

## ABSTRACT

This research examines the success of the design and construction of an automatic traffic light modeling tool based on the Internet of Things (IoT) using NodeMCU. The test results indicate that the ultrasonic sensor used successfully detects vehicle queues with high accuracy. The hardware and software system functions as intended. The precise ultrasonic sensor ensures reliable vehicle detection, and the system's rapid response in controlling traffic lights based on sensor data contributes to traffic management efficiency. The measurement results of the distance parameter indicate that the traffic light will turn red when the distance of the vehicle from the sensor is less than 30 cm. Furthermore, if the measurement shows that the queue of vehicles ranges from 1 to 4 cars, the traffic light will be red. However, if the number of vehicles in the queue exceeds 5 cars, with a distance parameter of more than 30 cm from the sensor, the system will automatically change the light to green. This is an intelligent solution in the modeling of automatic traffic lights based on IoT, integrating distance measurement and the number of vehicles to optimize traffic flow at intersections. In conclusion, this design effectively utilizes IoT technology and ultrasonic sensors to optimize traffic light settings, improve traffic efficiency, and enhance the driving experience for motor vehicle users. The test results can serve as a foundation for implementing similar systems on a larger scale to assist in more efficient and safe traffic management.

Keywords: *Design and Construction, Automatic Traffic Lights, IoT*