ABSTRACT

The increase in the use of motorcycles has led to criminal activities such as motorcycle theft. The decline in economic activity, limited mobility of goods and services, and restrictions on people's movement ultimately affect the income of companies and the public. As a result, layoffs and furloughs of employees occur everywhere. According to data obtained from the Central Java Provincial Statistics Agency, there were a total of 2,167 reported cases from 2019 to 2021, while the resolution of reported cases in the same period totaled 952. Based on these issues, this study aims to develop a security and tracking device for motorcycles using the geofence method. In this study, the geofence method uses the haversine formula to calculate the radius from the center point. The components to be used are Arduino Nano, GPS Neo6Mv2, and SIM800LV2. The device will send an SMS containing a coordinate link when the motorcycle exits the geofence area, allowing the owner to receive information more quickly. This study tested the accuracy of the GPS Neo6Mv2 module with Google Maps, the delay, and the notification system for the motorcycle's security based on distance. The results showed that the average accuracy of the GPS Neo6Mv2 module with Google Maps was 7,144 meters. The delay test produced an average of 4,7417 seconds, and the distance test for the geofence showed a minimum distance of 1,63 meters and a maximum distance of 21,79 meters. This study shows that the use of geofence and GPS for motorcycle security is effective. This system sends a quick notification when the motorcycle leaves the geofence area, with an accuracy of 7.144 meters and a delay of 4.7417 seconds, reducing the risk of theft.

Keywords*: GPS Tracking, Geofence, Haversine Formula, Internet Of Things*