ACCIDENT PREVENTION SYSTEM FOR VEHICLES USING V2V COMMUNICATION

Adithya S
Department of ISE, Sai Vidya Institute of Technology,
Bangalore, India

Mohana Das
Department of ISE, Sai Vidya Institute of Technology,
Bangalore, India

Mahesh Kumar P
Department of ISE, Sai Vidya Institute of Technology,
Bangalore, India

Priyanka L
Department of ISE, Sai Vidya Institute of Technology,
Bangalore, India

Harshini C M
Department of ISE, Sai Vidya Institute of Technology,
Bangalore, India

Mamatha E
Department of ISE, Sai Vidya Institute of Technology, Bangalore, India

Abstract: For the realization of a safe road environment, a wireless communication system is needed. The proposed system is used to provide the passenger safety and to prevent accident on roads/highways and pass the message to the nearest vehicle in case of emergency. A wireless communication is used for vehicles to prevent the accidents; this is obtained using the ZigBee technology. The proposed system aims to improve the vehicle safety and the passenger safety, in this system we are using the different sensors which helps the driver to be aware of the faults inside the vehicle such as fire and smoke that had occurred. The implementation of forward collision system, do-not pass warning, intersection assist helps to avoid accidents.

Keywords: vehicle-to-vehicle communication, ZigBee technology, GPS, object sensor, fire sensor, smoke sensor, Blynk application.

1. INTRODUCTION

The vehicle to vehicle communication (V2V) technique has been proposed to meet the road safety. Accidents have become one of the leading causes for death. This led to the motivation of reducing the number of accidents and provide safety to passengers in the vehicle. As number of vehicle is increasing the accident rate also increased because of less safety in these vehicles. Suppose if a vehicle passing on a road with 40kmph and if break is applied and the rear vehicle had no idea about the decrease of speed, in that case collision of vehicle may occur. The proposed system involves many features which help in preventing accidents such as the forward collision [1] system which indicates if there is obstacle nearby. ZigBee is used for wireless communication between vehicles. Status of the vehicle is stored in cloud through blynk.

1.1. Related work and Contribution

Because of more vehicles on road, traffic and transportation delay on urban areas are increasing day by day. By using V2V communication it is possible to detect the movement of another vehicle.

Now a days almost all vehicle are attached a Global Positioning System (GPS) Technology, with the help of this we can able to know where the other vehicle is and a blind spot detection is possible through this technology, if there is an internal accidents in the vehicle like smoke and fire the sensors used to detect these can help the driver and passenger about the emergency, if the accident has occurred to the vehicle the immediate message is passed to the nearest vehicle through ZigBee technology and blynk application is using for controlling the arduino and other vehicles can find the longitude and latitude of the vehicle in trouble.

1.2. Outline

The introduction is explained in section 1. The proposed system is explained in the section 2. The Architecture is described in the section 3. Section 4 explains Advantages. Final section explains conclusion and references.
2. PROPOSED SYSTEM

Fig 1: System Design

Fig 1 is the proposed system design which involves following:

2.1. Internal accident prevention

This part of the system includes different sensors like fire, smoke and accident sensors which are communicating with Arduino. If smoke or fire accident occurs in the vehicle these sensors senses and sends the signal to the Arduino, then the Arduino do certain operations like displaying alert messages on LCD[3].

2.2. Wireless Communication

A wireless communication[2] is possible through ZigBee technology which consists of transmitter and receiver. A message can pass through this from one vehicle to another provided both vehicles have ZigBee.

2.3. GPS

Today almost every vehicle has a GPS module. Global positioning system (GPS), which is used to locate the vehicle by knowing the longitude and latitude of the vehicle.

2.4. Blynk Application

Blynk application is an open source, specially designed for hardware interface. Blynk app allows us to create interfaces. Blynk server is responsible for all the communication between the smartphone and hardware.

V2V communication that is vehicle to vehicle communication is constructed in order to prevent crashes in a very large number of cases and situations. These are some of the features that can help in avoiding accidents.

2.5. Intersection assist: When intersection is approached, an alert message will be displayed if any other vehicle is travelling in a cross street, at high speed that it could stop or hit the car in the side. This feature helps in avoiding fatal T-bone accidents.

2.6. Do-not-pass warning: Often driving on a two lane road, a warning message will be displayed when a vehicle passing in the opposite direction makes it unsafe to cross a slower moving vehicle. The system sends an alert message when vehicle that is ahead of two or more vehicles in the same lane which is probably out of sight hits the brake unexpectedly. This feature can help prevent rear-end collision.

2.7. Forward collision warning: When there are chances of a vehicle which is moving at high speed hits a slow moving vehicle ahead, an alert message will be displayed. This feature also alerts in advance of a stopped vehicle in the same lane, which cannot be seen because of vehicles in front or if it’s around the bend in the road.

2.8. Blind-spot warning: This feature is very useful while driving during night times. When the driver is unable to see outside of a vehicle, a warning message or a beep sound will be generated.

3. ARCHITECTURE

Fig 2: System Architecture

The fig 2 is the architecture of the vehicle to vehicle communication module of one vehicle. Different modules are connected to the Arduino controller according to their pin configuration. When the power
supply is given to Arduino, communication takes place between the modules simultaneously.

The different sensors that are included are fire sensor, smoke sensor, object sensor, accident sensor.

**The fire sensor** senses or detects any sign of fire within the vehicle, if any detection of fire is noticed an alert message is displayed on LCD and a buzzer beeps to alert the driver about the fire and the vehicle stops immediately.

**The smoke sensor** works similar to the fire sensor.

**The object sensor** detects any objects in front within the specified range, if the object is detected then the message is displayed on LCD, buzzer beeps and the vehicle is stopped, using this we can implement forward collision.

**The accident sensor** is used to sense any hit or jerk or accident to the vehicle.

GPS[5] is fixed in the vehicle to track the location. Using this we can implement do-not pass warning, intersection assist and blind spot warning. Using blynk application we can control the arduino.

### 3.1. FLOW CHART

Firstly, initialize all the sensors, LCD and switches, when the vehicle starts all the sensors get activated all starts sensing for internal accident such as fire and smoke and obstacles is detected using ultrasonic(object) sensor, if any of these sensors are detected then the vehicle stops and the alert message will be displayed on LCD. By using wireless technology ZigBee, the status of vehicle can be read by other vehicles within the specified range. The information of the vehicle can be stored on cloud platform through Blynk. The ZigBee continuously provide communication between vehicles.

### 4. ADVANTAGES

This system helps in reducing the accident rate, and provide safety for passengers, vehicle damage can be avoided. If it is implemented in large scale it could be cost effective since almost every vehicles comes with GPS. Monitoring the vehicles is easy.

### 5. CONCLUSION

In the view of road safety, there is a much need for the system which at most prevents accidents. This can be achieved by implementing some of the features which are mentioned above. This helps in reducing the number of accidents in real time scenario. Since wireless communication is implemented, there will be better interaction of messages between vehicles. As blynk application is used, the vehicle location and the current activity of the vehicle can be stored and accessed by the authenticated users of blynk.

The main purpose is to provide safety for the passengers who are in the vehicle and prevent accidents as much as possible.

### REFERENCES


Fig3. Flow chart