

A SURVEY ON ACCIDENT DETECTION USING VIBRATION SENSOR AND GPS MODEL

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Abstract: *In recent days accident rates are increasing rapidly and because of this many people are losing their lives. Many lives could be saved by providing emergency medical treatment and rescue services. The delay happens due to traffic congestion and unstable communication to the medical units. To prevent these many accident detection systems are developed. In this paper, a secure and new accident detection system is developed to improve the existing accident detection techniques. The main aim of this paper to recognize a better method which is highly efficient and accurate compared to the conventional methods.*

Keywords: *IoT, Accident Detection, GPS, GSM, Sensor*

I. INTRODUCTION

Nowadays rate of accidents are increasing swiftly. If any accident happens then there is a delay in providing first aid medication, because of this problem number of death rates are increased. To prevent these problems the automatic road accident detection system should be there in vehicles to outrival from this circumstance.

In day today life IoT is getting famous because of its automation and response to the scene. By using IoT sensors they are developed different accident techniques. Some techniques are also depends on machine learning algorithms that are discussed in this paper.

II. LITERATURE SURVEY

In this section we are providing brief information of previous work done, that are related to our project. In previous works they used different types of sensors and algorithms to find an accident, those methods are discussed here. By using those papers we are trying to find new and better techniques to implement our project.

2.1 IoT Based Automatic Accident Detection Using Vanet Manuja M et al.

In this project they are using Tilt sensor to detecting angel tilt in vehicle, Fire sensor is used to detect fire, MEMS sensor and Temperature sensor. If the accident occurs then that it will be detected by using Fire sensor, Tilt sensor and MEMS sensor then they provide input the controller and it sends alert messages to the rescue team and nearest hospital by using the RF (Radio Frequency) module. GPS and GSM modules are used to find location of the vehicle and that also send to the recue team. If the vehicle is in normal condition then they do not send any alert messages. Temperature sensor is used for continuous monitoring of temperature if the temperature

exceeds the threshold level then also it sends alert messages automatically.

Advantages of this system is user friendly, wireless monitoring, fast recovery and quick process.

2.2 Smart Vehicle Accident Detection Using Pressure Sensor Adnan Bin Faiz et al.

In this system they are using accelerometer sensor for measuring of Tilt angel, pressure sensor is used for detecting pressure, android phone app is used for detecting accident and sending messages, and GPS is used for continuous location tracking. When accident occurs then that will be detected by using pressure sensor and accelerometer sensor. This pressure sensor sends data to the android app. Then this android app send messages along with the location to the rescue team. In android application Bluetooth connection must turn on for sending messages. Android application also displays speed and pressure value on its screen. Pressure sensors detect accident when the vehicle speed decreases rapidly comparing to threshold value. Accelerometer detects accident when the tilt angel reaches the threshold angel. When accident occurs buzzer occurs then the alarm. Then user can cancel the alarm if the accident is minor.

Disadvantage of this system is it requires continuous internet connection for whole process hence it is a cost effective.

2.3 Accident Detection by Using Piezoelectric Sensor Ulhas Patil et al.

This system uses Piezoelectric sensor. This sensor is embedded in the helmet, it senses the vibration and pressure variation in the vehicles and transmit electrical signal through helmet to the RF encoder. RF encoder encodes the electrical signal and sent to the receiver of the vehicle. RF Receiver decodes the transmitted signal. Renesas microcontroller is used in this system. This Renesas ports are used for GPS and GSM modules. Software program is written for controlling GPS and GSM in controller. GPS is used for getting location of the vehicle this GPS having both receiver and antenna. GSM is used for sending messages here it connects between vehicle device and remote device for message transferring. LCD is used for message displaying and speed displaying for alerting the user. disadvantage of this system is there is no switch button to cancel the alert notification when accident occurs minorly and it also requires lot of battery.

2.4 Accident Detection Using Raspberry Pi

Shwetha Bergonda et al.

In this project they are mainly using Raspberry Pi. They are used LED, this LED switched on when the system is switched on. Power supply is also required to LED switch on. Vibration sensor is used to detect the accident and then send the information to the raspberry pi. The GPS is used for receiving the location of the vehicle. If the accident occurs then GPS gives the exact position of the vehicle, this information will be delivered through the WhatsApp message to a mobile phone number. This message will be received by using circuit's internet connection. The values of longitude and latitude will be provided in this message, by using these variables approximated the vehicle location. The raspberry pi receives data by vibration sensor and it responds by sending WhatsApp message to the recipient's phone. LED is interfaced in any ports of the raspberry pi, it is used to display speed and GPS model status. Internet is interfaced in raspberry pi via transmit and receive pin.

Disadvantage of this system is it requires internet connection for whole process. hence it is a cost effective method.

2.5 Accident Detection Using Neural Network

Sreyan Ghosh et al.

In this system they are using Raspberry Pi Model B+, GSM module, Pi camera it is used for detecting image and video frames, Keras is an opensource library developed in python in order to experiment extensively in neural networks, OpenCV is image processing library. Here CCTV cameras are used to detect accident. CCTV cameras are the input for CNN model. Raspberry Pi is intercepted to CCTV camera and Pi camera is used detect to the image frame and objects in videos. Here the videos frames are divided into accident frame and no accident frame. CNN model id used to detect the accident. Each video frame is run through the CNN model if the frame crosses the threshold limit then that video frame is divided into accidental frame otherwise called as non-accidental frame. If the frame is divided into accidental frame then the GSM is automatically send an alert message to the phone number. This system gives more accuracy compared others but this system is cost effective and suitable for severe accidents. It didn't detect the moderate or small accidents.

2.6 IoT Based Accident Detection Using Naïve Bayes Algorithm

Ratheeshkumar A M et al.

In this system they are using Ultrasonic sensor for sound measuring, Heartbeat sensor for measuring driver blood pressure and heartbeat, Speedometer for calculating vehicle speed, Arduino UNO board used as a microcontroller and Alcohol sensor is used for measuring alcohol level.

In this system, all the sensors will be wired inside the vehicle. The sensors value will be uploaded in a cloud server. A threshold value will be assigned for every sensor. In case of any abnormal means, the warning will be sent to the user interface end. Then, automatically the horn will turn on and the vehicle will slow down towards left corner. Secure Service Virtualization in Internet of Things by Dynamic Service Non-Dependency Verification is to be ensured by the hardware.

2.7 Accident Detection Using Shock Sensor

Elie Nasr et al.

In this system they are using Shock sensor, NFC reader, GPS, and cellular IoT. In this system several steps are there

- a. Vehicle Registration
- b. Passenger Register
- c. Accident monitoring through Public Safety Organization

In first step the vehicle is registered to the system and IoT device is installed. Passenger get the vehicle ID. If the accident occurs then that will be detected by shocking sensor then that send the GPS location to the PSO. Cellular IoT and NFC reader helps to send messages. The messages send through the HTTP request format.

III. CONCLUSION

In daily life number of accidents are occurring, providing them timely medical aid can save many people lives. In this paper we are discussing various accident detection techniques. Some of the methods are depending on the hardware sensors like shock sensor, VANET, pressure sensor etc. and some are depending on machine learning like neural network, naïve bayes algorithm etc. they are detecting accident and sending alert messages to the rescue team. Although sometimes these sensors may destroy themselves in accident and chances of generating error message is also a one of the possibility.

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