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Smart Vehicle Monitoring and Accident Prevention System using Arm

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Abstract: ***After drunken driving, mobile phone usage is the leading cause of accidents around the world. Also, at sudden stoppages on cross roads or due to sudden obstructions on road, natural or otherwise the driver cannot anticipate back bumper and side collision. Also, low height railing or pavements in blind spots while parking may damage the vehicle. Costly mobile phone jammers while effective render emergency communication impossible. As alcohol detection and vehicle tracking system are successfully implemented we are proposing an essential vehicle safety kit which is absent in majority of the vehicles on Indian roads. Furthermore, this can be an addition to the developing cognitive driver assistance system. The proposed system provides vehicle with safety features like SMS alert facility, blind spot detection and tail gating detector. The vehicle is equipped with angle sensors and a GSM modem interfaced with NXP ARM 2148 processor. The driver has access to a user interface consisting of LCD and switching ports. The driver may aware two modes of angle sensing with sensors located on centre of the Vehicle. A braking system can be actuated in the parking mode if the distance measured from the sensors crosses the defined threshold. In case of an emergency the driver can send a text or call from the stored numbers in the memory using the keypad. To save time and to maintain the driver's focus on the road a default text can be sent to a default number by a single key pad entry. Call service from the system eliminates the need of using the phone and prevents driver's loss of focus. Further the freedom to choose the number and the corresponding message to be sent is available when the vehicle is at rest. The system thus prevents accidental damage to the vehicle and its driver while eliminating the use of phone by the driver.***
Keywords: PIC Microcontroller, LPC2148, LCD 16*2, GSM Module, ADXL335, GPS Module

I. INTRODUCTION

This project can be used to control the thefting of vehicles, track the thefted vehicles and finding the location of vehicle and also implement the scene of accident alarm system. In this we are trying to program a GPS/ GSM module incorporating an accelerometer to report occurrences of accident automatically via the GSM communication platform (using SMS messaging) to the nearest agencies such as hospitals, police stations, fire services and so on, giving the exact position of the point where the crash had occurred. This can provide early response and rescue of accident victims, saving properties and lives. The whole paper is based on arm controller. This controller is used to coordinate all the activities in the system. The components details are ARM 7(LPC 2148), Accelerometer (MMA7660FC), GPS module (MR 87), and GSM module (SIM 800).

The heart of above system is ARM 7LPC2148, GPS module and GSM module. Power supply require for GPS, GSM and ARM7LPC2148 is 3.3V &5V. Keypad is used to enter security code. Accelerometer & temperature controller is used for pre-accident detection system. GPS module is used to display the co-ordinates of any location with the help of GSM module. If any value of temp-controller & accelerometer is changed beyond limit then buzzer will on & if driver can't stop the buzzer than it will consider as a major accident then coordinators of the location along with vehicle no. is send to owner, police station and few more contacts.

II. LITERATURE SURVEY

Transport is one of the country's major infrastructures. The main transport concern is the difficulty of waiting time due to traffic congestion and any other live irregular ventilation issues. The health of both private and public cars is a major concern, so the tracking system for GPS vehicles assures their protection when driving. Different monitoring methods are used in the existing system, such as connectivity of Google maps, intelligent transit instructions or real-time tracking and estimation of arrival time. Radio Frequency Identification is a cellular identification system used in many areas, including the tracking of solid state, organisms, artefacts and animals [1]. Vibration is one of the most significant negative effects caused by transport systems. These are simply unwanted anomalies which affect the level of safety and the degradation of the technological and natural environment considerably. There are therefore many separate bodies of cars that have as their principal goal the reduction and propagation of vibrations or the destruction of them and not merely the question of the substance [1, 2, 3].

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The article presents a basic monitoring system for the vibrations of vehicles [2]. In the developed world today road services are a major concern. Recent studies show that one-third of the deadly or severe incident figure involves insufficient or excessive sizes and route modifications (such as roadwork or unwanted obstacles). Reducing the number of collisions and reducing their effects is of great concern to traffic regulators, the automotive industry and academic organisations in the area of transport. One important line of action is the use of specialized driver assistance devices, which are auditory, hectic or visual cues that the car itself generates to convey the likelihood of a crash to the driver [3]. Based on the Embedded ARM User Guide, this article establishes a vehicle terminal based on the features to be introduced in the vehicle terminal. This method analyses the NMEA0183 process, which provides information on the GPS location, and shows in real time the current position on the LCD terminal for the road direction of the vehicle, in order to complete current time and range, length, latitude and speed extraction [4]. Vehicle security, protection, and tracking devices and systems are revealed. Devices relevant to the present disclosure have a housing with at least one actuator, two or more adjustable arms with video cameras mounted, a processor located inside the housing, a processor in electronic communication with each of the video cameras, a GPS receiver and an accelerometer. The computer will wirelessly transmit and receive data through a transceiver. A central repository may be connected to one or more devices and allow users to remotely control vehicle status [5]. Around 1.4 million people die each year while driving because of their overbearing cell phones. In India, an approximate 1.35 lakhs died in 2010 as a consequence of road accidents, which accounts for roughly 10 percent of road accident deaths worldwide and these statistics are the maximum in the world.

III.FLOW CHART

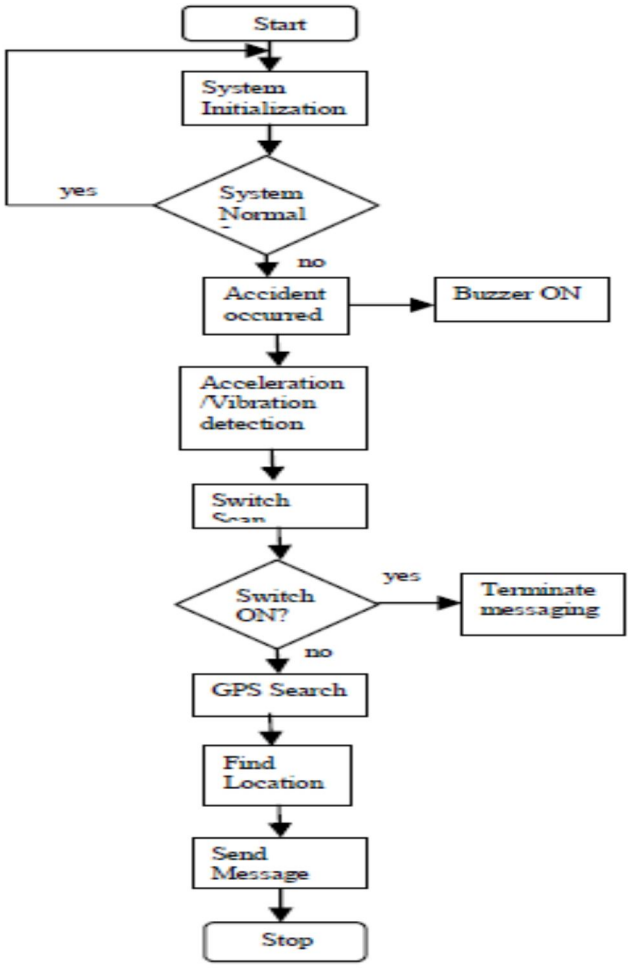
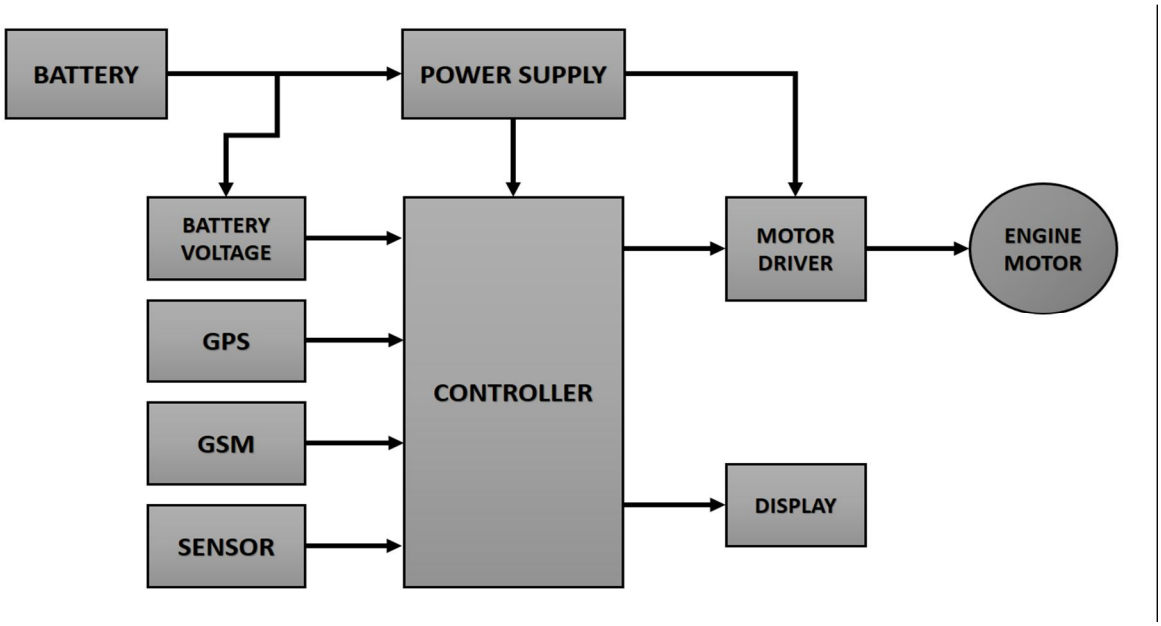


Fig. 1.1 flow chart of Vehicle monitoring system

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IV. BLOCK DIAGRAM



V. WORKING

In then above circuit PIC microcontroller and ARM controller is used. Both of this controller required constant 5vdc. As the battery source is of 12vdc, hence to convert 12v to 5v we used 7805 regulator IC. 7805 is only regulator which delivers 5v to whole circuit and there is a chances of loading in case of excessive requirement of 5v by GPS, GSM, Lcd which may result drop in 5v. As both the controller required constant 5v, hence controllers get reset in case of regulator voltage goes below 5v. To overcome this problem a capacitor C2 of 470uF is used. Once power supply gets start, initially microcontroller requires reset, hence R1 and R2 are used. An accelerometer is ADXL353 is used to detect X, Y axis angle, further the analog signals from accelerometer is fed to ARM microcontrollers ADC (Analog to Digital Converter). Arm Controller compares the signals with threshold stored inside for left and right, up and down direction and sends data to PIC microcontroller through USART also alarm will be activated and sound the Buzzer. After getting data from ARM controller PIC check the LATITUDE and LONGITUDE with date and time and send the SMS to the numbers stores inside the PC microcontroller. To store the number a set of keys are interfaces with PIC microcontroller. During first start up PIC microcontroller stores mobile number through key pad and display on 16x2 LCD display.

VI. CONCLUSION

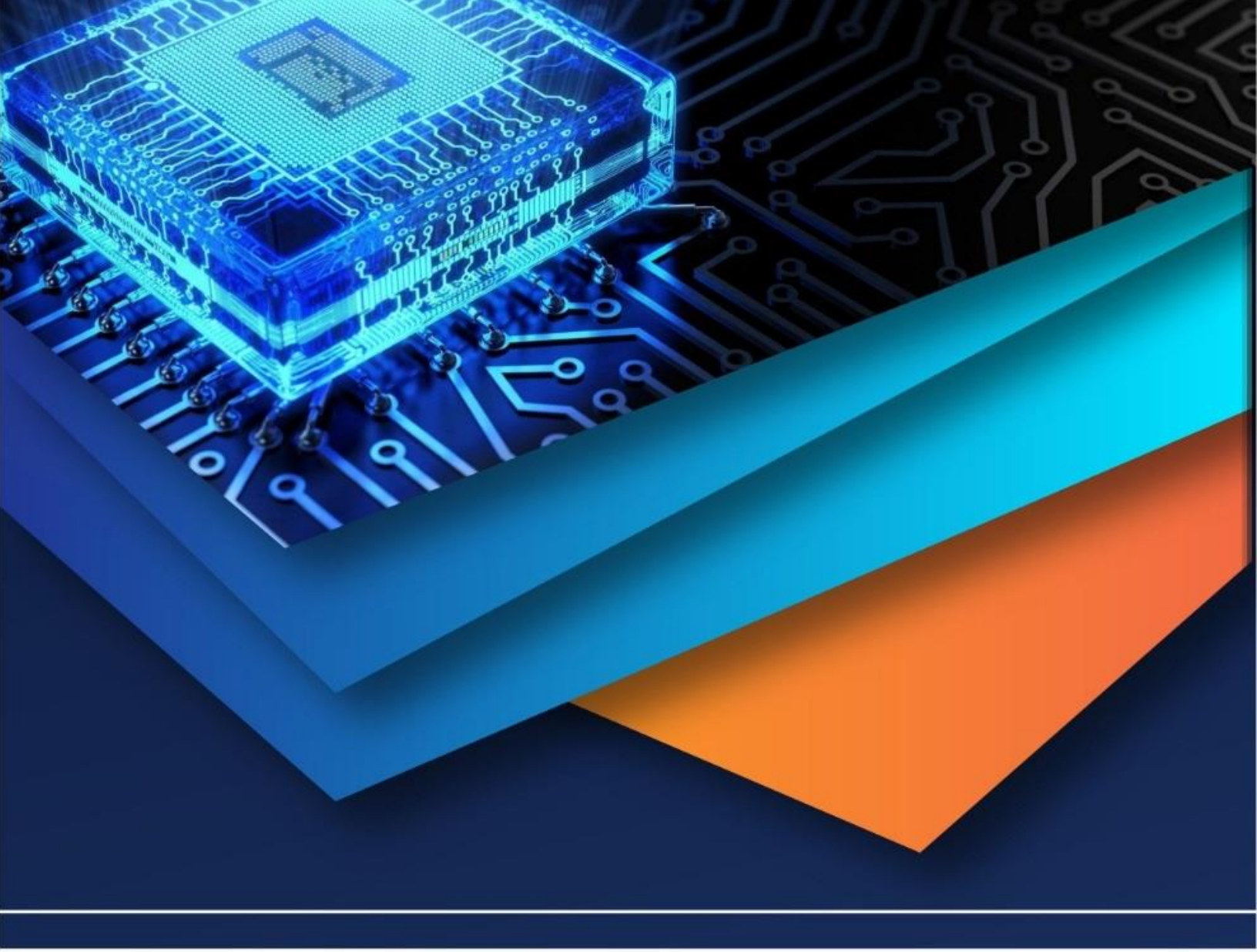
With the advent of science and technology in every walk of life the importance of vehicle safety has increased and the main priority is being given to reduce the alarming time when an accident occurs, so that the wounded lives can be attended in lesser time by the rescue team. This paper provides the design which has the advantages of low cost, portability, small size and easy expansibility. The platform of the system is ARM along with MEMS, Vibration sensor, GPS and GSM, interfacing which shortens the alarm time to a large extent and locate the site of accident accurately. This system can overcome the problems of lack of automated system for accident location detection. Consequently, the time for searching the location is reduced and the person can be treated as soon as possible which will save many lives. This system will have broad application prospects as it integrates the positioning systems and the network of medical based

services. The accident can be detected by both vibration sensor and MEMS sensor which will give the accurate information. The controller will process the data, as soon as input is received by the controller the alarm is ON and message is sent through the GSM module. The geographical coordinates and the time of the site of the accident is detected by the GPS module. An alternate condition is given by pressing a switch, in order to interrupt the flow of sending the message in case of no casualty; this will help to save time of medical rescue team and unnecessary alarming which creates havoc in such unusual conditions. The accident location automatic detection will help us to provide security to the vehicles and to the lives of the people. The high priority is given to the lives of the people. Hence, this paper provides a feasible solution to traffic hazards and it gives security to vehicle and reduces loss of valuable lives and property.

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