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Preface

2017 International Conference on Computer Science and Artificial Intelligence (CSAI 2017) was held in Jakarta, Indonesia during December 5-7, 2017. The purpose of CSAI is to bring together researchers and people from industry working in the fields of computer science and artificial intelligence. It seeks to offer a broad spectrum of current research in this area of theoretical and applied knowledge.

The volume consists of 53 selected papers (from originally 94 papers) which are presented orally at the conference or via poster session. The topics of papers include machine learning and artificial intelligence, software design and program development, image analysis and processing, design and application of information system, communication system and network security as well as computer theory and engineering technology.

The papers are accepted after being peer-reviewed by the conference Technical Program Committee and international reviewers based on the topic of each paper. All the authors of accepted papers have done excellent presentations on this conference via oral presentation or poster presentation. On the basis of the conference achievement, we collect and compile these research papers into the conference proceedings, in which the content represents the latest international academic progress of computer science and artificial intelligence fields. We hope that the presented papers will be interesting for readers and be a good base for inspiration for future developments.

The chairpersons, keynote speakers, plenary speaker played important role in conducting the proceedings of the session in a timely and efficient manner and on behalf of the conference committee, we express sincere appreciation for their involvement. The reviewers of the manuscripts, those by tradition would remain anonymous, have also been very helpful in efficiently reviewing the manuscripts, providing valuable comments well within the time allotted to them. We express our sincere and grateful thanks to all reviewers.

We truly believe the participants will find the discussion fruitful, and will enjoy the opportunity for setting up future collaborations. It is our sincere hope that CSAI will one day become the leading conference in this specific academic area.

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December 22, 2017

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Image Segmentation for One Way Video Traffic Using Background Substraction Method

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ABSTRACT
Current technological developments are experiencing a rapid increase, one of the areas that have increased is pattern recognition. Data or information of movement process of an object can be presented in video form. Video is a composite image / dead images that are read sequentially at a time with a certain speed. Image is something that describes the object. While digital image is an image that has been stored in the form of a file so it can be processed using a computer. Digital image processing techniques can be applied in the process of image segmentation. OpenCV is a library that contains programming functions for real-time computer vision technology. OpenCV already uses the C # language interface and all its development is in C # language format. Examples of applications from OpenCV are human and computer interactions; identification, object segmentation and recognition, face recognition, motion recognition and movement tracking. By utilizing traffic video containing one way traffic flow, then made a vehicle detection program with background substraction method. This research can detect moving objects (vehicles). In the process of testing a video with .avi extension. Then from the video will be segmented thresholding image to find the moving object. Then, a background and foreground separation sequence is performed to separate moving objects with non-moving objects of a certain value.

CCS Concepts
• Computing methodologies→Artificial intelligence →Computer vision problems→ Image segmentation.

Keywords
Image Segmentation; OpenCV; Background Substraction.

1. INTRODUCTION
Image segmentation is one of the important topics in computer science especially in the field of digital image processing and computer vision. The purpose of image segmentation is to partition the image into areas that do not overlap with homogeneous characteristics, such as identity, color, and texture. In applications that process an object such as three-dimensional reconstruction, object recognition, writing recognition, face detection, object coding etc., the process of segmentation is necessary. Segmentation results should be accurate because if not accurate will affect the results of the next process. Monitoring the flow of traffic with the camera is necessary to support the smooth flow of traffic. However, the recording video only displays the usual shelf, so sometimes the passing vehicles are not too visible. So in this study made a program that contains video image segmentation process that is able to display only objects that move without background. The development of this traffic video image segmentation program uses the C# programming language with OpenCV libraries. In this study, the OpenCV library is used because it has the ability to be combined. This OpenCV library has various functions in a programming related to digital image processing and pattern recognition. This program can run on a desktop platform so it can help the officer to calculate passing vehicles easily. Using the background substraction and foreground detector methods in the encoding, the movements within the monitoring area can be detected. The substraction background technique subtracts the frame with the background frame to get the moving object.

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2. LITERATUR REVIEW
Currently the need for monitoring systems in various sectors is increasing rapidly. More and more monitoring systems are implemented for the purpose of improving the security and productivity aspects. Implementation of monitoring is always based on the needs of monitoring on a regular basis and record all activities that take place in the location in the hope that when there is a critical / important things that can be immediately known and addressed. Monitoring systems are usually applied to security aspects, for example in banking, warehousing, offices, public facilities such as airports, stations, to use in residence. Implementation of a monitoring system for transport aspects is applied to the traffic sector where traffic flows can be monitored. Monitoring the flow of traffic with the camera is necessary to support the smooth flow of traffic. On the other hand there is a problem that sometimes passing vehicles are not too clearly visible on the camera. From the problem then built a program for video image segmentation process that able to display object that move without background. There has been a lot of research on this issue and with various methods to solve this problem. Real-time information flow is a very useful resource for implementing security applications and managing a traffic[1]. Other research that has been done is vehicle counting program using background registration technique and segmentation using morphological operator. The system is structured to detect and quantify dynamic objects on the highway efficiently. This system effectively combines a simple knowledge domain of objects that are timed out[2]. The same research has also been done. This study

discusses a method of detection with no background modeling where blocks are altered based on differential method frames, proper extraction area objects with double foregrounds, foreground segmentation, and integrated verification objects to develop adaptive scene of detected vehicle systems[3]. The OpenCV system is implemented using this experimental and kit development drawing shown with real-time video taken from single cameras. Backgrounds taken are used in subsequent analyzes to detect vehicles and classify moving light as vehicles, heavy vehicles and motorcycles[4].

2.1 Image Segmentation

There are two main approaches in image segmentation that are based on edge and region-based. Segmentation is based on the edge of dividing the image based on discontinuities among sub-regions, whereas segmentation is based on the region of work based on the uniformity of the sub-region. The result of image segmentation is the set of regions surrounding the image, or a set of contours extracted from the image (at edge detection). Video segmentation is one of the most challenging mining areas in multimedia. It deals with identifying an interesting object. It has such wide application in the areas of traffic control, security, criminology, etc. Each pixel in a region has similar characteristics or properties, such as color, intensity, and texture[5].

2.2 Background Substraction

Background Substraction is a computational vision with the process of foreground excavation of objects in a particular event. The object's background can be described as an attention object that helps in reducing the amount of data to process as well as providing important information with its task under consideration. In some cases, the distance of a moving object is considered as a background. Identifying moving objects from a video sequence is one of the most critical jobs in many computer-vision applications. A common approach to making background reductions, identified as moving objects from parts of different video frames from the model background[6]. Counting vehicles is done by background reduction and finding center of mass. Classification is done by thresholding method. The frame reference was originally used and considered as background information. While the new object goes into the frame, it is detected by the background reduction[7]. This method is used in making this program because the process of calculating the vehicle based on moving objects and is in the foreground position of the video frame obtained. Figure 1 shows the algorithm of background substraction method.

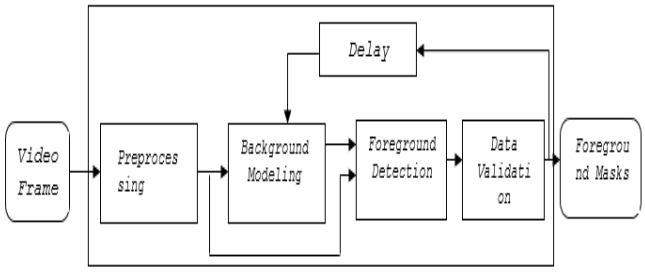

Figure 1. Algorithm of Background Substraction Method.

3. METHODOLOGY

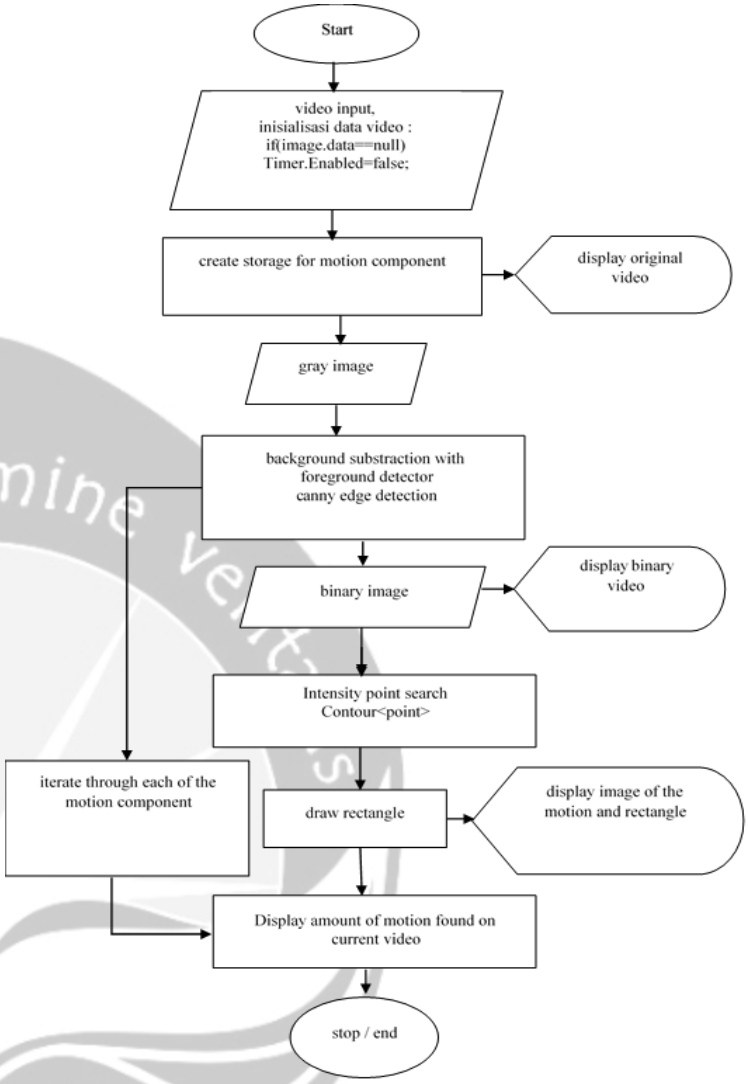

Figure 2. One Way Video Image Segmentation Process with Background Substraction Method.

In Figure 2 shows the process about one way video image segmentation with background substraction method. The first thing users do to run this program is the user upload the video to be used, after the video is inserted then the program will check the video data, what if the video data has a null value then the program will proceed to the next process. The next process is to create a blank storage which is a pointer to a physical address where the stored variable is much better to override an individual variable in it, then storage is expected to create a new resource where it must be re-pooled and reallocated. Then, after the program creates a memory for storing data, the program displays original or original video. In addition, the program also makes a video with gray scale display, where the video with gray scale display is used for the process of segmentation with background substraction and foreground detection method. After the video gray scale is formed then the video enters background and foreground separation process using background substraction and foreground detector method. From the process generated a video

with binary view, the binary video will appear on the GUI (Graphical User Interface) program so that users can see moving objects without any background. The next step is to detect the moving object through the binary video that was previously obtained. In this process the program performs an action to find a point point, this point is used to allocate storage during the approach to the binary video that has been obtained. Then, once the binary video is retrieved and the storage allocation process has been completed, the program runs a rectangle-making process or a yellow box, this box serves as a marker of the captured object from the segmentation result using background sbustraction and foreground detector methods. After the process is complete then the results will be displayed on the GUI (Graphical User Interface). The last process of the program is to display the number of motions detected, ie by using the results of the storage manufacture to store each variable of the moving object components, from which components are calculated how many motions are detected by the program, and the results are displayed on the GUI (Graphical User Interface).

4. DISCUSSION

Figure 3. Main Program.

In Figure 3 shows that three image boxes feature 3 different video views; the first image box displays the original video or the original video, the second image box displays the video that has passed the background and foreground separation with the background substraction and foreground detector method, and on the third image box will show the result video from the second image box added with the box colored yellow as a marker of moving objects. Also on this page there are also buttons or buttons used to open or upload videos from computer files. Then, there is a label that serves to display the number of how many motions are in the video. In this one-way traffic video segmentation program uses the background substraction and foreground detector methods. Background Substraction is a computational vision with the process of foreground excavation of objects in a particular event. The object's background can be described as an attention object that helps in reducing the amount of data to process as well as providing important information with its task under consideration as well as foreground detector. This type of foreground detector is taken from the OpenCV library. Then after selecting the method type, the program updates the background and foreground values on the video image by calling the variable that holds the foreground detector type. So the program displays the video with the background and foreground values that have been updated. Video display after update background and foreground value can be seen at Figure 4.

Figure 4. Video Display After Update Background and Foreground Value.

The next stage is to update the image that has been in the previous process, by taking a variable with MotionHistory data type. MotionHistory is a class that serves to store static image movement data that helps in understanding the movement of the road location and process. With these variables done an update process to the video image to be taken its foreground value only. Video view after update process and foreground value retrieval on previous video image can be seen at Figure 5.

Figure 5. Video View after Update Process and Foreground Value Retrieval on Previous Video Image.

The next step is to place the object box on the object of the vehicle then the program using the list that has been storing the previous vehicle object so that the box object will follow the object of the moving vehicle. In Figure 6 shows the program result with a box object.

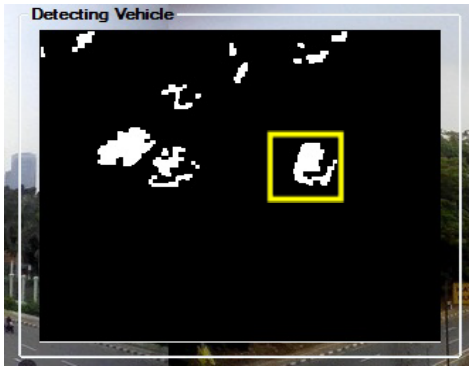

Figure 6. The Program Results with a Box Object That Follows the Movement of the Object Of The Vehicle.

Table 1 shows the test results for some video samples. The sampled video has a different time duration so the number of passing vehicles is also different.

Table 1. Results of The Program Output Test.

Number of vehicles in the video	Number of vehicles detected	Accuraccy (%)
5	3	60
7	4	71
10	7	70
15	10	66
20	14	70

From table 1 it can be concluded that the accuracy of the program output has an average of 67%. Another conclusion that can be concluded from the results of this test is to use the vehicle background substraction method that can be detected only about 67% of the number of vehicles in the video

5. CONCLUSION

The background substraction method is used for the separation of background and foreground values, with a static background and with a moving foreground object. The program is able to detect the motion of any object detected by the canny edge detection method, so the program is able to display the number of motions of all the motion of the detected object. The accuracy using background substraction method is 67%.

6. ACKNOWLEDGMENTS

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