Accident Detection & Rescue Information System for vehicles

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Accident Detection & Rescue Information System for vehicles

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Abstract: ***The rapidly changing technology and substructure made our lives easier. The technology has arrival to ease the human life, also increasing the traffic hazards at the road accident take placed, many times which causes loss of life cause of the poor urgency facility. This research work will provide the optimum solution for the said problem. The information about detection of vehicle accident and send the location information of the accident place to vehicle owner rescue team and family members of the vehicle owner. Notifications were sent to users through web application, mobile application or SMS.***

Keywords: IoT, Embedded System, Vehicular Safety, and Sensors.

I. Introduction

In most major cities and highways roads are congested and there is a need to use them more efficiently. One possible way is to remove human involvement in driving as possible from the system through computer control. Driver behavior in vehicle following has been an active area of research. Vehicle safety is one of the most important areas in which automotive companies are investing. In 1970, the idea of driver assistance was started with the 'cruise control devices' first appeared in USA. When system in vehicle is switched on, this system takes up the task of accelerating or braking to maintain a constant speed set by driver. But it could not consider the other vehicles on the road which was a great disadvantage. Over the years, automotive companies have developed many technologies, which can be helpful driving the vehicle safely and assists the driver in driving.
Advanced driver assistance systems, or ADAS, are that the term accustomed describes the growing range of safety functions designed to enhance driver, passenger and pedestrian safety by reducing each the severity and overall range of car accidents. ADAS will warn drivers of potential dangers, intervene to assist the driver stay in control so as to forestall an accident and, if necessary, reduce the severity of an accident if it can't be avoided. In short, ADAS compensates for our mistakes, be they inattentiveness, incorrect control inputs or, up to a point, downright stupidity. As uncomfortable as humans are with admitting it, we're not good – however ADAS is here to assist.

The accident detection and rescue system for vehicle based on the internet of thing (IOT). The system gathers all the information of computing devices like detection of accident, location of the accident place and nearby police stations & hospitals. As nowadays because of vast use of automobile increase the traffic hazardous and the many road accident and the life of the peoples is in high risk. The critical situation occurs day by day because of the increase in the value of automobiles in the country which lead to the lack of the facilities which we cannot give to every person if in the case any accident happened on the road. Peoples are not ready to take injured person at the hospital due to legal & time constraints. In this case injured person get died because of not getting proper or lack of treatment. To overcome such thing and save life of the people IoT based system is proposed which detect vehicle accident and through rescue system help injured person immediately by reporting to the nearest police station and location of accident point is conveyed to Ambulance and hospital so as to get immediate treatment to the injured person.

Processors: Electronic control units (ECUs) and micro controller units (MCUs) are essential for many ADAS applications, together with autonomous driving. For ADAS to advance, processors would like higher performance that can be enabled by multi core architectures and better frequencies, in addition as lower power-consumption needs.
Sensors: These devices gather info on their immediate environment, like pedestrians and oncoming cars. Most have a restricted measure vary and signal bandwidth, that makes it tough to differentiate between "signal" (for example, obstacles within the road) and system "noise." it's particularly tough for sensors to trace moving objects throughout less-than-ideal environmental conditions, like rain and fog.

Unfortunately, India has the dubious distinction of registering the very best variety of road fatalities within the world and it remains a challenge for the govt. and its people. The assistive devices for cars and different vehicles change the right road map for the Indian road users to use technology to help and alter high level of safety each for drivers and people/vehicles around it. The solution to the current rising road incidents has to be self-addressed in real time. However because the needed infrastructure would take an excessive amount of your time and money to create up, having driver assisted' technologies on vehicles will create the Indian roads abundant safer.

II. LITERATURE SURVEY:-

In the present situation, it is not possible to determine the actually location of accident**t, where it has occurred and therefore there is no information related to accident, leading to the death of individual. The research work in process on for tracking the vehicles even in clumsy area where the less network is there due to which the signals cannot be received, the numbers to approaches that supply safety and security by monitoring the vehicle in real time position and information that uses different technologies that have proposed. GSM, GPS is used that has provide the general

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mechanisms to provide a real time geographical positions of the vehicle, that uses GPS receiver that send the information to GSM centers by configurable software, that is done through monitor centers which are working as the units.

III.Methodology

Automotive protection technology is quite convenient to tie your brain around, however advanced driver assistance systems (ADAS) are a small tougher in accordance with nail down. At that point, the debate above whether anti-lock brakes are without a doubt essential is exceptionally a great deal nonexistent, however most technologies categorized as ADAS are nevertheless viewed namely luxuries and too fun curiosities.

The system is design for accident detection using combination of Hardware and software.

Hardware components used:

1. GSM,
2. GPS,
3. GSRM Shied (SIM808)
4. Arduino UNO REV3
5. LCD Display
6. Vibration Sensor (sw420)

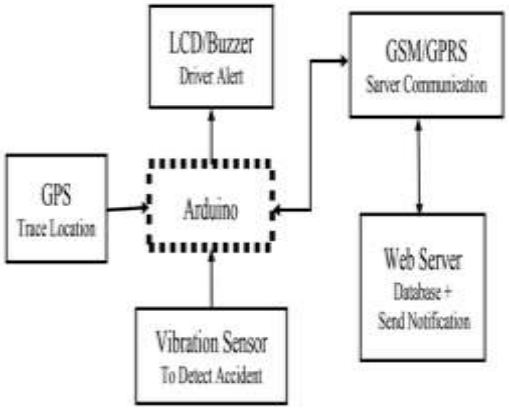

Fig. 1: System block diagram

As shown in the block diagram an ATMEGA 328 based board is used for automation and monitoring. Devices like GPS, GSM, vibration sensor, LCD display, etc. are used for designing the system.

The accident detection and rescue information system for vehicle, do tracking of routing vehicle to spot accident in defined location. This project split in two sections one is a finding location using GPS. It will find the location in the form of longitude and latitude. The second is detections of accidents through various sensor and to spot accidents. If the vibration is more than the defined one it will considering that accident occurs and after 60 second it will confirm the accident. Later detect the accident show the accident location on app. The server informs the vehicle possessor and police station and hospital near by accident spot through mobile application or SMS.

The system module will be fixed in the vehicle. Authorised person can observe their automobile using the android application services. If the accident is occurred the alert notification of accident place send to nearest police station, Ambulance and hospital.

Web services

Interaction with any users a website has been develop the users along with hardware can form the account and monitor all vehicles install to system. Users get the notification of GPS location if vehicle got the accidents through this web account and SMS. and nearest police station and hospital can monitor the same information through website and will get the SMS notification about accident location and the and google map show the direction the accident palce.

Calculation of shortest distance:

To locate the nearest Hospital and quick response team locatio, formulas calculate the great-circle distance by two points The shortest distance by the earth surface area giving an the crow flies distance between the points and formula given below

$$a = \sin2\,(\Delta\varphi\,/2) + \cos\varphi1 \times \cos\varphi2 \times \sin2(\,\Delta\lambda\,/2)$$

$$c = 2 \times \operatorname{atan2}\,(\,\sqrt{a},\,\sqrt{(1-a)}\,)$$

$$d = R \times c$$

φ is latitude λ is longitude R is earths radius mean radius = 6,371km note that angles needs to be in radians to pass the trig functions The haversine formula remaining particular well conditionation the numerical the small distances un like calculations in base on the spherical law of cosine.

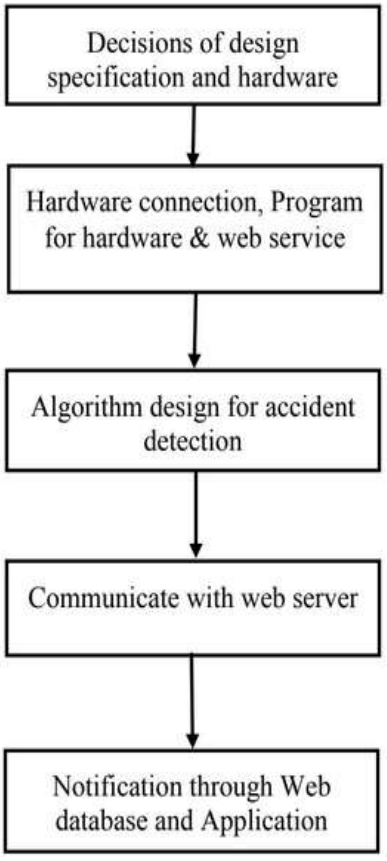

Fig. 2: System flow chart

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This module include controller which is compatible of doing computations with sensors and are liable for processing of data. Controllers used here can be 8051, Atmel , At mega, PIC and various other controllers are used.

Now a days MEMS (Micro electro mechanical system) are used MEMS sensor has a very high response time due to which it is widely used in many automotive applications . Sensors data is directly fed to the controller so that it can be processed by the controller and proper decision can be made by the controller. Sensor used here would be vibration sensor which gives the data of pressure, acceleration , strain and force applied to it at time. It uses piezoelectric effect for converting the physical quantity to electrical quantity.

Global Positioning System(GPS) is a module which gives string of data i.e. in form of location . In GPS no addition signal is to be given to it for starting up of it only proper supply voltage us required . As supply voltage is provided to it the working of the GPS starts and it transmits data form it Transmitter pin and the data format is string used over here and the data dose not stops it continuously gives the data . Only to get the perfect location we have to wait for some minutes to let the GPS work properly .

GSM(Global System Positioning for Mobile) module used here is GSM 800 or GSM 900L .These GSM module receive AT commands from the controller due to which after accepting AT commands the operation of GSM is performed .In GSM module there is a SIMcard which has be filled with amount and net package due to which it can access the internet as well as the message and call services. The controller here is used to send the AT command depending upon the operation.

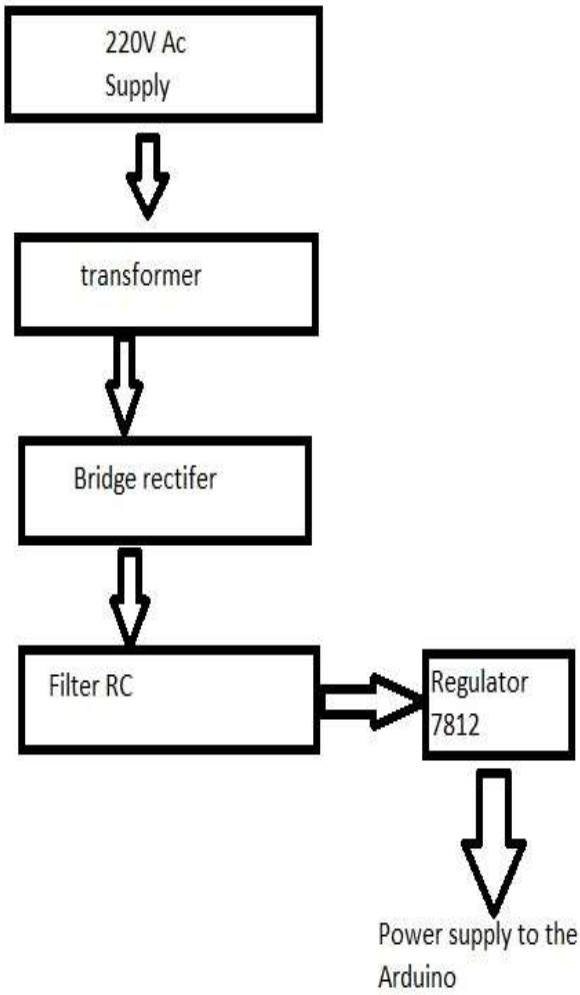

Fig. 3: Power Supply unit

Adaptive Light Control:

Adaptive light control systems are designed in accordance with help drivers consult better then similarly between the darkness. This advanced driver assistance technology allows the headlights to swivel and rotates to higher illuminate the roadway via corners and in other circumstances.

Automatic Braking

Automatic braking is a pre-crash technology as is designed after reduces the speed on high-speed collisions between the match over a fail concerning driver attention. While incomplete automatic braking systems may really prevent collisions, they're usually meant to slow the vehicle after the point where less injury is prompted or fatalities are unlikely.

Power supply unit:-

Regulated dc power supply is the electronics circuits it is design to provides the constant AC to dc voltage of pre-determinate value of the load points with the reference of mains ac fluctuations or load .The output of the ordinary power DC supply is applied to the voltage regulated device that supplies the output.

Conclusion:-

An Iot Based Accident detection and rescue system for Vehicle is successfully Assembled by use of database services, API and satisfied all requirements. The devices are capable of receiving and storing the data. Also Transmit it securely on the server. This device can also have trace of a vehicle on which it is mounted. If the accident happens the system is capable of communicating hospital and police station that are near to accident spot. Ambulance & police can identify the shortest route for reaching accident spot with the help of this system that have the web applications and mobile applications. By monitoring real time data system are more convenient for seeing all the data. As Day to day No of vehicles are increasing rapidly due to which Traffic Density is increased and we face Jam on roads frequently. To avoid Jam traffic must be Managed in such a way that there will not be any jam and every vehicle should Run at good speed. So we are designing system which will be consist of RSU (Road Side Units) Vehicles, Ambulance, Server. All sub part or systems will communicate with each other to manage the traffic density. There will be a system which will communicate with the vehicles and control traffic signal timer for managing traffic density as well as path clearance to ambulance using IOT technology

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