

ABSTRACT

Technological advancements have opened opportunities to develop innovative solutions to address the problems of traffic congestion and the high rate of traffic accidents, especially in big cities. This research aims to design and implement a real-time vehicle position information monitoring system to improve driving safety and efficiency. The system utilizes GPS (Global Positioning System) to obtain vehicle position information, LoRa (Long Range) for inter-vehicle communication, and Raspberry Pi as the microcontroller. Test results indicate that the system can provide accurate information on the position of other vehicles, with an average deviation of fewer than 10 meters from the reference point. The system can also transmit vehicle position data consistently within the specified time interval, achieving an effective communication range of 190 meters. However, testing also revealed packet loss in LoRa communication, which requires further optimization. An intuitive user interface was successfully developed, but user feedback suggests the need for improvement in the size of warning notifications. Overall, this system has good potential for real-world application, but further enhancements are needed, particularly in optimizing LoRa to make a more significant contribution to improving driving safety and efficiency.

Keywords: Monitoring System, Vehicle Position Information, Real-Time, GPS, LoRa, Raspberry Pi, Driving Safety