

## ABSTRACT

According to the Central Bureau of Statistics, the increase in the number of land transportation equipment is always increasing every year, this increase certainly raises a new problem, namely congestion. Congestion is a major problem in big cities in Indonesia that have been going on for a long time in big cities in Indonesia, especially in the hours of going to work and going home. Congestion often occurs anywhere including at the capital's crossroads and has become something that can be seen almost every day.

Based on the above problems the author makes a tool that can regulate traffic lights so that it does not happen by using an ultrasonic sensor which will detect the density of vehicles on the road, this ultrasonic sensor will transmit data via wireless to NodeMCU which becomes the brain of the system after this, the NodeMCU will receive data where the road is the most congested and will give a green light to the congested road section.

Based on the results of the design of the smart traffic light prototype, the system can monitor each path and control the lights on the traffic light. The average accuracy of the ultrasonic sensor is 99.18% with a maximum reading distance of 635 cm and the effective reading distance is 350 cm. Then, the QoS value such as delay from the network used shows that delay is affected by the number of active nodes, the more nodes that are active and connected to the Broker, the delay will increase. Therefore, after testing on this system, the Availability average value is 99.919% and Reliability is 99.919%.

**Keywords: Traffic Light, Smart Traffic Light, Wireless Sensor Network, Ultrasonic Sensor, NodeMCU.**