

ABSTRACT

Collision between cars is one of many traffic accident causes due to negligence of drivers who ignore the speed and safe distance between cars. In order to reduce it, a communication between cars is needed so that car driver can exchange distance and speed information with the car in front of it. In addition, a system where the distance of the car is getting closer then it slows down itself so that the car can keep a safe distance with the object or car in front of it, is also needed to anticipate the possibility of accidents due to collision between cars.

The collision avoidance system is designed using the concept of vehicular ad-hoc network (VANET) which utilizes vehicle-to-vehicle (V2V) communication where there are two nodes exchanging data information until data can be displayed to the user via the website page.

The prototype of a collision avoidance system in smart car works by retrieving the distance data of the car which obtained from the ultrasonic sensor and the speed data of the car which obtained from the speed sensor. Then, the data that has been taken is sent to Raspberry Pi 3B as microcontroller in order to proceed to the motor driver so that the optimal speed of the car can be adjusted to the distance that has been obtained and also to proceed to the web server so that user can see the data that has been taken by the sensor as information to the user. The data that displayed in web server is the distance between the car and the object or car in front of it, the optimal speed of the car, and other additional data such as time, distance status, delay, and throughput.

The test results that have been done is the smart car prototype can still transmit data and receive data up to 100 meters in open space with straight track with the average value of delay and throughput is 0.2523 seconds and 3.117 kbps. The average value of reliability, availability, and packet delivery ration on system are 99.678%, 99.367%, and 99,915%.

Keywords : *collision avoidance, VANET, V2V, Raspberry Pi 3B*