

## ABSTRACT

*The number of vehicles in Indonesia has been rapidly increasing, leading to a rise in traffic violations and road accidents each year. To address these issues, technological advancements such as the Internet of Things (IoT) can play a crucial role in enhancing safety and convenience. An example of IoT application is the development of more efficient and effective gate control systems using the ESP8266 microcontroller and MQTT technology. In this study, ESP8266 is used as the central component in a system that detects light intensity using a Light Dependent Resistor (LDR) to control motorcycle tail lights. By connecting the detection results to the Telegram application, the system can send messages to users based on the measured light intensity. A prototype was developed to convert readings from the LDR sensor into lux values with high accuracy. Experimentation showed that the ADC values from the LDR sensor had a strong correlation with the lux meter readings, with an average error of only 0.73%. This indicated that the system could provide results nearly consistent with the actual lux meter readings, demonstrating the accuracy of the conversion algorithm. The tests also revealed that variations in angle and distance could affect LDR sensor readings, suggesting that external factors such as reflections and light interference need to be considered. This underscores the importance of proper calibration and adjustment to achieve accurate and reliable results. These findings highlight the need for consistent maintenance and monitoring to ensure the system's performance in various environmental conditions.*

**Keywords:** ADC, ESP8266, LUX, MQTT.