

Dashcam for Traffic Object Detection

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Abstract—Dashcam is a camera stored in a vehicle. This tool serves to record all events in front of the vehicle. Security and safety have become a major concern in various sectors, including transportation and public security. On the highway, traffic accidents caused by the driver's ignorance of objects around the vehicle are still a serious problem. In this study, the development of a simple dashcam built from an edge computer was carried out by combining the number of cameras. Image stitching is applied to combine images that have been collected by each camera. Next, object detection is carried out on the images that have been collected. The object detection system approach is carried out using YOLOv8 which is the latest variant of the YOLO series. This research is expected to be one step in the development of an Intelligent Transportation System that is in accordance with traffic conditions in Indonesia. The results obtained in testing using the system created exist using the configuration of 78000 datasets, 3332 data validation with 8 epochs, batch size 32, linear learning rate and SGD optimization. Results are best in the morning and afternoon. The program can recognize predefined objects.

Index Terms—object detection, YOLOv8, dashcam

I. INTRODUCTION

Security and safety have become a major concern in various sectors, including transportation and public security. On the highway, traffic accidents caused by the driver's ignorance of objects around the vehicle are still a serious problem. Smart and effective object detection technology is becoming increasingly important for monitoring traffic [1].

Video captures from dashcams usually only show one side according to the camera position. However, this results in a lack of information about nearby objects. To overcome this problem, this study tried a solution by using two cameras or cameras placed at different positions in the vehicle. By using more than one camera, diverse viewing angles can provide more complete information about objects around the vehicle. For example, the camera on the left side helps detect objects on the left, while the camera on the right side helps detect

objects on the right. This approach is expected to provide more comprehensive results according to the actual situation in front of the vehicle. Therefore, the study of the application of dual cameras to detect objects becomes very relevant and interesting. By optimizing the use of dual cameras, it is hoped that this technology will be able to provide effective solutions in increasing driver awareness and safety on the road. The application of dual cameras for object detection has the potential to reduce accident incidents, reduce the risk of collisions, and improve the safety of all road users.

II. LITERATURE REVIEW

A. Object Detection

Object Detection is one of the important task in computer vision field, mainly dealing with detecting instances of visual object then categorize them into several classes [?]. With this kind of identification and localization, object detection can be used to count objects in a scene and determine and track their precise locations, all while accurately labeling them. Object detection has been widely used for face detection, vehicle detection, pedestrian counting, web images, security systems and driverless cars. Within the past twenty years, object detection have been going through a lot of changes and development. Although it is commonly divided into two periods: "traditional object detection" and "deep learning based". In 2012, Krizhevsky et al. [?] proposed a deep convolutional network trained on a subset of ImageNet.

This network, called AlexNet, was the first to demonstrate that convolutional neural networks (CNNs) could be trained effectively on large-scale datasets and used to achieve state-of-the-art object detection results. A year later, Girshick et al. proposed a new object detection framework called R-CNN [?] because it used region proposals combined with CNNs to detect objects in images. Since then, the field of object detection has been rapidly advancing, with new models, datasets, and techniques emerging in a rapid pace.

B. YOLO (You Only Look Once)

With the birth of AlexNet, YOLO (You Only Look Once) model was introduced in 2015. Base YOLO model can achieve 45 frame per second. While the smaller version, Fast YOLO can achieve 155 frames per second. YOLO outperforms DPM and R-CNN on Picasso Dataset and People-Art Dataset [?].

As of January 2023, YOLOv8 was introduced by Ultralytics, the same software company that released YOLOv3 and YOLOv5.

III. SYSTEM DESIGN

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- The word “data” is plural, not singular.
- The subscript for the permeability of vacuum μ_0 , and other common scientific constants, is zero with subscript formatting, not a lowercase letter “o”.
- In American English, commas, semicolons, periods, question and exclamation marks are located within quotation marks only when a complete thought or name is cited, such as a title or full quotation. When quotation marks are used, instead of a bold or italic typeface, to highlight a word or phrase, punctuation should appear outside of the quotation marks. A parenthetical phrase or statement at the end of a sentence is punctuated outside of the closing parenthesis (like this). (A parenthetical sentence is punctuated within the parentheses.)
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- There is no period after the “et” in the Latin abbreviation “et al.”.
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An excellent style manual for science writers is [?].

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a) *Positioning Figures and Tables:* Place figures and tables at the top and bottom of columns. Avoid placing them in the middle of columns. Large figures and tables may span across both columns. Figure captions should be below the figures; table heads should appear above the tables. Insert

TABLE I
TABLE TYPE STYLES

Table Head	Table Column Head		
	Table column subhead	Subhead	Subhead
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^aSample of a Table footnote.



Fig. 1. Example of a figure caption.

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IV. RESULTS AND DISCUSSION

A. Training Configuration

B. Real World Testing

V. CONCLUSION

Dashcam has become a popular device for drivers to record the road condition. However, the dashcam video is not only used for recording the road condition, but also used for other purposes, such as the insurance claim. In this paper, we proposed a dashcam system to detect traffic object. The system is based on the YOLOv8 model. We also proposed a new dataset for dashcam object detection. The dataset contains 78000 images with 12 traffic objects class. The dataset is divided into training set and testing set. The training set contains 800 images with 8,000 traffic objects. The testing set contains 200 images with 2,000 traffic objects. The dataset is available at

ACKNOWLEDGMENT

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