ABSTRACT

Toll road is a freeway and one of the facilities widely used by the general public to shorten travel time. As a freeway, a toll road has a shoulder that can be used for special purposes such as an ambulance, fire department, or other emergency situations. Often the shoulder of the road is misused for non-urgent and non-emergency purposes so that it can harm other toll road users. This is due to the lack of supervision from toll road officials.

Making a monitoring prototype for vehicles that are prohibited from parking can facilitate the work of toll road officers. This centralized monitoring prototype has the ability to detect vehicles that are in no-parking areas on toll roads and can overcome these problems. This system has main components, namely: the YOLOV4 (You Only Look Once) algorithm for vehicle object detection. Then cameras are deployed in the area around the shoulder of the toll road so that they can record the movement of the vehicle. The results of the data recording can be processed into information that will be sent to the nearest toll road officer via Telegram Bot.So that when the driver parks carelessly, it can be followed up immediately. The prototype of this system is simulated in a market that handles toll road issues and can run well in terms of every component and functionality that runs as needed.

The result obtained through this final task is a system that will detect violations on the shoulder of the toll road using a model with a ratio of 90%:10%, learning rate 0.06, and max batch4, with a mAP value of 97.96% obtained through matrix confusion calculations. The accuracy value obtained through testing with the YOLOV4 algorithm in this case is 80%.

Keywords: *Deep Learning, Telegram Bot, Vehicle Detection, YOLOV4*