ACCIDENT DETECTION AND TRACKING SYSTEM USING GSM, GPS AND ARDUINO

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ABSTRACT

The rise of technology and infrastructure has made our lives easier. the entrance of technology has also increased the traffic hazards and also the road accidents happen frequently which causes huge loss of life and property due to the poor emergency facilities. This project is a few system which is developed automatically to detect an accident and alert the closest emergency services. this technique may locate the place of the accident so the medical services is directed immediately towards it. The system comprises of accelerometer, ultrasonic sensor, vibration sensor GPS and GSM Module support in sending message. Accelerometer detects the sudden change within the axes of car. Vibration sensor detects the heavy vibration within the vehicle. Ultrasonic sensor decrease speed of the vehicle when it comes closer to the opposite vehicle and GSM module sends the alert message to mobile with the situation of the accident. Location of accident is consigned within the kind of Google Map link, derived from the latitude and longitude from GPS module. Then after confirming the situation necessary action are going to be taken and this can help to achieve the rescue service in time and save the precious human life.

Index terms – Arduino, GSM, GPS, Ultrasonic Sensor, Vibration Sensor, Accelerometer.

I.INTRODUCTION

Traffic is on the increase because the demand for vehicles is getting higher day by day. So, transportation needs improvement as, since demands are increasing, there'll be more possibility of car accidents. Vehicle accidents are one in every of the leading causes of the fatalities. it'll be a heavy consequence if people can't get assistance on right time. Poor emergency incident may be a major reason for death rate in our country. Crash analysis studies have shown, traffic accidents could are prevented with the utilization of this advanced life saving measure. This design focuses on providing basic information on the accident site to the emergency contacts. As a results of the sudden help, precious life may get saved. during this work, a three-axis accelerometer and GPS tracking system work for accidental monitoring. This design detects accidents in less time and sends this information to the specified authorities. The development of a transportation has been the generative power for citizenry to own the best civilization above creatures within the earth. Automobile features a great importance in our way of life. We utilize it to travel to our work place, confine touch with our friends and family, and deliver our goods. But it may also bring disaster to us and even can kill us through accidents. Speed is one in every of the foremost important and basic risk factors in driving. It not only affects the severity of a crash, but also increases risk of being involved in an exceedingly crash. Despite many efforts taken by different governmental and non-governmental organizations all round the world by various programs to aware against careless driving, yet accidents are going down every now then. However, frequent lives could are saved if the emergency assistance could get the smash information in time. As such, productive automatic accident detection with an automatic information to the emergency service with the accident location may be a prime must defend the beneficial human life. This project is to employ proposes to advance the potential of a GPS receiver to detect the speed of a vehicle and detect an accident basing on the supervises speed and send the placement and time of the accident from the GPS data processed by a microcontroller by using the GSM network to the Alert Service Centre.

II.LITERATURE SURVEY

T Kalyani [1], because the usage of vehicles is increasing drastically, the hazards thanks to vehicles is additionally increased. the better cause for accidents is high speed, drunk and drive, distracing minds, over stress and thanks to electronic appliances. This paper approaches with accident detection system that happens thanks to inattention of the one who is driving the vehicle. This introduces accident alerting system which alerts the one who is driving the vehicle. If the person isn't during a position to regulate the vehicle then the accident occurs. Once the accident shows to the vehicle this system will send instruction to registered mobile number.

S. Mutharasu [2], Arduino Based Vehicle Accident Alert System using GPS, GSM and Accelerometer. Accelerometer notices the sudden variation within the axes of car and GSM module send the active message on your itinerant with the situation of the accident. The propel technology has made our day to day lives easier. Since every coin has two sides similarly technology has its benefits similarly as its disadvantages. the increase in technology has increased the speed of road accidents which causes huge loss

of life. The poor emergency facilities available in our country just increase this problem. Our project goes to produce an answer to the present problem.

S. Mohanram [3], Now a days we are able to track vehicles using many applications which helps in securing personal vehicles, public vehicles, feet units et al.. Furthermore there's a rapid increase within the occurrence of the Road accident. This paper is a couple of system which is developed to automatically detect an accident and alert the closest hospitals and medical services about it. this technique also can locate the place of the accident in order that the medical services may be directed immediately towards it. The goal of this paper is to make up a Vehicle accidental monitoring system using MEMS, GPS and GSM Technology. The system invloves of accelerometer, MCU, GPS & GSM Module support in sending message. The accelerometer is employed to detect fall and Threshold Algorithm are accustomed detect accident. Short Message will invlove GPS [Latitude, Longitude] which helps in locating the vehicles.

III.BLOCK DIAGRAM

A 9V compact power surplus will power the Arduino board. The GPS and the GSM shield and the impact sensor will derive power from the Arduino board itself. The circuit is first initialized and the GPS and GSM module is turned on. The system hold till the GSM module acquires a signal and is registered with the network. The system then goes on standby until the impact sensor gives a positive output. Once the accident is detected, Arduino acquires the current location of the vehicle using the GPS module and the co-ordinates are then sent via SMS to emergency services and/or contacts the user may have stored.

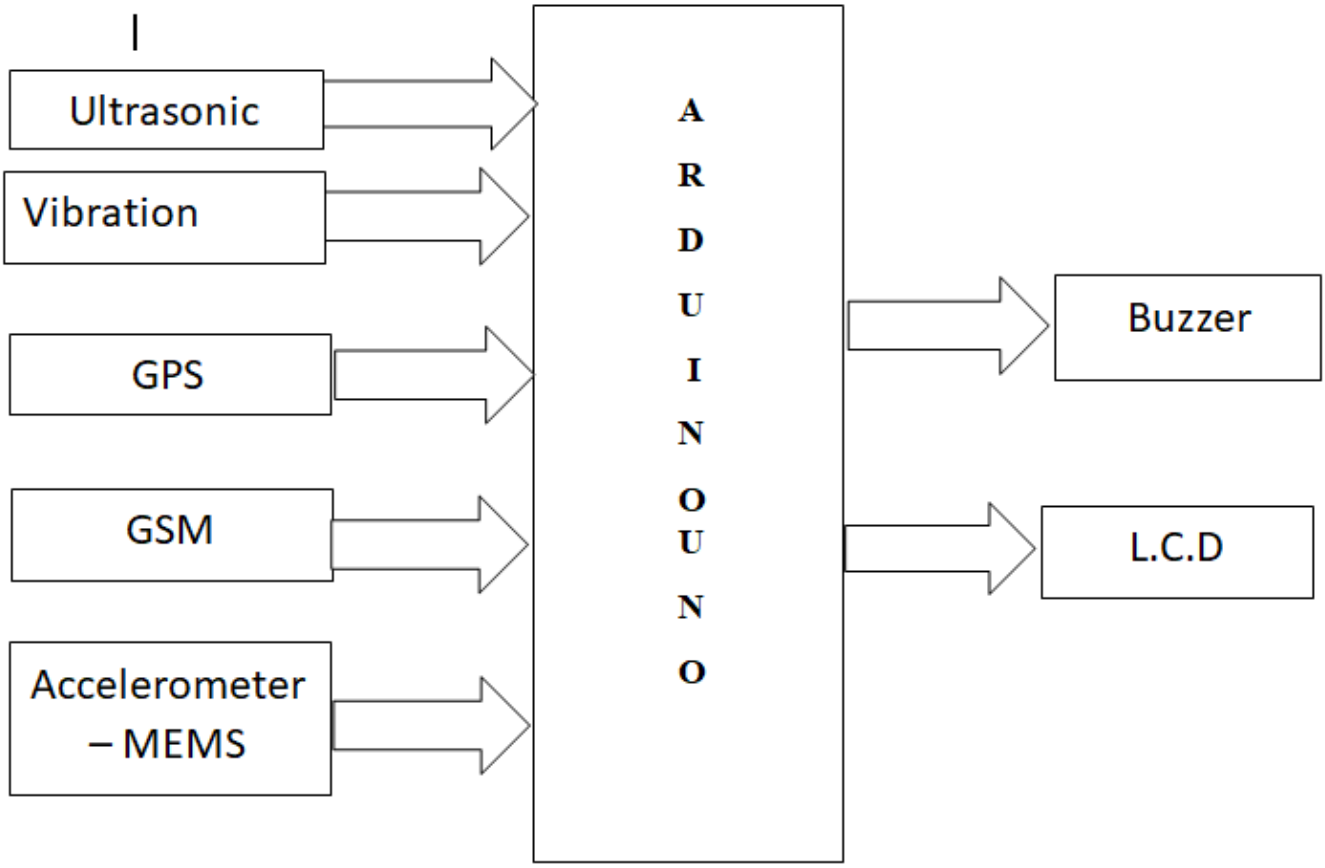

Fig 1 Block Diagram

3.1 AURDINO UNO

Arduino/Genuino Uno could be a microcontroller board supported the ATmega328P (datasheet). it's 14 digital input/output pins (of which 6 are often used as PWM outputs), 6 analog inputs, a 16 MHz quartz, a USB connection, an importance jack, an ICSP header and a push. It accomodate everything needed to backing the microcontroller simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to bring out started. "Uno" means one in Italian and was chosen to mark the discharge of Arduino Software (IDE) 1.0. The Uno board and version 1.0 of Arduino Software (IDE) were the reference versions of Arduino, now evolved to newer releases. The Uno board is that the first in an exceedingly series of USB Arduino boards, and therefore the mention model for the Arduino platform; for an in depth list of current, past or outdated boards see the arduino index of boards.

3.2 GPS MODULE

GPS abbreviates global positioning system and this can be accustomed detect the latitude and longitude of the actual position and it also shows the precise time. It detects these values anywhere on the world. In our project it plays main role and it's the most source of the latitude and longitude of the vehicle to grasp the accident occurred location, or perhaps for theft tracking of the vehicle. This gadget gets the coordinates from the satellite for every and each second. This device is that the main component of car tracking project. The Global Positioning System (GPS) may be a satellite based navigation system that sends and receives radio signals. A GPS receiver acquires these signals and provides the user with information. Using GPS technology, one can determine location, velocity and time, 24 hours daily, in any weather anywhere within the world at no cost. the most application of this technique is track the vehicle using the GPS receiver. This receiver gives the data about its position whenever required within the variety of latitudes and longitudes. this can be finished the assistance of the GPS satellite and also the GPS module attached to the vehicle which must be tracked.

3.3 GSM

GSM is an open, digital cellular technology used for impart mobile voice and data supply. we will path the vehicle frequently and also instruct to the Local ambulance if the vehicle is met with any accident using GSM automation. this is often an affordable device which reduces the matter related to accident notification and antitheft control. If the user is somewhere off from the vehicle and he wants to grasp where his vehicle is correct from the place he's standing, he needs to send a predefined message to the modem. The controlling unit are going to be fixed to the vehicle. The controlling unit contains the microcontroller and also the GSM modem interfaced to that. The microcontroller continuously checks whether it's received any message from the modem. Finally it receives the message and transmits the data to owner of the vehicle. This a second generation (2G) mobile network. this is often widely utilized in everywhere the planet for mobile communication. This GSM device consists of sim squeeze which a sim card may be inserted which contains a unique number, this unique number is employed for contact. This GSM device consists of a singular number called IMEI number and this is often different for every and each hardware kit. In our project the device is employed for transmitting data. the info from GPS is transmitted to given mobile through this GSM itself.

3.4 VIBRATION SENSOR

The sensor accustomed detect accident is shock sensor. this is often one stage shock sensor, it detects any hard impact acted thereon. The output from sensor after impact are +5v and connected to INT (pin 12) of processor. These sensors are fixed on all sides of the car to detect impact occurred thereon. These outputs from sensors is send into gate to detect a minimum of one impact. it's integrated within the circuit system by connecting all the sensors to gate whose output is connected to the int pin of microcontroller. These sensors are connected in such the simplest way that they detect force impact occurring from any side of the car. this is often concerned to the protection of the system of the human driving the car in order that once accident is detected the paramedics can reach to the placement as soon as they'll.

3.5 ADXL345 ACCELEROMETER

The ADXL345 is analogous temperament for mobile device applications. It part the static acceleration of gravity in tilt-sensing operations, additionally as dynamic acceleration resulting from motion or shock. Its high perseverance (3.9 mg/LSB) enables frequency of inclination changes but 1.0°. It parts the pair dynamic acceleration resulting from motion or shock and static acceleration, like gravity, that enables the device to be worn as a tilt sensor. The sensor could be a polysilicon surface-micro machined structure built on top of a silicon wafer. Polysilicon springs append the structure over the surface of the wafer and quantity a resistance against forces due to applied acceleration.

3.6 ULTRASONIC SENSOR

The sensor is primarily intended to be used in security systems for detection of moving objects, but are going to be effectively involved in intelligent children's toys, automatic door opening devices, and sports training and contact-less-speed measurement equipment. The ultrasonic sensor can easily be interfaced to microcontrollers where the triggering and measurement are going to be done using two I/O pin. The sensor conducts an ultrasonic wave and produces an output pulse that corresponds to the time required for the burst echo to return to the sensor.

3.7 DC MOTOR

Motors are the devices that provide the particular speed and torque in an exceedingly drive system. This family includes AC motor types (single and multiphase motors, universal, servo motors, induction, synchronous, and kit motor) and DC motors (brush less, servo motor, and kit motor) additionally as linear, stepper and air motors, and motor contactors and starters.

3.8 LCD

LCD screen be composed of two lines with 16 characters each. Each character consists of 5x7 dot matrix. Contradiction display lead on the power supply voltage and whether messages are displayed in one or two lines. For that reason, variable voltage 0-Vdd is applied on pin marked as Vee. Trimmer potentiometer is usually used for that purpose. Some versions of displays have built in backlight (blue or green diodes). When used during operating, a resistor for current limitation should be used (like with any LE diode).

IV.SOFTWARE IMPLEMENTATION

The foremost aim of the system is to develop a coffee cost solution for tracking vehicular accidents. The proposed system works in two phases. within the primary phase, the Arduino monitors the pin at which the impact sensor is connected and waits for the input to urge active. within the second phase, the GPS receiver fetches the GPS location, after calculating the precise location, the GSM module creates a SMS which includes things of the accident and sends it to respective authorities.

Arduino IDE:

The Arduino integrated development environment could even be a cross-platform application written in Java, and derives from the IDE for the Processing programing language .Arduino programs are written in C or C++. The Arduino IDE comes with a software library called "Wiring" from the primary Wiring project, which makes many common input/output operations much easier. The users need only to define two functions to make an executable cyclic executive program: 1) setup(): a function that runs once at the start of a program which may initialize settings. 2) loop(): a function called repeatedly until the board powers off. Flowchart for accident tracking:

1. Start
2. Power on all the modules
3. await the shock/vibration sensor to detect accident
4. Get this location from the GPS modem
5. Check whether the GSM modem is registered on the network
6. Send the SMS

V.RESULT

Whenever accident of the vehicle occurs, then the device sends a message with the information of accident location to the predefined numbers so that help can be made available. The message sent with the help of the GSM module will appear like this - Mems moved accident, vib on accident alert." This system shows the location of vehicle where the accident has occurred with the help of the GPS module connected to it and hence that information is added in the form of latitude and longitudinal values in accident alerting message.

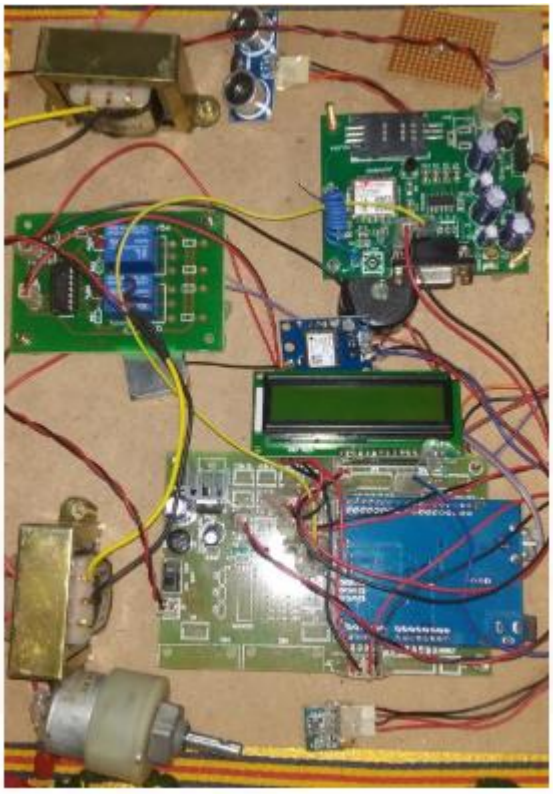

Fig 2 Kit

Fig 3 LCD display Accident Identification and Alert system using GPS GSM

Fig 4 To store the mobile number in the device

Fig 5 Latitude and Longitude values of the location

Fig 6 Vibration sensor and Accelerometer conditions

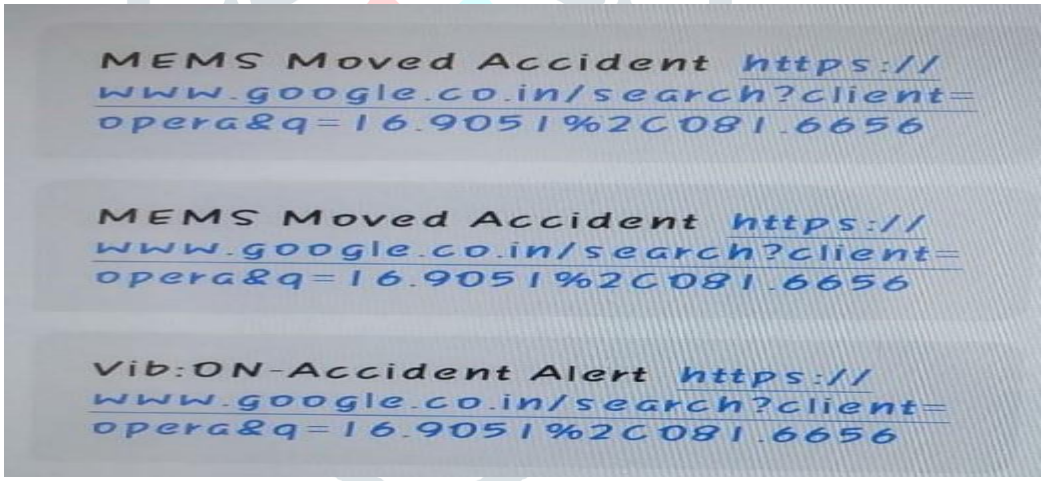

Fig 7 GPS Coordinate received in emergency contacts

VI.CONCLUSION

The papers provide various methods to detect accidents using both hardware and software methods which give good results. Most of the discussed methods also provide the driving force with the choice of turning of the alarm in cases where the accident isn't serious or false detections of an accident. These methods are either mostly hooked in to some hardware like sensors that need to be present within the car or require a sensible phone to be present within the car. While the utilization of such hardware can convince be a more cost-efficient approach it's the disadvantage of being destroyed within the accident and hence giving spurious or no readings in the least . Hence, an approach that doesn't depend upon any hardware device or sensor that's related to the car is required for the detection of traffic accidents.

VII.FUTURE SCOPE

This system are often interfaced with vehicle airbag system that forestalls vehicle occupants from striking interior objects like the wheel or window. this will even be developed by interconnecting a camera to the controller module that takes the photograph of the accident spot that creates the tracking easier. Mostly in accidents, it becomes serious because the drivers lose control and fail to

prevent the vehicle. In such cases, the vibration sensor are going to be triggered due to the vibrations received and also processed by the processor. The processor has got to be linked to the devices which may lock the brakes when triggered. With this improvement, we will stop the vehicle and may weaken the impact of the accident. This system also can be utilized in fleet management, food services, traffic violation cases, rental vehicle.

VIII.ADVANTAGES

Accident detection and tracking system using GSM,GPS and arduino

1. .Easy operation.
2. Highly secure.
3. Simple and Reliable Design.
4. Isolates both GSM&GPS

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