

## ABSTRACT

Traffic lights are the only technology that needs to be developed in Indonesia, where traffic has an impact on road management or congestion, one of which depends on the traffic light system itself. Renewable use of traffic lights is still very minimal, the use of sensors and system development on this object must be developed in such a way that it can manage traffic flow effectively and efficiently by using the development of the system on the traffic light itself with an innovation. This study aims to develop an existing system by adding several renewable technological innovations that are applied to the technology used today.

The method used in this study is YOLO (You Only Look Once), whose application is in the form of an application to the four intersection traffic light scenario using video recording data of traffic flow. The use of this method is expected to be used optimally because the algorithm developed in this method is to detect objects in real-time. By using a simple prototype using Arduino Mega which requires serial communication in a different second program, where Arduino can only accept string data, maximizing detection using the YOLOv3 method is considered quite good because YOLO can detect objects by training and generate presets according to detection needs.

Based on the results of data processing taken as an intersection scenario, it was concluded that with video recordings of the main traffic flow as the main data, the sample test results obtained in the form of configuration accuracy(%), precision(%), recall(%), and F1 Score. The results of the data taken can be proven in the second road flow scenario with the highest accuracy of 69%, precision 89%, recall 75%, and F1 Score 0.8. And also the implementation of a simple prototype went well using serial communication between OpenCV Python and Arduino Mega which resulted in an automatic and efficient intersection system based on the number of vehicles on a road segment.

**Keywords:** traffic light, Object Detection, YOLO, Technology Development