naïve Bayes (NB) in recognizing genuine banknotes and counterfeit banknotes.

In the process of distribution training and testing data, the authors use scikit-learn machine learning by importing `train_test_split`. To see the effect of training data on the performance of supervised learning methods, the authors divide the training data into three groups, namely 30%, 50%, and 80%. 30% of the total data was about 411, 50% of the total data was about 686, and 80% of the total data was about 1097. Then the authors again use scikit-learn machine learning to call the supervised learning methods used in this paper. In all methods, the author uses `random_state = 4`. After that, the authors make the prediction process of the test data.

After that, the authors evaluate all the methods that have been used by importing `classification_report` and `confusion_matrix`. Where the attributes displayed are True Positive (TP), False Negative (FN), False Positive (FP), and True Negative (TN). Then based on the results of the `confusion_matrix` the authors display the accuracy, precision, recall, f1-score. In evaluating the author also shows sensitivity and specificity. Following in table 3, the authors show the accuracy, sensitivity, and specificity of each supervised learning method based on the distribution of training data that has been determined.

TABLE III. EVALUATION OF METHODS USED BASE ON SPECIFICITY, SENSITIVITY, DAN ACCURACY

Data Training	Methods	Specificity	Sensitivity	Accuracy
30%	K-NN, K=1	0.99	1.00	0.99
	K-NN, K=3	0.98	1.00	0.99
	K-NN, K=5	0.99	1.00	0.99
	SVM	0.98	1.00	0.99
	NB	0.86	0.82	0.84
50%	K-NN, K=1	0.99	1.00	0.99

	K-NN, K=3	0.99	1.00	0.99
	K-NN, K=5	0.99	1.00	0.99
	SVM	0.98	1.00	0.99
	NB	0.85	0.81	0.83
80%	K-NN, K=1	1.00	1.00	1.00
	K-NN, K=3	1.00	1.00	1.00
	K-NN, K=5	1.00	1.00	1.00
	SVM	0.98	1.00	0.98
	NB	0.83	0.83	0.83

Table 3 displays the Specificity, Sensitivity, and Accuracy values of the K-NN, SVM, and NB methods based on the distribution of training data. In the distribution of training data by 30%, the NB method has the lowest accuracy value compared to the K-NN and SVM methods. While both SVM and K-NN methods that have a value of $k = 1$, $k = 3$ or $k = 5$ have the same accuracy value of 0.99. Then in the 50% training data division, the NB method has the lowest accuracy value compared to the SVM and K-NN methods. While in the distribution of training data by 80%, the K-NN method has the highest accuracy, either having a value of $k = 1$, $k = 3$, or $k = 5$. Then followed by the SVM method and, finally, the NB method with an accuracy of 0.83.

The distribution of training data influences the three methods used by the authors, although the effect is not significant. In the K-NN method, both those with a value of $k = 1$, $k = 3$, or $k = 5$ have an accuracy of 0.99 when the training data are 30% and 50%, but when the training data is 80%, the accuracy level becomes 1.00. However, in the SVM method, the accuracy is 0.99 when the training data is 30%, and 50% then decreases to 0.98% when the training data is 80%. In the NB method, the accuracy reached 0.84 when the train data was 30% and decreased to 0.83 in the training data by 50% and 80%. The authors display an evaluation of machine learning methods based on precision, recall, f1-score on table 4.

TABLE IV. EVALUATION OF METHODS USED BY PRECISION, RECALL, DAN F1-SCORE

Data Training	Methods	Precision	Recall	F1-Score	Class
30%	K-NN, K=1	1.00	1.00	1.00	0
		1.00	1.00	1.00	1
	K-NN, K=3	1.00	0.99	0.99	0
		0.98	1.00	0.99	1
	K-NN, K=5	1.00	1.00	1.00	0
		1.00	1.00	1.00	1
	SVM	1.00	0.99	0.99	0
		0.98	1.00	0.99	1
NB	0.86	0.86	0.86	0	
	0.83	0.83	0.83	1	
50%	K-NN, K=1	1.00	1.00	1.00	0
		1.00	1.00	1.00	1

	K-NN, K=3	1.00	1.00	1.00	0
		1.00	1.00	1.00	1
	K-NN, K=5	1.00	1.00	1.00	0
		1.00	1.00	1.00	1
	SVM	1.00	0.99	0.99	0
		0.99	1.00	0.99	1
NB	0.85	0.86	0.85	0	
	0.82	0.81	0.82	1	
80%	K-NN, K=1	1.00	1.00	1.00	0
		1.00	1.00	1.00	1
	K-NN, K=3	1.00	1.00	1.00	0
		1.00	1.00	1.00	1
	K-NN, K=5	1.00	1.00	1.00	0
		1.00	1.00	1.00	1
	SVM	1.00	0.98	0.99	0
		0.97	1.00	0.99	1
	NB	0.87	0.84	0.85	0
		0.79	0.84	0.81	1

In table 4, the authors display the values of precision, recall, and f1-score of the three methods. In the 30% training data, the K-NN method with value of $k = 1$ and $k = 5$ has the highest precision, recall, and f1-score both in class 0 and in class 1. This observation means that the K-NN method has a value that is the highest compared to other methods. In comparison, the NB method is the method that has the lowest value. Then in the training data of 50% and 80%, the K-NN method either $k = 1$, $k = 3$, or $k = 5$ has the highest precision, recall, and f1-score compared to the SVM and NB methods. At the same time, the NB method has the lowest precision, recall, and f1-score values.

Based on table 3 and table 4, when the training data is 30%, the K-NN method has an accuracy value of 0.99, a specificity value of 0.99, sensitivity 1.00 at $k = 1$ and $k = 3$. While at $k = 2$, the accuracy value is 0.98, the specificity value is 0.99, sensitivity 1.00. These three values are the same as the SVM method. While the NB method has an accuracy value of 0.84, the specificity value is 0.86; sensitivity is 0.82. This means that the K-NN method is the method that has the highest accuracy compared to the other two methods. Then in the 50% training data, the K-NN method has an accuracy value of 0.99, a specificity value of 0.99, sensitivity 1.00. While for the SVM method, the accuracy value is 0.99, the specificity value is 0.98, sensitivity 1. Likewise, for the 80% training data, the K-NN method has an accuracy value of 1, the specificity value is 1, sensitivity 1. While for the SVM method, the accuracy value is 0.98, the value of specificity is 0.98, sensitivity 0.98. And the NB method has an accuracy value of 0.83, a baseline specificity value of 0.83, sensitivity 0.83. This observation means that the K-NN method has accuracy, specificity, sensitivity values better than the other two methods.

Based on the data in table 3 and table 4, this means that the distribution of training data influences the performance of the supervised machine learning algorithm used in this research. The effect of the distribution of training data on the KNN method is that the greater the training data, the better the performance. On the other hand, the SVM and NB methods the smaller the training data, the better the performance.

V. CONCLUSION

Identifying genuine or counterfeit money is an important thing. Many methods have been established to do this. Here the authors use the K-NN, SVM, and NB methods. Before using these methods, the authors first carry out the process of collecting data. The data used in this study were obtained from the UCI machine learning repository website. After that, the authors apply the three methods using sci-kit-learn machine learning python. Then the authors see the effect of training data sharing on the three methods. The distribution of training data conducted by the authors is 30%, 50%, and 80%. Then the authors analyze the results obtained using several attributes, namely the specificity, sensitivity, accuracy, precision, recall, and f1-score. The distribution of training data influences the performance of the KNN, SVM, and NB methods. Where if the training data is getting bigger, the performance is getting better for the KKN method. On the other hand, the SVM and NB methods the smaller the training data, the better the performance. K-NN method is a method that has the highest specificity, sensitivity, and accuracy of the 3 methods used by the authors both in the training data of 30%, 50%, and 80%. Where in the training data 30% and 50% value specificity: 0.99, sensitivity: 1.00, accuracy: 0.99. While the 80% training data value specificity: 1.00, sensitivity: 1.00, accuracy: 1.00.

ACKNOWLEDGMENT

The author expressed their appreciation for financial support from the Magister Informatika, Universitas Atma Jaya Yogyakarta. Thank you to all those who have supported this research.

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**Influence Distribution Training Data on Performance Supervised Machine
Learning Algorithms**

for outstanding contribution at the 3rd ISRITI 2020
(International Seminar on Research of Information Technology & Intelligent Systems)
organized by STMIK AKAKOM YOGYAKARTA in collaboration with
the Indonesia Researcher & Scientist Institute (IRSI).
Yogyakarta - Indonesia, 10 December 2020

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