Automatic Acceleration Control in Multizones and Crash Detection using Zig Bee Technology and GSM Communications

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Abstract— **This project has an aim to control the speed of vehicles automatically in restricted areas such as schools, hospitals and in speed limited or sensitive areas. Nowadays in a fast moving world all people do not have self-control. Such people are driving vehicles in a high speed. This paper provides a way for how to control the speed without harming others. Driver does not control anything during such places; controls are taken automatically by the use of electronic system. In this project we are using ZIGBEE for indicating the speed limit areas it is placed in front and back of the restricted zones. ZIGBEE receiver is placed inside the vehicle. Speed of the vehicle is acquired. The controller compares the speed, if it exceeds the limited speed the controller alerts the driver and control is taken automatically. In this paper, an efficient vehicle wireless system is designed and implemented for vehicle accident detection and reporting using vibration sensor and GPS. Vibration sensor is used to detect crash and GPS give location of vehicle. In case of any accident, the system send automated message to the preprogrammed number such as family member or emergency medical services via GSM.**

Keywords: ZIGBEE, GPS,Vibration sensor ,GSM

I INTRODUCTION

In today's fast moving world, as the rate of accidents is increasing day by day, speed of vehicles should be controlled as much as possible. Most of the accidents reported in India are results of lack of speed control or over speeding and violating the road rules. For this reason, different speed limits are put to decrease accidents. Unfortunately, drivers usually do not take these speed limits seriously and ignore them.Again with growth in traffic, there is occurrence of bundle of problems too; these problems include traffic jams, accidents and traffic rule violation at the heavy traffic signals. This in turn has an adverse effect on the economy of the country as well as the loss of lives.Road accidents can be prevented by adopting measures such as Traffic management, improving quality of road infrastructure and safer vehicles. To Ensure decline in accidents and to improve road safety, speed control techniques such as speed control in school and college zones by using ZIGBEE transceiver. The existing techniques still is not able to reduce the number of accidents. Hence there is a need to implement Intelligent Speed Adaptation (ISA) in which violation management provides efficient monitoring, registering and reporting system of speed of the vehicle which exceeds the limit. . Speed limit information is sent with the help of Zigbee which uses

wireless mode of communication. The high demand of automobiles has also increased the traffic hazards and the road accidents. Life of the people is under high risk. This is because of the lack of best emergency facilities available in our country. In this paper we have developed a alert system which send a automated message to the preprogrammed number and it also sends photo and location details of the accident spot.

II LITERATURE SURVEY

In "Automatic speed control of vehicle in restricted areas using RF and GSM"[1] they have controlled the speed using RF(Radio frequency) modules. Pic microcontroller has been used . The signal from the transmitter and the speed meter is compared by the controller. The information like vehicle number is sent to police station if the vehicle exceeds the speed.

In "wireless system for vehicle accident detection and reporting using accelerometer and GPS "[2]aims at detection of accident using MEMS accelerometer. An accelerometer is electromechanical device that measure acceleration forces. Accelerometers are sensor or transducers that generally measures acceleration forces applied to the body. An ARM controller is used here. When vehicle meets with an accident, a MEMS sensor will detect the signal and sends it to ARM controller, the ARM controller sends it to GPS(global positioning system)and GPS sends it to preprogrammed number or EMS (emergency medical services)

III PROPOSED METHOD

In the proposed system we are controlling the speed of the vehicle using transceivers. The system consists of a transmitter and a receiver.The transmitter module is fixed at pre-determined lanes/areas. Speed limit and traffic signs are preprogrammed in microcontroller. This information is transmitted as wireless signals through Zigbee. Speed limit information is sent with the help of Zigbee which uses wireless mode of communication, proves to be effective. The other part of the project is accident detection where when accident occurs a message alert is sent to the preprogrammed number . Most people die after accidents due to non availability of immediate help, therefore immediate rescue is necessary ,the proposed system does that, it sends location and photo details to the guardian or pre programmed number .

IV BLOCK DIAGRAM
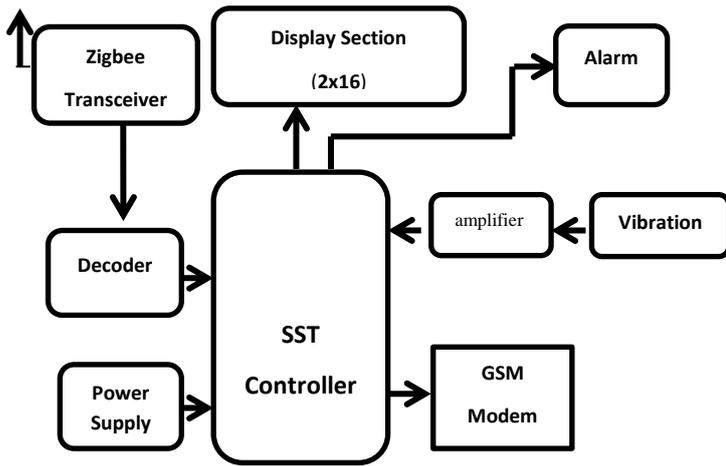
V WORKING PRINCIPLE

The main aim is to control the over speed of vehicle, so in order to achieve this we use ZIGBEE technology for wireless transmitting and receiving of data. The ZIGBEE is placed along with road lane or in speed sensitive zones in which it transmits the data, and it is also placed in the vehicle to sense or receive the data and provide information to the driver. Once the information is received from the ZIGBEE, it warns the driver by LCD and buzzer,. The Zigbee transmitter sends the speed limit of the particular speed limit or sensitive zones like school, hospital, forest etc then the present speed of vehicle is compared with the speed limit, and if it's exceeded then it should be controlled by the user within time limit .If the time is out and still the speed is not controlled or reduced manually by driver then system itself will control the speed of vehicle automatically. As a other part of the project accident or crash detection mechanism is included, vibration sensor is used for this purpose. Vibration sensor checks for the vibrations and detects accident, as soon as accident occurs a text alert is sent to the guardian or the preprogrammed number, it also sends photo details and the location details of the accident spot to the guardian and they can arrive for immediate help.an application is developed for the sole purpose ,the location and photo details are requested by the guardian and the system capturesfor the photo of the spot by the camera placed inside the vehicle and for the location it calculates latitude and longitude value and these details are sent to the email of the preprogrammed id.

VI HARDWARE

A. SSTP89V51RD2 Microcontroller

SSTP89V51RD2 microcontroller acquires and stores different parameter of vehicle. The SSTP89V51RD2 micro controller which is heart of the system which provides monitoring and controlling actions. It senses signals from input blocks and processes output blocks. The software program is stored in microcontroller on chip memory, according to which it provides the controlling actions.An

input of 12v is given through supply but microcontroller requires only 5v ,therefore 7805 voltage regulator is used to reduce the voltage to 5v.It is a 40 pin IC with 4 ports and 8 pins in each.

B. Zigbee

An IEEE 802.15.4-based specification for a suite of high-level communication protocols used to create personal area networks with small, low power digital radios. The technology defined by the ZIGBEE specification is intended to be simpler and less expensive than other wireless personal area networks (WPANs), such as Bluetooth or Wi-Fi. Applications include wireless light switches, electrical meters with in home-displays, traffic management systems, and other consumer and industrial equipment that requires short-range low-rate wireless data transfer. Its low power consumption limits transmission distances to 10–100 meters line-of sight, depending on power output and environmental characteristics.[1] ZIGBEE devices can transmit data over long distances by passing data through a mesh network of intermediate devices to reach more distant ones. ZIGBEE is typically used in low data rate applications that require long battery life and secure networking (ZIGBEE networks are secured by 128 bit symmetric encryption keys.) ZIG BEE has a defined rate of 250 kbit/s, best suited for intermittent data transmissions from a sensor or input device

C. DC Motor

DC Motor is a mechanically commutated electric motor powered from direct current. DC Motor can operate directly from batteries which are rechargeable, providing the motive power for electric vehicles.
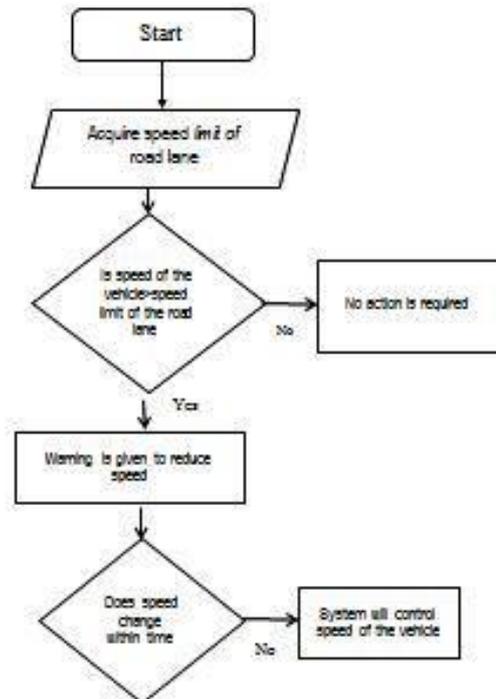
VI. FLOW CHART

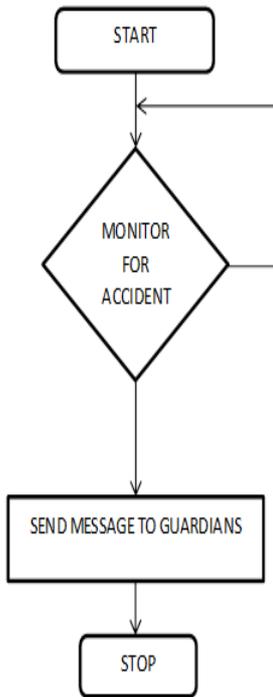

Figure 2: Flowchart for speed control

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Figure 1: Flowchart for accident detection

VIII RESULTS
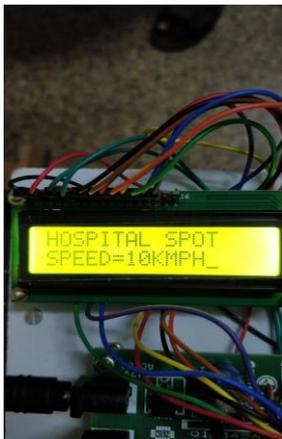
Figure 3:Alert as soon as vehicle enters speed llimit zone
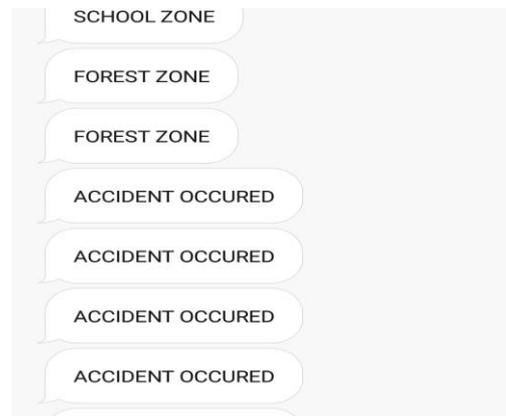

Figure 4: Accident alert

Figure 5: message alert sent to the guardian

IX CONCLUSION

In this paper the prototype design of a system that can deliver road sign to commuter's vehicles and can control the speed of the vehicle has been demonstrated. This project is very simple which is durable and is of low cost. It consumes less power. The driver can get information without any kind of distraction. This prototype works even in bad weather conditions. This is easy to implement on present system which ensures maximum safety for drivers, passengers and pedestrians. An innovative wireless system using Accelerometer and GPS tracking system has been developed for vehicle accident detection and reporting. This vehicle accident detection and reporting systems provide crucial information to emergency responders in the earliest possible time. The crucial time between the accident and getting victim medical attention can often be the difference between life and death. This system provides better safety .

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