

Accident Avoidance and Intimation System using GSM and GPS

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Abstract - Today the rapid growth of technology has made human lives easier and the adverse effect of technology has also increased. The road accidents and traffic hazards takes place frequently which resulting human injuries or even deaths because of poor emergency care facilities or services. This project is about making vehicles more intelligent, which provides critical information of real time situation to the nearest emergency care center. An electronic sensor based system provides the assistance to the passengers or person involved in the vehicle accident. The modules comprises an alcohol sensor, MEMS based accelerometer, an eye-blink sensor and an obstacle sensor. The intimation task is carried out with GSM, GPS and ARM7 based microcontroller. This embedded system sends the alert message to the emergency care center whenever the vehicle met with an accident.

Index Terms - ARM7, GPS, GSM, MEMS etc.

I. INTRODUCTION

A Road Traffic Accident is an event that occurs on a road resulting in human injuries or even deaths. RTA involves high human suffering and monetary costs in terms of injuries, deaths and loss of productivity. [1]

The frequency of traffic collisions in India is [amongst the highest in the world](#). A [National Crime Records Bureau \(NCRB\)](#) report revealed that every year, more than 135,000 traffic collision-related deaths occur in India. [2]

Incidence of accidental deaths has shown an increasing trend during aperiod 2003 - 2013 with an increase of 54.3% in the year 2013 as compared to 2003. Increase in the rate of accidental deaths during the same period was 25.5%. A total of 4,00,517 accidental deaths were reported in the country during 2013 (5,535 more than such deaths reported in 2012) showing an increase of 1.4% as compared to 2012. However, the average rate of Accidental Deaths has remained same 32.6 in 2012 and 2013. During 2013, 456 Deaths and 1300 injuries per day due toTraffic Accidents, also 377 Deaths per day and 1287 injuries per daydue to Road Accidents. Nearly 4,43,001 road accidents in India, which resulted in 4,00,517 deaths. [3]

The government has taken initiatives and many awareness programs are also carried out even though the rate of accident still high.

II. OBJECTIVES

- To minimize vehicle road accidents
- To reduce Human Death Ratio

- To provide maximum assistance and fast indication by message to emergency care center

III. LITERATURE REVIEW

The various technologies implemented were found to be as follows:

Manuel Fogue proposed system requires each vehicle to be endowed with an on board unit (OBU)responsible for detecting and reporting accident situations to an external control unit (CU)that estimates its severity, allocating the necessary resources for the rescue operation. The development of a proto type based on off-the-shelf devices and its validation at the Applus+ IDIADA Automotive Research Corporation facilities how that our system could not ably reduce the time needed to alert and deploy the emergency services after an accident take splace.[4]

V. Dhana Raj describes ARM7 based system, the core hardware has modules such as RFID Reader, GPS, GSM wireless transmission will try to compensate the new transport related issues. Applications such as accident alert, traffic rule violation control and special zone are explained in this paper. This system efficiently utilizes communication link between RF Modems over a wireless channel to provide the information regarding vehicle monitoring, vehicle authentication. The implemented system is a more convenient to automatically sending information to above such applications. [5]

T. Krishna Kishore presents the principles of a low operational-cost but flexible Internet-based data-acquisition system. The main core of the system is an embedded hardware running a scaled down version of Linux: a popular choice of operating system for embedded applications. The embedded device communicates through General Packet Radio Service (GPRS), which makes it accessible from anywhere in the world through a web server built into the embedded device. In addition, GPRS provides a bidirectional real-time data transfer allowing interaction. The proposed system eliminates the need for server software and maintenance. A novel approach is introduced to minimize the operational costs while operating with a large amount of data. The system is demonstrated to be suitable for different embedded applications by attaching several real-time modules through appropriate interfaces. [6]

IV. OVERVIEW OF SYSTEM

This section shows the complete block diagram and its functional description.

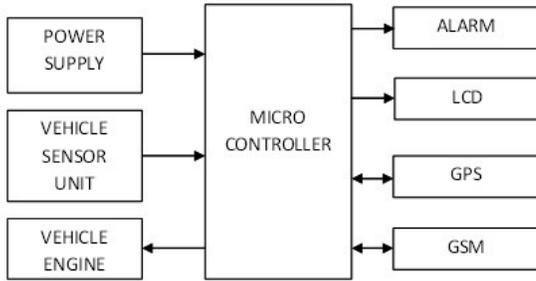


Fig.1: Accident Detection Unit

The accident detection unit will be located inside the vehicle. It has following blocks:

Power Supply

It supplies power to different components present in this unit. All the hardware components work on dc supply from 3.3V to 12V.

Vehicle Sensor Unit

It consists of various sensors for alcohol, obstacle, eye blink and rollover detection. The sensors sense various parameters and displayed in LCD.

Microcontroller

We use LPC2148 (ARM7) as a core controller. It accepts data sensed from sensors through ADC and check it if environment is safe for driver.

Alarm

If the parameters exceed safety threshold, microcontroller will raise alarm in order to inform driver.

Vehicle Engine

If the parameters exceed safety threshold, microcontroller will turn off the engine.

LCD

This section is basically meant to show up the status of the project. Collected data values displayed on LCD.

GPS

Here we are using GPS MODEM to spot the vehicle location.

GSM

Here we are using GSM MODEM to communicate with mobile phone of an authorized person.

V. FLOWCHART

The design of software part for ARM7 based accident detection system consists of designing the logic for entire accident detection unit. The logical tasks are sequenced and programmed for the accident detection unit is shown as follows-

The Realization of Flow of Tasks

The system comprises of very simple procedure as-

1. Get the data from sensors in to LPC2148.
2. If the data crosses threshold, raise buzzer.
3. Display it on LCD.

4. To send the messages through GSM with Latitude and Longitude.

To complete this flow of task, programs are developed in embedded C language.

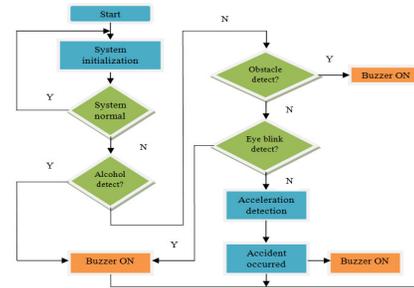


Fig.2: Flowchart of Accident Avoidance and Intimation System

VI. RESULT

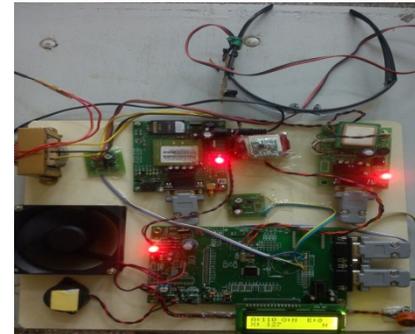


Fig.3: Hardware Implementation of Accident Avoidance and Intimation System

Obstacle Detection



System at Normal Condition



Indication of Obstacle Detection

Fig.4.: Obstacle Detection On LCD showing Obstacle as O: Y

Alcohol Detection



System at Normal Condition



Indication of Alcohol Detection



Fig.9: Alert message received through GSM modem

Fig.5.: Alcohol Detection On LCD showing Alcohol A: 207 (>200)

Eye blink Detection



System at Normal Condition



Indication of Eyeblink Detection

Fig.6.: Eyeblink Detection On LCD showing Eyeblink E: 5 Acceleration Detection



System at Normal Condition



Indication of Vehicle Rollover

Fig.7.: Acceleration Detection On LCD showing X: 152(>150)

GPS and GSM Indication



Indication of Latitude and Longitude



Indication of Message Sent

Fig.8. : Intimation of Message sent with Latitude and Longitude

Alert Messages

VII. CONCLUSION

Hardware Implementation of Accident Avoidance and Intimation System is shown in Fig.3. The sensors data is displayed on LCD shown in Fig.4 to Fig.4. The alert messages that can be received by authorized person through GSM are shown in Fig. 9.

This project is cost effective intelligent accident alert system which not only notifies accidental alert but also provides the location where the accident has taken place. This work will reduce the accident death ratio in considerable amount even in rural roads. Then it has a great importance in day to day life of the people in the country like India. Also this work will provide vital information about the accidents even in unpopulated area. So, the emergence care center could be able to serve to the victims with better efficiency and they could plan to have important first aid kits which have to be brought along with them to the accident spot.

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