Iot Based Automatic Accident Detection And Rescue Management In Vanet

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Abstract-

In our day to day life we are facing a lot of problems due to traffic congestion, which is arising due to vehicle failure or accidents in no network area. The proposed system will solve this problems based on VANET [Vehicle Ad-hoc Network]. In which each moving vehicle is considered as node. In VANET each vehicle communicate with another vehicle that is, where the vehicle to vehicle communication takes place. The previous system conveys the message with the help of GSM module but it is incompatible in no network area. In this system we are transmitting the alert message using RF module and within the range of RF module the alert message is received by the moving vehicle and that is send to the next moving vehicle and the process is continued until the vehicle receives message, which is in the network area. Finally the message is received by the vehicle in the network area. Then the message will be transmitted to the base station (the road side unit). The alert message contains four types of messages. They are detected by piezo electric sensor, mems sensor, flame sensor, and temperature sensor. The message that is given by the flame sensor is send to the fire station. And the message given by the tilt sensor is send to the crane station.

IndexTerms—*Accident Detection; Vehicular AdhocNetwork (VANET), GSM, GPS, Sensors system, Internet of Things(IoT).*

I. INTRODUCTION

The intense interest of vehicles has additionally expanded the traffic perils and the street mishaps. The general population life is under high hazard. If there should arise an occurrence of mishap, long reaction time to go to the unfortunate casualty may prompts increment number of death. As indicated by the overview in 2017, around the aggregate of 2,076 individuals kicked the bucket in street mishaps. The interest of the vehicles has expanded the street mishaps. Because of the absence of crisis offices in our nation, we are presenting the programmed ready gadget for vehicle mishaps. A programmed alert gadget for vehicle mishaps is presented in here. The proposed structure is a framework which can identify mishaps in essentially less time and sends the fundamental data to medical aid focus inside a couple of moments covering topographical directions, the time and point in which a vehicle mishap had happened. This alarm message is sent to the save group in a brief span, which will help in sparing the profitable lives. Switch is likewise given so as to end the sending of a message in uncommon situation where there is no loss, this can spare the valuable time of the medicinal safeguard group.

The proposed framework distinguishes the mishap and sends the data in less time to close by medical aid focus. The street mishap in many creating nations is described by human fueled vehicle without embracing traffic isolation assets. This made extraordinary concern designers and organizers. The street mishaps are anticipated to cause the main demise except if move is made. 'Mishaps are caused not characteristic', so surmised measures are produced. The uncontrolled occasion of an individual outcomes in close to home damage .The most elevated level of all passings because of street auto collisions .It influences the accident as well as expands the hazard associated with it. With this undertaking, an application is made alongside the equipment parts so the data is exchanged to the close by police headquarters or emergency vehicle. An IOT is the system of the physical gadget, vehicles and different things implanted with hardware, programming, sensors, actuators and system network which help in availability of information. IOT alludes to quickly developing system of associated articles that can gather and trade information utilizing installed sensors. It is utilized for observing occasions and changed in basic conditions which packs of hazard and booking fix and upkeep action in effective way.

At the point when the mishap happens the alarm message is sent consequently to the protect group and to the police headquarters. The message is sent through the GSM module and the area of the mishap is identified with the assistance of the GPS module. The

mishap can be recognized decisively with the assistance of accelerometer and vibration sensor. The edge of the rollover of the vehicle can likewise be known by accelerometer. If there should arise an occurrence of flame, the fire sensor detects the fire and send the area to local group of fire-fighters. This application gives the ideal answer for poor crisis offices gave to the streets mishaps in the most attainable way.

II. OBJECTIVE

Here the following objectives are set, in the view of above mentioned research background for the present work in ADS, accident detection and rescue management system.

- To design a vehicle unit with sensor system to detect accident details and send the alert message to the Road side unit.
- To design a road side unit that receives all alert message's and sends that into the rescue team.

III. LITERATURE SURVEY

Kiran Sawant et al., created Associate in Nursing accident alert system mistreatment GSM and GPS electronic equipment and Raspberry Pi. A electricity detector 1st senses the prevalence of Associate in Nursing accident and offers its output to the microcontroller. The latitudes and meridian position of the vehicle is shipped as message through the GSM. The static information science address of central emergency dispatch server is pre-saved within the EEPROM. Whenever Associate in Nursing accident has occurred the position is detected and a message has been sent to the pre-saved static information science address.[1]

ManasiPatil et al., described a better traffic management system using Raspberry pi and RFID technology. The vehicle includes a raspberry pi controller fastened in it that is interfaced with sensing elements like gas sensor, temperature sensor and shock sensor. These sensors square measure fastened at a planned worth before accident. When associate accident happens the worth of 1 of the sensing element changes and a message to a predefined variety is distributed through GSM. The GPS module that additionally interfaced with the controller also sends the placement of the vehicle. When the message is received by the car, a clear route has to be provided to the ambulance. The car includes a controller ARM that is interfaced with the RFID tag sends magnetism waves. When associate car reaches the light the RFID reader that is placed on the joints notice the magnetism waves of the tag. If the light is red, then the readers goes through the database in fraction of seconds and turn the red light green. [2]

V.Sagar Reddy et al., developed Associate in Nursing measuring instrument based mostly System for driver safety. The system has the advantage of chase or distinctive vehicles location simply by causing a SMS or email to the licensed person. The system is meant by victimization Raspberry Pi (ARM11) for quick access to measuring instrument for event detection. Is there any event is happens the message sent to the licensed person so that they will take immediate action to avoid wasting the lives and cut back the damages.[3]

Sri Krishna Chaitanya Varma et al., planned associate Automatic Vehicle Accident Detection and electronic messaging System exploitation GPS and GSM Modems. When the IR sensors that square measure used sense any obstacle, they send interrupt to microcontroller. The GPS receives the situation of the vehicle that met with associate accident and offers the data back. This info is distributed to a mobile variety as a message. [4]

Apurva Mane et al., represented the ways for vehicle collision detection and remote alarm device exploitation Arduino. Key options of this style embrace period vehicle observance by causation its data relating to position, time, angle to the observance station and to the user mobile that should facilitate them to induce medical facilitate if accident or the stealing happens Also user has Associate in nursing access to induce period position of a vehicle in real time. Whenever accident happens MEMS and vibration detector detects and sends the signals to microcontroller, by exploitation GPS specific locations wherever accident has occurred is found, then GSM sends message to authorized members.[5]

Prof.Mrs.Bhagya Lakshmi V et al., projected a FPGA based mostly Vehicle chase and Accident Warning system mistreatment GPS.FPGA is mainly used to track position of any vehicle and send automated message to preprogrammed number. The owner of car, police to clear traffic, ambulance to save people can be informed by this device. FPGA controls and co-ordinate all elements employed in system. With the assistance of measuring device device, the exact position of the vehicle can be detected. It may be expected whether or not the vehicle is in traditional position or the wrong way up[6].

IV. EXISTING SYSTEM

The existing system only use the information about the vehicle's vibrating measurements to detect the accident and that is doesn't work in network less areas.And after occurence of the accident, controlling of traffic takes high time. This drawback can be overcome by proposed system.

Disadvantage:

- It has low reliability
- Poor control system

V. PROPOSED SYSTEM

The main principle of the project is the detection and rescue management. The system is on and initialization. If vehicle is normal, no messages has been sent to rescue team. And the temperature level of the driver is monitored in all the time, if it reaches the threshold level then the action has been taken automatically. Whenever accident occurred, the MEMS sensor, tilt sensor and fire sensor detects the accident happened with vehicle. The controller get the input from sensors and send the accident alert information to road side unit and then message is send to the rescue team and also WIFI and GPS finds location of the vehicle and that also send to the rescue team. It will facilitate connectivity to the nearest hospital and provide medical help through IOT technology.

Advantages:

- Fast recovery and quick process.
- Monitor all hazards and threats in both network coverage and no network areas.
- Wireless monitoring and user friendly
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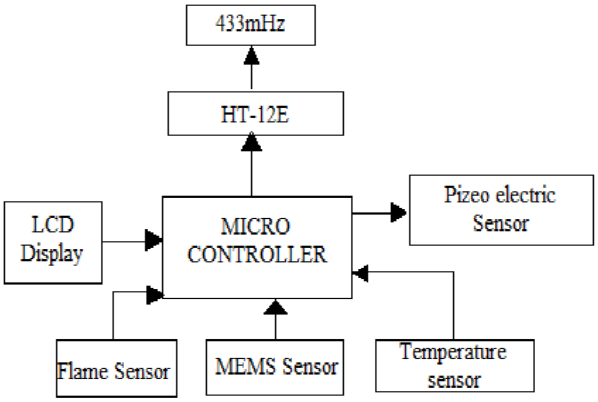
VI. SYSTEM ARCHITECTURE

Transmitter module:



Receiver module:

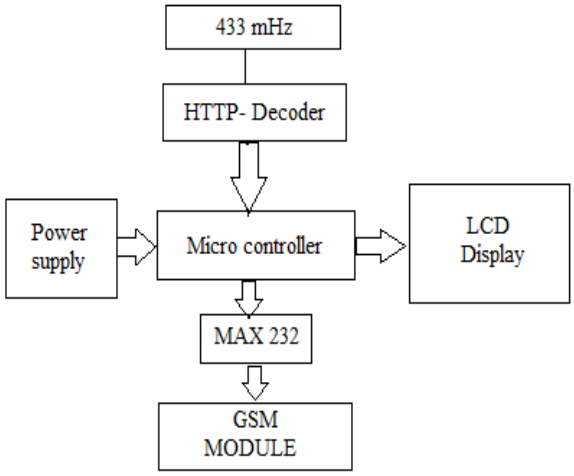


Figure 1.1Automatic accident detection and rescue management.

The following steps takes place in figure 1.1 automatic accident detection and rescue management:

- Step 1: Start the vehicle.
- Step 2: Power on all the modules.
- Step 3: Wait for the MEMS sensor to detect accident.
- Step 4: Then send the alert message to the rescue team.
- Step 5: After the accident detection the other sensors will senses temperature level of the driver, and vehicle condition.
- Step 6: If sensors reach their threshold levels, it send the alert message to the particular contacts or else go to step 3.
- Step 7: If accident is detected, get the current location from the GPS modem.
- Step 8: Check whether the GSM modem is registered on the network.
- Step 9: Send the SMS with the location to the rescue team.
- Step 10: Stop the process.

A. Transmitter Module

TX block is main block of the project, and it is attached in the vehicle with pizeo electric sensor, flame sensor, mems sensor, and temperature sensor. The first three sensors are used to detects the information about the vehicle. And last one is used to monitor the user of the vehicle. The micro controller is controls and collects the information's from the sensors and encode the details using HT-12 Encoder. And using GPS MODULE location of the accident spot is detected. Then these information's will be send to the receiver block [Road side unit or rescue team] by RF tx.

*1) **Mems Sensor***

It is a chip-based technology, referred to as a Micro Electro-Mechanical System, this is composed of a suspended mass among a couple of capacitive plates. When tilt is applied to the sensor, the suspended mass creates a distinction in electric powered capacity that is measured as a change in capacitance. That sign is then amplified to provide a solid output signal in digital, 4-20mA or VDC. The finest resolution you could get with a MEMS inclinometer is zero.0001° (JDI series). A MEMS sensor affords the handy functions that you may get with every other sensor line together with analog voltage, modern and virtual output alternatives. You don't want to concern yourself with area constraints as MEMS makes use of very compact micro machine components so that each sensor can suit into the palm of your hand. They have an IP67 seal and since the operating temperature range is -40° to +85°C, they'll withstand some severe situations.

*2) **Temperature Sensor***

Thermocouples are the primary sensors of this class. The fundamental standard is the See back impact. At the point when two unique metals or amalgams are put together in order to frame two intersections, a voltage is prompted over the intersections when there is a distinction of temperatures between the intersections. These sensors are equipped for distinguishing extremely high temperatures (as high as 1700o), have an exceptionally oversimplified plan which makes them very hearty to stun and vibration and can have practically prompt reaction to temperature changes. Pyrometry is the procedure of block attempt and estimation of warm radiation with a non-reaching gadget. The radiations exuding from the body are centered around to a radiation collector utilizing a focal point. The collector can be any delicate gadget like thermocouple, photoresistor, photodiode and so on. The transducer activity creates an electrical flag corresponding to the measure of radiation which can be utilized to quantify temperature.

*3) **Flame Sensor***

A fire identifier is a sensor intended to distinguish and react to the nearness of a fire, permitting fire discovery. Reactions to a distinguished fire rely upon the establishment, however can incorporate sounding a caution.

*4) **GPS***

GPS is a satellite route framework used to decide the ground position of an article. GPS recipients are incorporated into numerous business items, for example, autos, advanced cells, practice watches, and GIS gadgets. Every GPS satellite communicates a message that incorporates the satellite's present position, circle, and specific time. A GPS collector consolidates the communicates from different satellites to figure its correct position utilizing a procedure called triangulation. Three satellites are required so as to decide a collector's area, however an association with four satellites is perfect since it gives more noteworthy exactness. All together for a GPS gadget to work accurately, it should initially build up an association with the required number of satellites. This procedure can take anyplace from a couple of moments to a couple of minutes, contingent upon the quality of the beneficiary. For instance, a vehicle's GPS unit will ordinarily set up a GPS association quicker than the recipient in a watch or advanced mobile phone. Most GPS gadgets likewise utilize some kind of area reserving to accelerate GPS discovery. By remembering its past area, a GPS gadget can rapidly figure out what satellites will be accessible whenever it filters for a GPS flag.

*5) **Pizeo Electric Sensor***

A electricity device could also be a tool that uses the electricity, to live changes in pressure, acceleration, temperature, strain, or force by changing them to associate an electrical charge.The prefix piezo- is Greek for 'press' or 'squeeze'.piezoelectric sensors can only be used for very fast processes or at ambient conditions.In fact, varied electricity applications turn out quasi-static measurements, and other applications work in temperatures higher than 500 °C. Piezoelectric sensors may be accustomed verify aromas within the air by at the same time activity resonance and capacitance.Computer controlled natural philosophy immensely increase the vary of potential applications for electricitysensors.They are also seen in nature.The albuminoid in bone is electricity, and is believed by some to act as a biological force device.

B. Receiver Module

Receiver block is a rescue team or a road side unit that receives the alert messages from the vehicle unit and it can facilitate connectivity to the nearest hospitals. In this the temperature of the user is monitored, using the web site called "THINKSPEAK". In this when the user temperature crosses the threshold level then it indicates emergency condition of the user then the further actions will be taken and the information of fire detection, vehicle condition will be send to the particular contacts through GSM Module. Then the actions will be taken to clear the traffic congestion in the accident spot.

1) ***GSM***

Global System for Mobile Communications or GSM (originally from cluster Special Mobile), is that the world's most well liked customary for mobile telephone systems. The GSM Association estimates that eightieth of the worldwide mobile market use the quality.GSM is employed by over one.5 billion folks across over 212 countries and territories. This ubiquitousness means subscribers will use their phones throughout the globe, enabled by international roaming arrangements between mobile network operators.GSM differs from its forerunner technologies in this each sign and speech channels are digital, and therefore GSM is taken into account a second generation (2G) transportable system.The GSM customary has been a bonus to every customers, who might enjoy the flexibility to tramp and switch carriers while not substitution phones, and additionally to network operators, who will select instrumentality from several GSM instrumentality vendors.

VII.RESULT AND CONCLUSION

This system provides the optimum resolution to poor emergency facilities provided to victims in road accidents within the most possible method. With the assistance of this technology immediate action are often taken once associate accident happens by alerting the various individuals by causation a message. So in areas wherever no network is out there the system won't be ready to send the alert message. The projected technique is extremely useful to the automotive trade. This will facilitate the medical groups to succeed in the accident spot in time and save the dear human lives. There is continuously scope for brand spanking new enhancements by interfacing it with completely different systems.

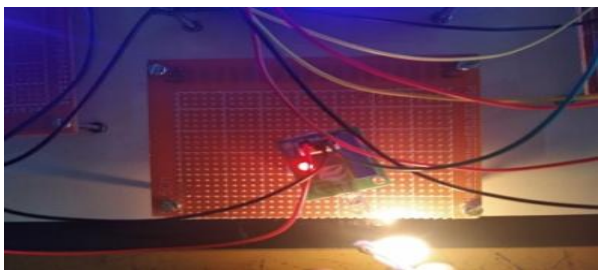


Figure 1.2 fire detection

The flame is recognized at 433mHz beneath this range the flame isn't detected. When the flame is identified the alert is sounded and the recognition message is send to the flame station.

Figure 1.3 Vehicle Tilting

At the point when tilt is connected to the sensor, the suspended mass makes a distinction in electric potential which is estimated as a change in capacitance. That flag is then enhanced to create a steady yield motion in advanced, 4-20mA or VDC.

FINAL OUTCOMES:

VEHICLE UNIT:

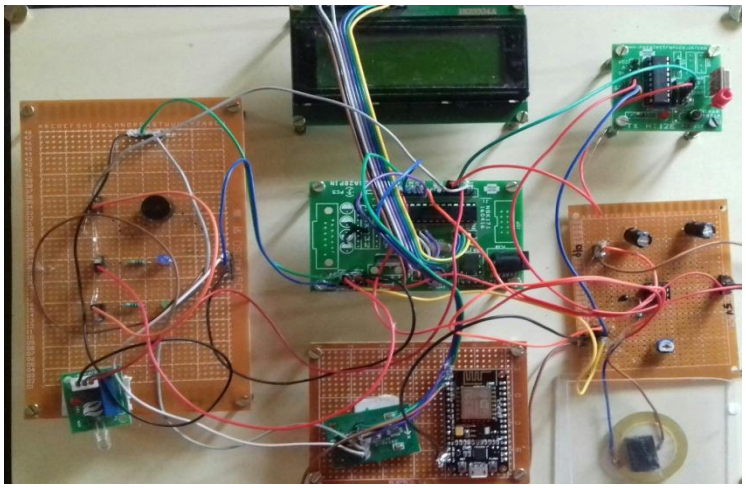


Figure 1.4 Transmitter module

ROAD SIDE UNIT:

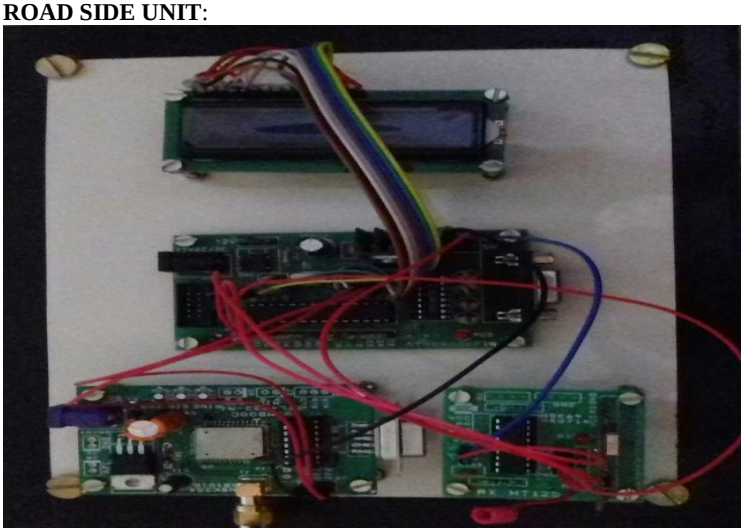


Figure 1.5 Receiver module

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