Real Time Embedded System for Accident Prevention

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ABSTRACT

This Paper presents automatic accident prevention with security enable technique, speed control and accident detection system. .The main objective is to design an Renasis RL-78 controller to monitor the zones, which can run on an embedded system and to automatically locate the site of accident and alert concerned people. It should be done automatically as the person involved in the accident may not be in the position to send the information [7].The proposed system is composed of two separate design units: transmitter unit and receiver unit .Just before the vehicle to enter the transmitter zone, the vehicle speed is controlled by receiving the signal from the RF transmitter. For this, RF transmitter can be kept at a few meters before the zone, where the speed has to be controlled such as school zone, hospital zone etc. Security system includes alcohol sensor and seatbelt sensor (only for car). Accident detection system consists of GPS and GSM in cell phones [12].As accident occurs, accident switch will go high and sends the signal to the Renasis Rl-78 controller[6].Then, the GPS available in the smart phone will start communicate with the satellite and get the latitude and longitude values and name of place of accident will be send to the previously set phone numbers of relatives and concerned authority [5].

Keywords: RF Transmitter and Receiver, Renasis RL-78 controller, GPS(Global Positioning System), GSM(Global System for Mobile Communication)

I. INTRODUCTION

According to a news report, eighty percentages of road accidents are occurred by human error. Based on the report of 2006 and 2012 statistics, collected from 178 participating countries, globally over 1.2 million people die in road accidents every year and 20-25 million people suffer injuries. Pedestrians age above 65 are more than 5 times more likely to die in accidents than pedestrians age 14 or less, and the likelihood of death increases steadily for ages in between .For vehicle which travels at speeds above 45mph,pedestrians above age 65 die in about 5 of 8 accidents[12].

The main motive behind this paper is to reduce accidents for which we propose a system that controls the speed of the vehicle without any inconvenience to the driver. There are circumstances where the speed of the vehicle is beyond the expected speed limit or the driver does not obey traffic signals. Therefore we are using RF technology[1].Where it is used to detect the ambiguities in the vehicle premises especially when it is moving too and pro where driver cannot see. If the obstacle is detected in the too and pro direction of the vehicle then alert voice is played using the voice play back module. If the vehicle moves into the school zone, hospital zone etc automatically the speed of the vehicle reduces. Whenever accident

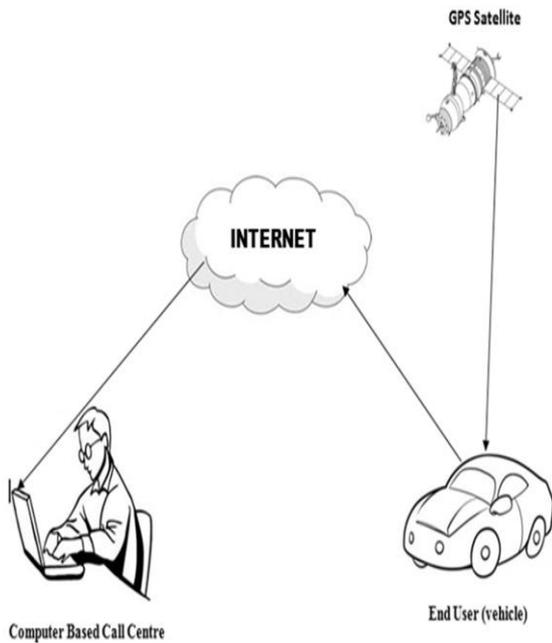occurs to the vehicle automatically the SMS is sent to the authority about the Location of the accident.

Figure 1. simple demonstration of wireless system structure for the proposed system

II. LITERATURE REVIEW

Review on the automatic speed control of vehicle using RFID Technology" [10] describes about Cruise control system (CC) and Adaptive Cruise Control (ACC) which have already been developed to avoid accidents.

Cruise Control System: In this system the driver bring the vehicle up to speed manually and use a switch to set the cruise control to the current speed. The cruise control usually used to control the speed of the vehicle to predefine value.

Autonomous Cruise Control: In this system the sensors are designed in such a way that which keeps the vehicle at pre-defined distance from the preceding vehicle.
But these systems are not able to reduce the vehicle speed automatically if driver doesn't respond [10].

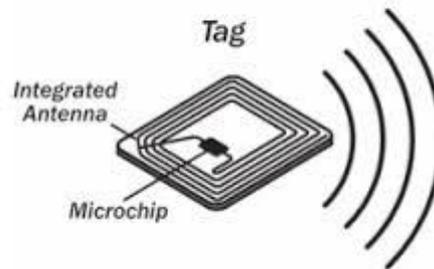## III. BLOCK DIAGRAM

Transmitter and Receiver Design:

Figure 2. Transmitter Design

The Radio Frequency (RF) module consists of RF transmitter and RF receiver. Transmitter module is placed in the specific zone, where we need to control the speed such as school zone, hospital zone, college zone etc. Both the Transmitter and Receiver should operate with same frequency. Transmitter receives data serially and sends the data to the receiver continuously [9]. The RF receiver is connected with Renasis RL-78 microcontroller. The RF receiver will be always in listening state, if it receives any signal of same frequency as of receiver, it will automatically indicate the micro controller which in turn reduces or limits the speed of the vehicle until the vehicle leaves that particular zone [12].From this, the accid which keeps the vehicle at pre-defined distance from the preceding vehicle. But these systems are not able to reduce the vehicle speed automatically if driver doesn't respond [16]. ent in school and college zone will get reduced.

The three main steps are identifying the accident, locating the position and transmitting the information for help. There are certain parameters that change during accidents which can be detected using sensors that measure these changing parameters .The position of the accident is located using Bluetooth module and android mobile phones .GPS data as it is freely available with the help of satellites, and this information about the

location of the vehicle is sent through the GSM network to the android phones [9].

Alcohol sensor, seat belt sensor and IR obstacle sensors are connected to the microcontroller. RF receiver is connected to the microcontroller. The speed is controlled in the particular zone by using RF transmitter, which is placed in the road and RF receiver, which is placed in the vehicle.

From Renasis RL-78 connection goes to the blue tooth module. From Bluetooth Module data is transmitted to the android mobile phone. Data is transmitted to the RX pin of the mobile phone. Cell phone is having both GPS and GSM in it. So that whenever the accident occurs the information is send to the authority.
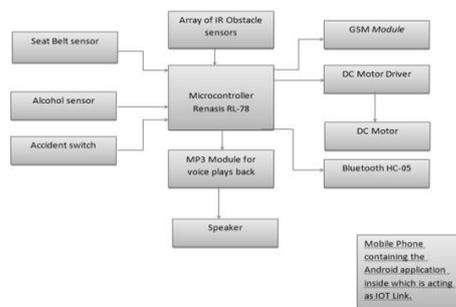

Figure 3. Block Diagram

The IR obstacle sensors are used at the corners of the vehicle to indicate that there is a danger from that side.

By interfacing the speaker and MP3 Module to the microcontroller we can get the play back voice messages. DC motor driver circuit is used to drive the dc motor which is interfaced to the motor.

IV. WORKING OF THE SYSTEM

Whenever a person sits in driver seat of a vehicle, the system checks for following parameters with the driver. The alcohol sensor - checks if the person has consumed alcohol or not.MQ3 sensor is suitable for detecting alcohol concentration from driver's breath. It has high sensitivity and fast response time. It provides an analog output based on alcohol concentration [2].If a drunk driver tries to sit on a driver seat, then the alcohol sensor MQ3 detects the presence of alcohol and blow the buzzer and unless the alcoholic person is replaced by a normal person, the vehicle wouldn't ignite [3].The seat belt sensor MOC7811 – checks if the person has wear the seat belt or not. The IR obstacle sensors are used at the corners of the vehicle to indicate that there is a danger from that side. It will be displayed by using LCD JHD162A and voice message by using FN-M16P MP3 Module and a speaker.

When the vehicle reaches the particular zone, it will reduce the speed. If an accident has occurred, the accident switch provides a high value and it indicates the occurrence of an accident [9].Location of motor cycle is acquired using the Bluetooth module. It connects wirelessly to mobile phone. When accident is occurred message will be displayed in the android phones having GPS and GSM in it. GSM is a globally accepted standard for digital mobile communication [4].

V. SOFTWARE REQUIRED

Mainly this project uses two software's namely
   a.   Cube suite +
   b.   Android app

A   Cube suite +
The Cube Suite + integrated software provides simple, safe and ease of use in developing software through iterative cycles of editing, making and debugging.

It can be used to the basic software for Renasis hardware tools debugging emulators, which facilitates advanced debugging. It creates an extensions and functions for user support ensure a friendly environment for all users.

B Android App
Android is a software used for the mobile devices that includes an operating system, middleware and key applications.

It is an open source web application. Android hardware will be basically designed for the consumers use, but the real win is for developers. It allows us to computer programming to create software applications for the android operating system (OS).It allows users to drag-and-drop visual objects to create an application that run on android devices .

The Android SDK provides the tools and APIs necessary to develop an applications on the Android platform using the Java language for programming.

VI. CONCLUSION

This paper has been mainly designed in order to avoid accidents. It can be utilized in special areas with sudden sharp & high curved roads. Accidents are prevented in bridges and Ghats sections. Thus speed of the vehicle in school, work zones is reduced. Accidents due to over speed, drowsy and drunken conditions of the driver are prevented. In heavy traffic zone, speed is controlled automatically without the interference of the driver. Thus we can reduce alcohol and drowsy related road accidents [11].Thus we can bring down the alarming rate of road accidents. Because of the flexibility of the embedded system, this system is compatible to any type of vehicle and is affordable to common man [8].

VII. REFERENCES

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