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Analysis and Development of Vehicle Tracking and Accident Detection using Embedded System

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ABSTRACT

This project presents review on the accident detection techniques and some future possibilities in this field. Now-a-days lots of accidents happen on highways due to increase in traffic and also due to rash driving of the drivers. And in many situations the family members or the ambulance and police authority is not informed in time. This result in delaying the help reached to the person suffered due to accident. Road accidents constitute the major part of the accident. The purpose of the project is to find the vehicle where it is and locate the vehicle by means of sending a message using a system which is placed inside of vehicle system Most of the times, we may not be able to find accident location because we don't know where accident will happen. Our project Real Time Vehicle Safety and Accident Detection with GSM is designed to avoid such situations

Keywords: Global positioning system (GPS), Global system for mobile communication (GSM), Micro-electro mechanical system (MEMS) sensors, Arduino UNO, Liquid crystal diode based on display (LCD), Buzzer

INTRODUCTION

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. This design is a system which can detect accidents in significantly less time and sends the basic information to first aid Centre within a few seconds covering geographical coordinates, the time and angle in which a vehicle accident had occurred. This alert message is sent to the rescue team in a short time, which will help in saving the valuable lives. When the accident occurs the alert message is sent automatically to the rescue team and to the police station. The message is sent through the GSM module and the location of the accident is detected with the help of the GPS module. The accident can be detected precisely with the help of both Micro electro mechanical systems (MEMS) sensor. The Angle of the rolls over of the car can also be known by the message through the MEMS sensor. This application provides the optimum solution to poor emergency facilities provided to the roads accidents in the most feasible way.

Proposed system makes an effort to provide the emergency facilities to the victims in the shortest time possible. In big organizations the drivers make illegal use of the vehicles thus resulting in financial, time loss of the organization. Apart from these purposes the system can be used for tracking of stolen vehicles or travelling

luggage, fleet management and vehicular sales etc. The system incorporates a single-board embedded system that contains GPS and GSM modems connected with a microcontroller. The entire set-up is installed in the vehicle. A Mems sensor is used. It measures the

Accident alert system is being used for only four wheelers by using Air bags On

GSM modem provides a two way communication by using a sim card. Such

Highway roads many motorcyclists wear protective gears while driving their bikes. amodule works the same as a regular phone. The project aims at intelligent

If anyone has met with an accident, the person is not noticed most of the time or security system providing situational awareness and agile safety.

vibration at the location placed. The signal is then compared with the standard values which further confer the accident of the car, unnecessary shock or vibration produced by machines, tilt of the car with respect to the earth's axis can be identified with the level of acceleration. Global Positioning System (GPS) is used to identify the location of the vehicle. GSM is used to inform the exact vehicular location to the precoded numbers. Message will give longitude and latitude values. From these values location of accident can be determined.

LITERATURE SURVEY

Hu Jian- ming , Li Jie, Li Guang-Hui et al-proposed an stolen vehicle recovery system. The system ensured increased safety and credibility. It used C8051F120 microcontroller and a vibration sensor. The vehicle owner gets the message regarding the vehicle location at specific intervals through GSM.

T. Krishna Kishore et al-emphasized on a system that is cost effective and also inculcates the modern internet facility for networking purposes. Linux operating system has been used along with General Packet Radio Service(GPRS).Advancements include more exact identification of the vehicle location at all times, data transfer facilitation, and freedom from software monitoring.

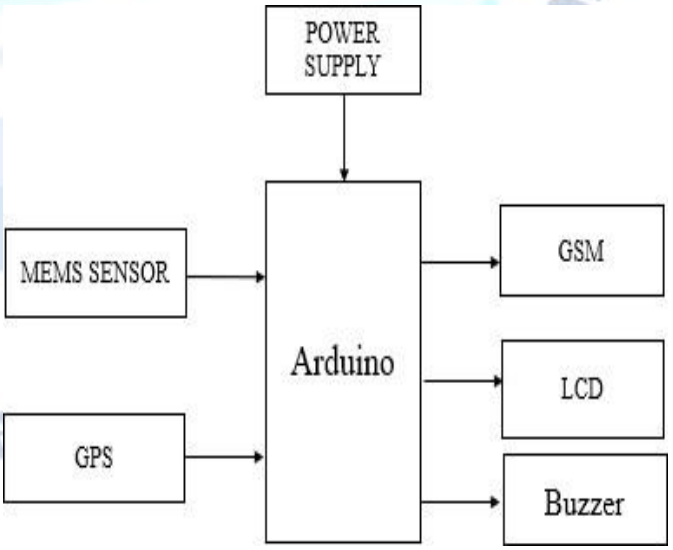
Nirav Thakor et al-have presented Automatic Vehicle Accident Detection System Based on ARM &GPS. The system detects the vehicle accident with the help of vibration sensor or MEMS sensor. GPS module captured the location of vehicle accident and a message is transmitted with the help of GSM modem. which contains the co-ordinates values. One more facility is also provided which can be very handy during the critical times. If a person requires help due to other reasons like having symptoms of heart attack. In such a situation all he has to do is to press a single switch provided in the system. By pressing this switch a message is transmitted by the GSM module to the help centre which contains the location of car provided by GPS with the information of the user.

PROPOSED SYSTEM

attended to after much delay which would be too late to save the person. An automated accident alert system is essential for bike riders who ride on highway area

In this we have interfaced MEMS sensor with Arduino. If the MEMS got tilted then it means accident occur. Then the GPS will track the location and will send to the number defined in the program by using GSM. Whenever accident occurred then GSM will send message and also create the alerts through Buzzer. The data will be displayed on LCD.

BLOCK DIAGRAM



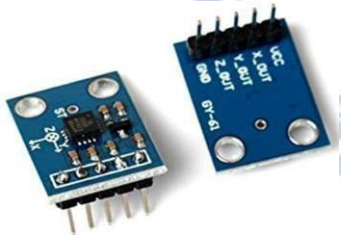
HARDWARE COMPONENTS

ARDUINO UNO

The Arduino microcontroller is an easy to use yet powerful single board computer that has gained considerable traction in the hobby and professional market. The Arduino is open- source, which means hardware is reasonably priced and development software is free. This guide is for students in ME 2011, or students anywhere who are confronting the Arduino for the first time. For advanced Arduino users, prowl the web; there are lots of resources. This is what the Arduino board looks like. The Arduino programming language is a simplified version of C/C++. If you know C, programming the Arduino will be familiar. If you do not know C, no need to worry as only a few commands are needed to perform useful functions.

MEMS Sensor

This sensor uses a chip-based technology namely micro-electro- mechanical-system(MEMS).MEMS are low-cost, and high accuracy inertial sensors . In this model we have interfaced MEMS sensor with Arduino. Initially it is steady state position , if the MEMS got tilted then it means accident occur.



GPS

Global Positioning System (GPS) is a satellite-based system that uses satellites and ground stations to measure and compute its position on Earth. In this model GPS is interfaced with the Arduino which is used to track the location of a vehicle in case any accident occurs.

GSM

GSM stands for Global System for Mobile Communication.GSM modules are one of the commonly used communication modules in embedded systems. In this model GSM is interfaced with arduino and power supply board. GSM will send the message to the number defined in the program when an accident occur.

LCD Step9: Now click on the Arduino IDE icon present on your Desktop. A window will appear.

The term LCD stands for liquid crystal diode based on display. It is one kind of electronic display module used in an extensive range of Step 10: For any sample programs, select FILE .

applications like various circuits & devices like mobile phones, calculators, computers, TV sets, etc. In this model LCD is used to Step11: After Entering the Sample Code in the file, it would look. display the location provided by the GPS module in the form of

latitude and longitude.

Step12: Before Connecting we have to select which Board is used

by the user, Basically UNO. By selecting TOOLS→Board→ARDUINO UNO.

Step 13: Now to dump the in the board Connect the Arduino to

the PCthrough the USB port available in it. Like this

TOOLS→SERIAL PORT→COMM4,COMM8.

Step14: To verify the written Program select COMPILE option available in the software (√).

Step15: Now Connect the Board and select the COMM port and then UPLOAD the file in ARDUINO(→).

Buzzer

Step16: To OPEN the Previous ARDUINO FILE selects (↑) option.

Buzzer is a sounding device that can convert audio signals into sound signals. Widely used in alarms, computers, printers and other

Step 17:To enter new files select NEW option. electronic product as sound devices.In this model buzzer is interfaced with arduino and power supply which will gives sound in the form of music incase any accident occur. Step18 :To Save the Existing File, Click on the(↓).

Step19: To Send the Data Through Serial Monitor, Click on the (Ǫ).

Step20: Here we can see the Serial Data.

SOFTWARE REQUIREMENTS

EMBEDDED C

Implanted C makes use of KEIL IDE programming. The framework program written in implanted C can be placed away in Microcontroller. The accompanying is a portion of the actual motives behind composing applications in C as opposed to get

collectively. It is much less disturbing and much less tedious to write down in C then amassing. C is less traumatic to trade and refresh. You can utilize code available in capacity libraries.

ALGORITHM

C code iscompact to different microcontrollers with subsequent to 0 alteration. Genuine, Step 1: Start the system. installed C programming need nonstandard expansions to the C driver with a view to bolster charming components, as an

Step 2: Insert the CD-ROM or PENDRIVE which Contains the software example, settled point range catching, numerous unmistakable andthen Copy the Setup File to your desired location. reminiscence banks, and fundamental I/O operations.In 2008, the C Standards Committee prolonged the C data to deal with these

Step 3: After Copying, now click on the setup you will see an window. problems via giving a normal wellknown to all executions to purchaser to contains numerous additive not handy in standard C,

Step 4:Click On NO, not this time. Then after NEXT. for example, settled factor wide variety catching, named address

spaces, and vital I/O equipment tending to.

Step 5: Another Window opens –select Install from a list of specificlocation and NEXT. Installed C utilize the greater part of the grammar and semantics of wellknown C, e.G., number one() paintings, variable definition, facts type statement,

Step 6: Select "include this location in the search" and then click contingent proclamations (if, switch. Case), circles (even as, for), Browse option available in it.

capacities, exhibits and strings, structures and union, piece operations, macros, unions, and so on.

Step7: Now it will Automatically check the USB driver and the software isinstalled click Finish.

Step8: Now click Finish, the Software will be downloaded.

EMBEDDED SYSTEM PROGRAMMING

Installed frameworks writing computer programs is not quite the same as creating applications on a desktop PCs. Key attributes of an implanted framework, when contrasted with PCs, are as per the following:

Embedded gadgets have asset limitations (restricted ROM, constrained RAM, constrained stack space, less handling power)

Components utilized as a part of installed framework and PCs are distinctive; implanted frameworks ordinarily utilizes littler, less power devouring segments. Inserted frameworks are more fixing to the equipment.

Two remarkable components of Embedded Programming are code speed and code estimate. Code speed is represented by the handling power, timing requirements, while code size is administered by accessible program memory and utilization of programming dialect. Objective of implanted framework writing computer programs is to get greatest elements in least space and least time Implanted frameworks are modified utilizing distinctive sort of dialects:

Machine Code

Low level dialect, i.e., get together

•High level dialect like C, C++, and Java and so on.

Application level dialect like Visual Basic, scripts

WORKING PROCEDURE

In this model we have interfaced arduino with power supply board , MEMS sensor , GPS , GSM and LCD.Switch ON the power supply which is connected to arduino. Initially MEMS sensor is on steady state position, whenever an accident occurs MEMS got tilted and then GPS will track the location of the vehicle.GSM module will activate and sends the message to a particular number defined in the program and LCD displays the location provided by the GPS module in the form of latitude and longitude.In this way we can track the location of any vehicle when accidents occur.

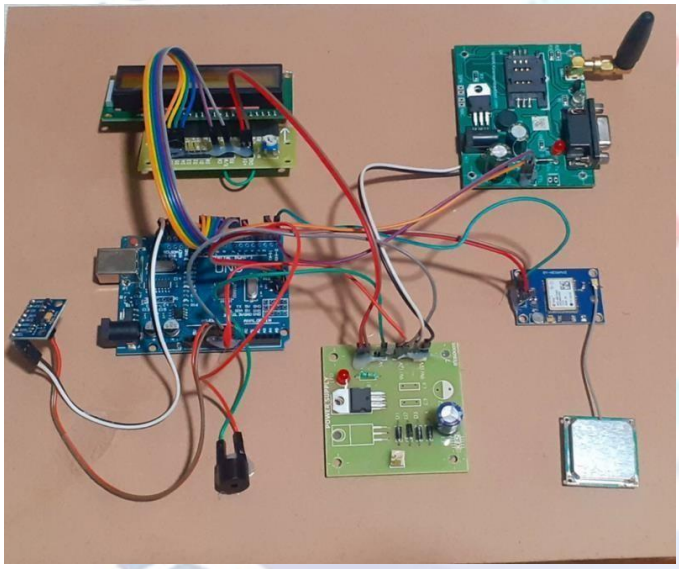


Fig: Vehicle Tracking and Accident Detection using

Embedded System

RESULT

In this way we can track the location of any vehicle whenever accidents occur which uses accelerometer sensor (MEMS)to detect accident and generate emergency alert and sent it to the nearest emergency responder and will also send an SMS to emergency contact containing location coordinates of the accident.

CONCLUSION

In this project , we developed the accident detection and smart rescue system, which uses accelerometer sensor(MEMS) to detect accident and generate emergency alert and send it to the nearest emergency responder and will also send an SMS to emergency contact containing location coordinates of the accident. With real time location tracking for both victim and responder the system will drastically increase the survival rate of accident victim by providing emergency aid in time.

Conflict of interest statement

Authors declare that they do not have any conflict of interest.

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