

## **ABSTRACT**

*Roads are a way to connect between places to ease commuting. But the increase of vehicle from year to year causes an increase in vehicle density on the road. Traffic lights are one of the solutions to reduce congestion on roads. However, traffic lights system nowadays are mostly inefficient because they usually use fixed time traffic.*

*Because of that, in this study a cross-lamp regulation system was conducted which was able to detect the density of the number of vehicles at crossroads using digital image processing. If one of the roads at the intersection has the highest number of queues, then the traffic lights on the road will light green first. This system works by recording the road and taking frames from the recording at a specified time to be used as system input data. Furthermore, the input data is processed using digital image processing, then the output data in this system is implemented using LED lights that will light up on the section of the road with the highest number of vehicles.*

*The results obtained from this system are knowing which section has the highest number of vehicles, through the labeling and edge detection process to retrieve the required objects. After testing the system, it can be concluded that the intensity of the light is very influential on the performance and accuracy of the system. In the morning bright conditions produce system accuracy of 92.50%. Whereas in bright daylight the system's accuracy is 80.00% due to high light intensity. And in the afternoon the cloudy condition of the system produces the most optimal accuracy of 95.00%. Thus, the average system accuracy obtained is 89.16%.*

*Keywords : Traffic Light, Digital Image Processing, Microcontroller, LED*