Accident reporting and big data analysis implementation to make road safer

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Abstract

Accident cases are on the rise these days, and as winter approaches in northern India, the number of instances will only rise in the following days. Accidents cannot be predicted, therefore all we can do is ensure that we are ready for any type of disaster and that the harm to the individual is kept to a minimal. Inadequate medical facilities are frequently to blame for accidents because of late reporting. In order to provide automatic assistance to the injured individual, we have attempted to incorporate all the elements necessary to detect the accident as soon as it occurs and notify it to the family member, local rescue personnel, and hospitals. When a driver has an accident, a MEMS sensor built into the body of the vehicle detects the tilt, or the direction in which the accident occurred, and sends the value to an Arduino-UNO board that is interfaced to it. When the input value exceeds the threshold programmed value, the accident is confirmed. An alarm is now set off to warn those in the area, and the driver can deactivate the warning if it turns out to be false. The GPS module then extracts the information from the GSM module and sends a message with crucial details about the accident, including the location of the accident in terms of latitude and longitude, as well as a link to Google Maps. These data are retrieved and kept in a location for further study, which can be used to recommend to the government authorities the implementation of traffic lights, speed brakes, or traffic police in order to lessen the frequency of accidents. As we can track down the car and temporarily suspend the driver's license, this can also be used to uphold law and order in the community. The system was designed with Indian roads and driving habits in mind, but we anticipate it will function just as well everywhere else in the world with any type of terrain.

1 Introduction

1.1 Background

India is a country where street accidents may occur more frequently than any other in Asia. This is largely because of the terrible state of our transportation system, which prevents money from being deployed effectively to have the greatest positive impact. The statistics on street accidents, especially those involving fatalities in India, are alarming. Despite ongoing attempts by the government to regulate this situation, India tops the list of 199 countries for the number of people killed in traffic accidents. Nearly 11% of all deaths worldwide take place in India. Further research revealed that 84% of these fatalities involved people between the ages of 16 and 60, or those in the working population. Lack of quick clinical attention for accident victims has resulted in the loss of many lives. The growth of the human population has also resulted in an increase in traffic. According to the assessment study "Street Accidents in India, 2011," an overall total of 1,42,485 people had lost their lives as a result of deadly street incidents. Although destiny cannot be changed, giving individuals access to medical care as soon as feasible makes them feel satisfied. We are working to create a system that will help to speed up the reaction time following an accident. The major goal is to transmit accident information from machine to machine without human interaction and notify the appropriate authorities using wireless technologies in the shortest amount of time. A web-based, multi-platform accident reporting and tracking system is called MySafeRoad. It is meant to provide a route to prompt reporting of accidents and prevent potential life losses. The framework offers competent and reliable announcements as soon as additional automobiles involved in an accident occur. Additionally, this system provides extensive and essential information on prior events, allowing for the proper action to be taken to prevent future accidents. The tracker, the reporter, and the analysis or big data module are the three key components of the framework. The following module was created using a Simulated Sensor. A software continuously analyses the data coming from the sensors, and when a sensor value exceeds a predetermined threshold value, the program recognizes accidents events and communicates them to the pre-set of treatment focus together with vehicle and client data as alert regions. These days, there are more accidents than ever before, and as winter approaches in northern India, there will be even more of them in the days to come. Accidents cannot be predicted, so all we can do is make sure we are ready for them on our end, minimizing any harm they may cause to others. Lack of appropriate medical facilities often results from reporting incidents too late. In order to provide automatic assistance to the injured individual, we have attempted to incorporate all the elements necessary

to detect the accident as soon as it occurs and notify it to the family member, local rescue personnel, and hospitals. When a driver has an accident, a MEMS sensor built into the body of the vehicle detects the tilt, or the direction in which the accident occurred, and sends the value to an Arduino-UNO board that is interfaced to it. When the input value exceeds the threshold programmed value, the accident is confirmed. Right now, an alarm is set off to warn those in the area, and the driver can manually deactivate the alarm if it turns out to be false. The GPS module then extracts the information from the GSM module and sends a message with crucial details about the accident, including the location of the accident in terms of latitude and longitude, as well as a link to Google Maps. These data are retrieved and kept in a location for further study, which can be used to recommend to the government authorities the implementation of traffic lights, speed brakes, or traffic police in order to lessen the frequency of accidents. This can also be utilized to uphold law and order because we can track down any cars that are causing too many collision ns and temporarily suspend the driver's license. The system was designed with Indian roads and driving habits in mind, but we anticipate it will function just as well everywhere else in the world with any type of terrain. Following the receipt of similar upsetting information, the treatment facility will display this information on its guide. The working team at the treatment center will check to see that the controller who is most conveniently located for the accident arrives at the scene first after receiving warning data. The Big Data analysis module provides real-time insights that can be examined to identify areas that are more prone to accidents so that appropriate actions can be taken, such as reducing vehicle speeds in that area, deploying guards, and positioning ambulances in appropriate areas so that they remain close to the area in the event of an emergency.

1.2 Motivation:

Road accidents are one of the major cause of deaths in India. Despite continuous efforts of the government to control this situation Among the 199 countries, India has the highest proportion of fatalities from traffic accidents—nearly 11% of all deaths worldwide. On diving deeper into the studies, it was known that 84% of these deaths are of the people of working age i.e., in 16-60. There have been several reasons for the death of the people of these age like not following traffic rule, driving on wrong the wrong side of the road, because of feeling tired during driving as a result of overworking and by drunk driving and rash driving. This is not just an issue in India but it a major issue faced by people worldwide. A lot of times it is known that the casualty happened only because of delay in providing the medical facilities, in such type of emergency situations delay of even 10 to 15 minutes may lead to death. Moreover, even after trying to get the medical facilities 70 times out of 100, calls made by phone, lack to provide exact location which leads to further delay.

In India, national main roads make up 2.03% of the total system and account for a disproportionate share of 35.7% of casualties (as of 2019), while other types of roads add up 95% of all roads and account for 39% of casualties. This is mainly because, every once in a while, when the road is empty, the individual who responsible for the accident tries to flee rather than seeking out the victim's medical attention, and it is also very difficult to find a hospital.

At times after the death the people concerned for the victims regrets that if only the accident was discovered early, they would have saved the life of their loved ones. One can't change what is there in destiny but providing medical facilities as early as possible gives sense of satisfaction to the people .In order to circumvent these problems we are trying to develop a system that will help to reduce the response time after the accident , the main agenda is to transfer the information of accident from machine to machine without intervention of humans and inform the respective authorities through wireless technologies which will involve as much less time as possible.

2 LITERATURE SUREY

2.1 Wireless Accident Information System Using Gsm And Gps

Designing a smart screen and control system that screens the zone and keeps the predetermined rate in the zone levels is explored, claim Mr. Rathnakumar and Manivannan (2012). The accident detection and information sending module, the programmed speed control module, and the security allowing module are all combined in one project. A radio frequency transmitter placed in a certain location and a radio frequency receiver within the car make up a programmed speed control module. GSM and GPS advancements are used in the accident discovery module. The safety-assuring module has material components that ensure both the driver's and safety belt's conditions. Two sensors—one for alcohol and one for eyes—are built into this module. The Receiver (speed Display and Control) Unit and the Zone Status Transmitter Unit make up the sharp showcase and control. When an accident occurs, the vibration sensor vibrates over its threshold and sends information to the GSM module. The GSM can communicate with the appropriate authority. Thus, this mechanism assures the security of human life.

Advantages –

Works well for a targeted area and gets activated for a particular area, thus functioning of each area can be defined independently

Disadvantage –

Do not provide a functionality for data analysis -less elasticity because to fix an issue or upgrade the area coverage one have to go and manually access the RFID transmitters.

2.2 Vehicle Accident Alert And Locator (Vaal)x`

Olugbemiga and Emmanuel, the study presents a thorough investigation on emergency alert circumstances involving automotive accidents. The accident detector is supported by a GPS/GSM module that the program's creator designed to send a report via the GSM communication platform to the closest offices, such as police stations, emergency rooms, fire administrations, and so on, outlining the precise location of the accident's occurrence. When a car accident occurs, the accident detection system sends a signal to the GPS/GSM module, which is configured to retrieve data from memory such as the license plate number, speed, etc. Finally, the system retrieves the above data along with the GPS data received and sends them to the relevant authorities after analyzing the data obtained with the planned data in the memory.

Advantages –

Works on SMS thus location reporting can be done at remote areas where cell phone tower is available but no reliable internet connectivity

Disadvantages –

Do not incorporate machine learning, big data analysis thus limiting the true potential of the IOT device, thus possible wastage of valuable data. -Since not on the Internet via long range wireless networks like 3G,4G the possibility of sending data to the servers via https or http requests decreases.

2.3 Accident detection and monitoring System using IOT

These days, there are a lot of accidents, and as a result, many people pass away. So, Dr. D. Karankuzhali, D. Madhubala, Y. Nisha, and S. Rajeswari created a project that will provide the best solution to this issue. According to this project, when a vehicle is involved in an accident, a vibration sensor and a micro electro-mechanical system (MEMS) sensor are used to identify the accident and send the information to the server. Through GSM and GPS, the Arduino Super Regulator transmits the alert message. By gathering the information, GPS MODEM is used to track the casualty's immediate location. After claiming the space, the necessary move can then be made. This document aids in measuring the subject's heartbeat and identifying the gas in the car. Mems and a vibration sensor are used to determine whether an accident occurred. Making use of Mems The car can rapidly notify the microcontroller when it has been rollover. The use of the ultrasonic sensor allows for the measurement of the distance between the vehicles and, as a result, a reduction in vehicle speed. To measure the amount of oxygen in the car where the accident occurred, a gas sensor is used.

Advantages

– Cost is less in this framework.

- It shows the situation where the mishap has happened.

-constant monitoring of data

Disadvantages

-More traffic in the network because no on board processor is available to detect an accident thus; data needs to be constantly sent to the server. This increases network traffic as well as keeps the cloud processor engaged unnecessarily thus wasting crucial processing time which could be used to analyze data or to append more nodes in the system.

2.4 Iot Based Vehicle Accident Detection And Tracking System Using Gps Modem

In this project, Swetha Bergonda, Shruti, and Sushmita construct a "IoT Based Vehicle Accident Detection And Tracking System Using Gps Technology" using a raspberry pi. A dazzling LED flashes when the system is switched on to indicate that power has been given to the circuit. The vibration sensor sends a signal to Raspberry Pi when it detects an impediment. The GPS finds the accident-related car and provides the information. Now, WhatsApp messaging will be used to send this information from a cellphone number. This response will include the longitude and range. You may assess the condition of the car using these featured. The Raspberry Pi receives the information that was obtained. In line with that, it sends a confirmation to the phone as a WhatsApp message. Driven used in the circuit demonstrates the message gathering. The Raspberry Pi connected to the GPS modem over the internet, and the devices are operated by using certain lines inside the web. Through communication and obtaining a pin, the web is connected to the Raspberry Pi. LED is connected to any port on the Raspberry Pi, and it is used to display the GPS modem's current status whether or not GPS data is being read.

Advantages

-The speed of the vehicle can be monitored.

-Cheap because of minimal architecture used for basic structure.

-Mobile numbers can be changed at any time.

Disadvantages

-Sending data is not secure.

-This system is not applicable for poor network connection places

-No scope of bigdata and machine learning not possible because no data is being maintained

2.5 Car Accident notification system based on Internet of Things

This study proposes an ioT and cloud-based call notification system. It covers how to use crash sensors to implement the occurrence of an accident, find the precise site of the accident, and relay the location to emergency service stations through Cloud.Other systems used with XBee WiFi include the Xbee shield, GPS module, Seeeduino, and crash sensors. The severity of the collision is assessed using crash sensors mounted on the vehicle. If the level of When higher than a predetermined threshold value, the impact is regarded as an accident. Arduino GPS and XBee modules are configured using the environment. When an accident is detected, the GPS data is sent via Bee and WiFi module. This system calls for a single dedicated server that will house three data lookup tables: one for car plate numbers, one for location updates, and one for the locations of all the state's hospitals. All XBee modules will communicate with the servers using the first server as their Gateway Identifier. Upon the purchase of a car, the XBee modules will be registered on the server. After logging into the server, a lookup table will be available for hospitals to use to register their location. The locations of each hospital in the state are included in this table. Once the module is registered on the server, it will automatically keep track of the information that is provided to it and, in the event that a signal of a car accident is received, do a matching of the automobile location with the locations of the hospitals.

ADVANTAGE:

With the use of cloud application, the data can be transmitted to longer distance

DISADVANTAGE:

The proposed study wasn't a complete successful one there were several limitations to it first is ,implementing server for cloud computing can be very costly ,the hospitals needs to be logged into the server 24x7 and have to maintain a constant updates. and third is the cars need to be WiFi enabled. Despite the limitations of this study it is a s a step forward in the implementations of not

2.6 Vehicle Accident Automatic Detection and Remote Alarm

The project, which is being led by Varsha Goud and V. Padmaja, would provide the best solution for reporting an accident and make it easier to handle. In order to detect dangerous driving, an accelerometer can be used in a vehicle alarm system. It might be used as the car's rollover or accident signal both during and after an accident. A serious accident can be detected using accelerometer readings. According to this task, if a car accident occurs quickly Depending on whether a vehicle is moving or not, a vibration sensor or a Micro electro-mechanical framework (MEMS) sensor will detect the sign and communicate the information to the ARM regulator. The microcontroller transmits the alarm message to the police control room or a service group via the GSM MODEM, along with the area. After receiving the data, the police can immediately follow the area using the GPS MODEM. Then, after acclimating to the surroundings, a crucial move will be made. The driver can turn off the alert message with a switch provided in the event of a minor collision or, alternatively, if there is no real threat to anyone's life in order to avoid wasting the clinical salvage team's valuable time. This study is useful for accurately identifying the accident using an accelerometer and a micro electromechanical system (MEMS). As there is room for improvement, we may eventually implement a remote webcam to take photographs that would aid in providing driver assistance.

Advantages

-False claim is minimizes by kill option

-cost effective solution –

Disadvantages

-No data is maintained on the server thus we won't be able to apply big data analysis to come up with useful information which can help in future planning.

2.7 Instance vehicle monitoring and tracking with internet of things using Arduino

The suggested system can locate the automobile, detect gas leaks, detect accidents, and measure speed while it is moving. It then notifies the owner of the car via SMS over a GSM network. The system's Arduino microcontroller foundation makes it an effective and reasonably priced car tracking and vehicle security solution. The main benefit of this system is to alert the driver of any gas leaks, about the speed of the car, and it is also used to send SMS to others when some accident occurs. It can also aid in preventing the vehicle from being stolen. Piezoelectric strip sensors are used to detect vibrations in moving objects. The vibrations put stress on the piezo material, which results in a change in value. Hall Impact Sensors are devices that measure speed and are triggered by an outside magnetic field. When the automobile is started, the current flowing moving around the sensor starts to compute a threshold. After that, the sensor finds a value and generates an output. Gas leaks are discovered using the MQ-2 sensor, which is also capable of finding cigarette smoke. Data from such an Arduino Particular request is delivered to a PHP program and a custom database, making all of these element's web-accessible. The Arduino Microcontroller receives a 9–12-volt input and uses it to access the SW420 vibration sensor, MQ2 gas sensor, Hall effect sensor, and Arduino GPS as input devices. SIM 300, an Ethernet module, and a buzzer are used as output devices.

ADVANTAGE:

This was a successful implementation, and this could reduce the number of accidents happening on road and

also may help in saving life if implemented well on ground level.

DISADVANTAGE:

For an accident detection case, only speed has been considered by making use of hall -effect sensors which won't produce correct information in most of the cases.

2.8 Detection and Prevention of Accidents using IOT

Some drivers who are travelling long distances in the evening fail to get enough rest, which leads to this accident. According to the Ministry of Road Transport and Roadway India, there were a total of 4,67,077 accidents in 2018, resulting in 1,51,417 fatalities and 4,69,418 injuries. The number of fatalities per 100 incidents, a measure of the severity of street accidents, increased by 0.6 percent in 2018 over 2017. India also holds the top spot among the 199 countries in terms of the number of fatal street accidents. Therefore, this study has addressed every scenario that could possibly arise. The Arduino board is the main component of the proposed architecture. In which the MQ3 sensor is mounted on the steering wheel to determine whether or not the driver is drunk. The engine won't start if the driver is inebriated. On the off event that the driver is drowsy, the alert will activate to wake him or her up. The eye signal sensor is utilised to assess whether the driver is relaxed or not. To find out if anything is in front of the car, an ultrasonic sensor is used. If an object is in front of the car at a certain distance, the speed will be reduced, and the backdrop illumination will warn the vehicle approaching from behind. The location of the car at the time of the accident is determined using a GSM and GPS module. To determine whether a mishap has occurred, vibration sensors are used. If an accident occurs, the GSM module helps to send the location of the accident to the rescue team, police, and family members. Alternatively, if the accident did not result in any casualties or real loss, the driver can press the reset button to stop sending messages to save the rescue team's time.

ADVANTAGE:

It is a self-contained system which can function independent of external devices. It uses SMS and hence ensures delivery of messages over other modes of emergency contact.

DISADVANTAGE:

In the scenario of an actual crash there is no guarantee of the survivability of the Arduino board in the crash and hence the whole system could fail if the crash were to damage some critical components.

2.9 Accident Detection, Alert and Tracking System Based on IoT

In this study, WSN (Wireless Sensor Networks) are used to pinpoint the location of accidents, alert emergency services, and track down vehicles using GPS modem. The PIC Controller, Eye Blink Sensor, Vibration Sensor, Alcohol Sensor, Power Supply, GSM, GPS, Relay, and Motor are really used in the suggested work. The square graph shows the many sensors that we used in our system including a microcontroller, bell, GSM, GPS, relay, motor, and LCD display. The main element for obtaining data is the MCU (Microcontroller Unit). In this case, a PIC MCU with five ports is used. It can transfer 8-bit data stored in the memory. There are numerous on-chip types in it. It has an oscillator made of precious stones that is used to start the microcontroller. Additionally, it includes a reset button and a MAX 232 interface between the GPS and GSM modules. Due to its self-reprogrammable and improved streak program memory, which has a usual 100,000 delete/compose cycles, the PIC 16F877A Microcontroller is used in this application. They make use of predetermined oscillators and conserve energy when in rest mode. Bidirectional information and yield pins are used on the ports. Individually, the ports produce complex and straightforward yields. In this use, USART, clocks, and coordinated recollections are registered. We suggest using an eye flicker sensor to detect when someone is dozing off so that the caution unit can alert the driver.

ADVANTAGE:

WSN is utilized to operate entirely independently and more effectively than other manual tasks. Effective from a financial point of view

DISADVANTAGE:

Not very cost effective, uses GPS tracking hence working might be doubtful in bad weather

2.10 An IoT Based Car Accident Prevention and Detection System with Smart Brake

This study explains a revolutionary system that aids in preventing automobile collisions. When an accident occurs, the system notifies the emergency services, the appropriate person, or both. It gathers data between two vehicles and measures their separation using an ultrasonic sensor. The measurement is updated every second, and the driver can see it via an interface. There are basically four situations in which this system will alert the driver: first, when two vehicles are close, a yellow alert will be displayed; second, when the distance between the vehicles becomes critical, a red alert is shown with a buzzer; and third, when the driver doesn't react even after the critical condition, the system will automatically apply the brakes or shift the car's gear to slow down.

This system is composed of ultrasonic sensors, leds, buzzers, servo motors, and a raspberry pi that sends email for profit. The only prerequisite is the installation of ultrasonic sensors in front of the vehicle. In order to be able to change gears, servo motors in manual transmission cars must be attached to the gearbox brake

paddle, as opposed to automatic transmission cars where the servo motor is mounted to the master cylinder. This enables the vehicle to instantly stop and modify its speed. The driver's face must be in front of the interface.

ADVANTAGES:

This paper suggests method which if implemented in right way may help decrease the number of deaths by accident. The system is available and functional throughout the day, it is robust also because the it has continuous alert system and notification function of an ion device.

DISADVANTAGE

can't be implemented on two-wheeler vehicles as there is always some scope of noise in way of ultrasonic sensors. This system can be enhanced further to suit vehicles of all type since adding GPS module to it will make the email system more efficient.

3 PROPOSED SYSTEM

3.1 Introduction:

Most of the studies on this topic as per our survey just worked on the improvement of hardware and giving alerts in lesser time but none of the studies have made efforts to try to remove the root cause of the accident by trying to analyze the data and imply more safety measures in the accident-prone areas and giving an automatic reminder to the driver as soon as he enters more accident-prone area. This will also help the authorities to be well prepared with ambulances and other first aid services nearby that area.

Example of such analysis can be: -

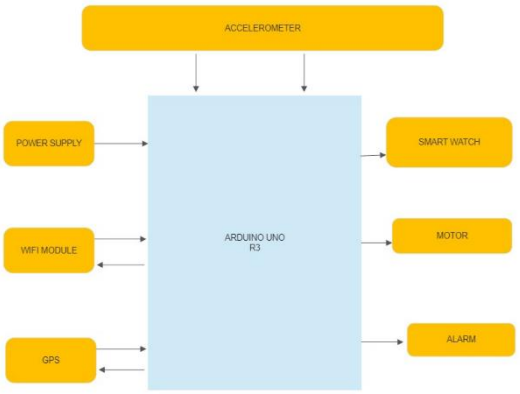
1>Ambulances and medical services can be placed strategically on the spots closer to more accident-prone areas thus this will increase the probability of presence of first aid service nearby.

2>We can mark down critical areas where an accident can cause huge traffic jams because of the heavy traffic on the road, so the police department can place traffic police officers closer to the

spot so that they can take appropriate measures to control the traffic as soon as possible.

In this system we are planning to make use of an ACCELEROMETER sensor, WI-FI module, and GPS connected to an Adriano UNO board.

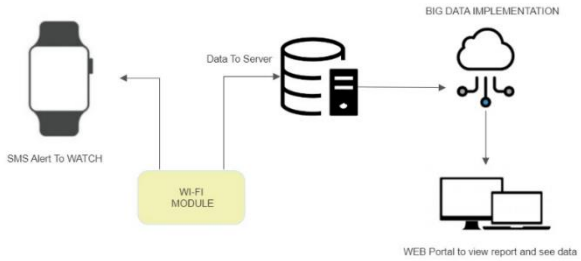
3.2 Power supply:



(Basic Model Structure)

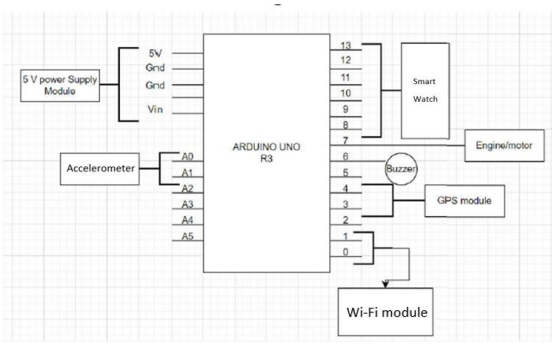
In the project we propose to use ACCELEROMETER sensors to identify the accleration, the readings in the means sensors are to be compared with pre-set threshold values designed for specific vehicles collected over a period of time after several experiments on how that particular vehicle behaves in case of an accident. ACCELEROMETER sensors also help us to identify the side from where the vehicle has faced an impact. In case If an accident is detected our system take on the current GPS coordinates from

GPS sensors moreover fetch details of driver and vehicle like age, vehicle number ect from the pre stored memory. After this The details of the accident are simultaneously pushed to the server using the WI-FI module where this collected data over time is analyzed and a list of meaningful outcomes are achieved. After these outcomes are analysed governments can prepare road safety policies according to this data and all together reduce the probability of accidents from hot zones. The driver is first promoted to switch off the alarm in 10 sec if he does not switch it off. The message of the accident along with the location is sent to the hospital and other emergency services providers and to his family, this thus ensures that only genuine requests are sent up to the police, hospitals and family members.



(Big data analysis and implementation basic diagram)

3.3 Circuit Diagram:

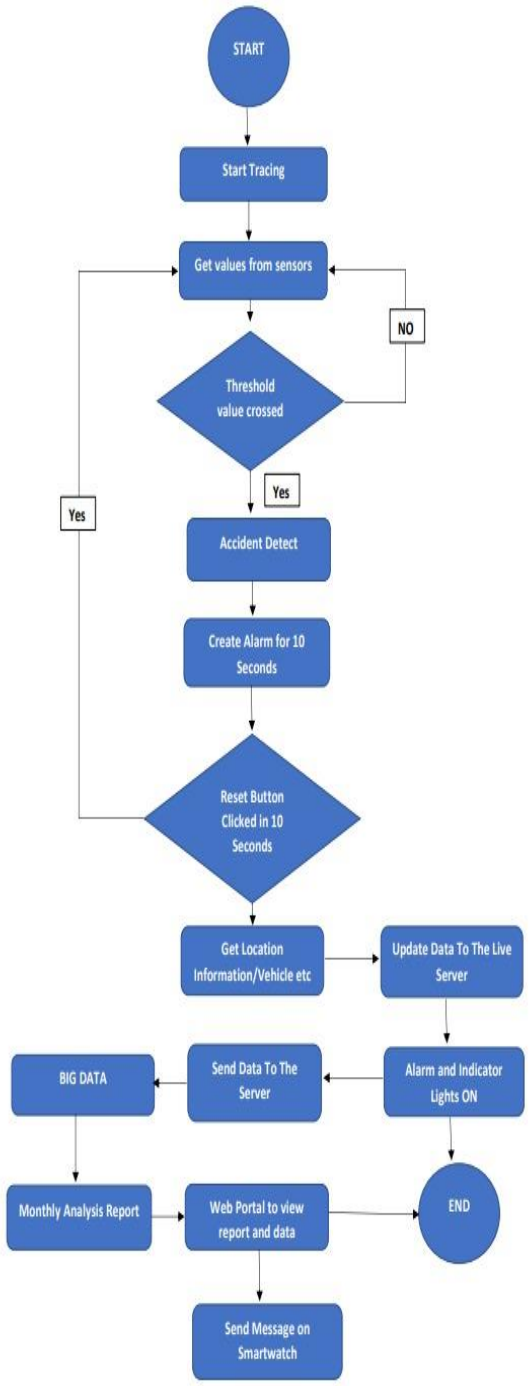


3.4 Algorithm

Let vibr , acc , incl be the values of vibration , acceleration , inclination of MEMS sensor
Let p1 denote the peak value of vibration , let p2 denote the peak value of the accelerometer and
p3 denote the peak value of the sensor .
1.readLinkedSensorDataFileDirectory( )
2.Process the sensory input
3.LocationMap= createLocationFromLinkedSensorDataFile( )
4.locationObject = fillLocationInformationFromLinkedSensorDataFile( )
5.locationMap.put(sensorName , locationObject)
6.sensorValuelist= {vibr , acc , incl }
7.while(incl ==LOW). {
8. if(acc==p2 AND vibr !=p1) {
9. \\there is sudden change in acceleration due to crossing of pets etc may or may not be accident
10. “Alarm for accident”
11. if (button.reset( )){
12. Return [step 6]
13. }
14. Else if(acc==p2 AND vibr ==p1){
15. \\there is sudden change in acceleration and there is collision with some object
16. “ Alarm for accident “
17. Send locationMap to centralised Server}
18.if(incl ==p3){
19. “ Alarm for accident “
20. Send locationMap to centralised server
21.Send data to server}
22..Exit .

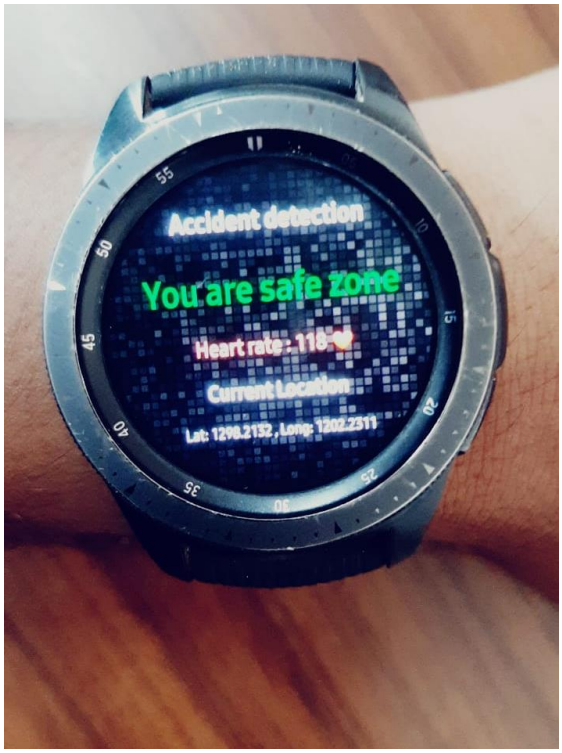
4 Result and conclusion:

4.1 Flow diagram



If an accident is detected our system takes on the current GPS coordinates from the GPS sensors. The detail of the accident is simultaneously pushed to the server using the Wi-fi module where this collected data over time is analyzed and a list of meaningful full outcomes is achieved. After these outcomes are analyzed. Some areas where frequently accident has

happened will be declared as Accident prone areas (Danger zone). As soon as the new user inters the accident-prone area, he/she will get a alarm on his/her smart watch indicating that “You are In Danger zone” or “You are in safe zone.



When Geo codes are plotted on the graph:

We have Used colour code to demonstrate the different types of accidents on map.

The colour code is as follows

RIGHT ACCIDENT: PURPLE

LEFT ACCIDENT: GREEN

BACK ACCIDENT: RED

FRONT ACCIDENT: BLUE

5 Future Work:

This project is already in a working state, but like nothing is perfect in this world few drawbacks are always inevitable so we welcome any kind of suggestion which we will try to implement in future in order to improve this project. The first and the foremost work would be to make every hardware enclosed in a case so that it is less vulnerable to breakage and can be used in rough and tough conditions. In addition to the features available right now we also plan to implement additional features which will track the movement and progress of the help pre-stations by making use of a passkey over phone. Our system right now detects only front, back, right and left accidents, it may not work well for fall in valleys where large change in altitude takes place because it is difficult to track the change in altitude using the sensors attached so we will work on implementing features which detects fall in cliff or any kind if destruction that occurs from below. Also, in order to increase the reliability of the result we can have planned to attach a greater number of MEMS sensors along with the existing ones We also plan to produce a second version of this project which will be basically an application over play store and IOS store where the same features will be implemented but by making the use of sensors that are present in the phone, so that the service readily is available to anyone.

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