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Accident Detection Using Raspberry Pi

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Abstract: ***It is observed that, the major hindrance on road is due to heavy traffic flow during peak hours especially when people commute to work. The total number of vehicles or objects exceeds its capacity by causing a blockage for emergency vehicles such as fire fighter and rescue vehicles, furthermore wastage of fuels adds more to the environmental pollution which is not adoptable for a country's economic growth. In order to develop an efficient, reliable, cleaner and safer mode of transportation,it is necessary to make the road transportation system automated as much as pos- sible.To track the vehicle, we need to send the message to GSM device, so that it gets activated. It also gets activated by detecting the accident on the vibration sensor connected to the raspberry pi controller. Once the GSM is activated it receives the last latitude and longitude position value and send message to the emergency serverwhich is predefined in the program. The process of image processing it detect the face of person and by using alarm it give the indication of that person***
Keyword : - GSM, raspberry pi, controller, road transportation etc.

I. INTRODUCTION

Road accidents are one of the major reasons of fatality. The time between the occurrence of accident and the emergency medical facility provided to the accident location is the important factor in the survival rates after the accident. By reducing the time between the accident and medical facility provided to the scene decreases mortality rates so that more lives can be saved. One approach to eliminate that delayis to use Accident Detection Using Raspberry Pi, which gives alert if the accident occurred and immediately notify to the emergency responders. The system is describedthe main application of which is to recognize the accident using the vibration sensorand give alert message to the respective places. Alert message includes location of the accident, alcohol percentage, disposal of seat belt, speed, number of members inthe vehicle. In this system, initially GPS continuously takes input from the satellite and stores the latitude and longitude values To track the vehicle, we need to send themessage to GSM device, so that it gets activated. It also gets activated by detecting the accident on the vibration sensor connected to the raspberry pi controller.Once the GSM is activated it receives the last latitude and longitude position value and send message to the emergency server which is predefined in the program. The process of image processing it detect the face of person and by using alarm it give the indication of that person.

A. Problem Definition

Population explosion leads to an unprecedented increase in the number of physical objects or vehicles on road. As a result, the number of road accidents increases dueto a very heavy traffic flow. In this paper, traffic flow is monitored by using computer vision paradigm, where images or sequence of images provides a betterment on the road view. In order to detect vehicles, monitor and estimate traffic flow using low cost electronic devices, this research work utilizes camera module of rasp- berry pi along with Raspberry Pi 3. It also aims to develop a remote access using raspberry-pi to detect, track and count vehicles only when some variations occur in the monitored area. The proposed system captures video stream like vehicles in the monitored area to compute the information and transfer the compressed video stream for providing video based solution that is mainly implemented in Python Programming. The proposed method is considered as an economical solution for industries.
second, real-time live capture is used. Humanity is seriously threatened by crime. Person recognition is a challenging issue to resolve in the field of image processing. Images with multiple sources may be more susceptible to noise and illumination. Face recognition in noisy, low-resolution photos can be difficult. The acquired image could also have a very high dimensionality. To solve these problems, preprocessing techniques must be applied. Preprocessed images can improve system performance and accuracy.

B. Project Objective

1) We can monitor the speed of the vehicle.
2) We can find the location of the vehicle.

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3) Alert message to mobile phone for remote information.
4) Mobile number can be changed at any time.

C. Scope of project

Further the system will be implemented by adding a camera module to capture im- ages when accident occurs and also unauthorised access and send them to authorised person and also to police. The proposed program deals with detecting incidents and warning paramedics to reach the specific location by taking them to the nearest hospital and providing the medical services to the person affected by the incident. This can be extended through providing the victim with medication at the spot of the accident. We can also avoid accidents by increasing the technology and using warning systems that could really stop the vehicle to conquer them.

II. LITERATURE SURVEY

1) Accident Detection Using Raspberry Pi

Hemangi S. Badhan, 2Shruti K. Oza

Abstract : Road accidents are one of the major reasons of fatality. The time between the occurrence of accident and the emergency medical facility provided to the ac- cident location is the important factor in the survival rates after the accident. By reducing the time between the accident and medical facility provided to the scene decreases mortality rates so that more lives can be saved. One approach to eliminate that delay is to use Accident Detection Using Raspberry Pi, which gives alert if the accident occurred and immediately notify to the emergency responders.

2) Real Time Vehicle Detection, Tracking and Counting Using Raspberry-Pi

Apeksha P Kulkarni

Abstract: Population explosion leads to an unprecedented increase in the number of physical objects or vehicles on road. As a result, the number of road accidents increases due to a very heavy traffic flow. In this paper, traffic flow is monitored by using computer vision paradigm, where images or sequence of images provides a betterment on the road view. In order to detect vehicles, monitor and estimate traffic flow using low cost electronic devices, this research work utilizes camera module with raspberry pi 3.

3) As the population is increasing at an exponential level this simultaneously increases the vehicle requirements.

M U Ghazi et al., 2020

Abstract: Considering the VANET, transferring the emergency message becomes a major challenge of packet losses. The paper discusses Intelligent Transportation System(ITS), IoT and also tried to develop emergency issues by using 5G technology.

4) Design of a control and monitoring system to reduce traffic accidents due to drowsiness through image processing

Bruno Eraldo

Abstract: It is known that 33% of traffic accidents worldwide are caused by drunk driving or drowsiness so a drowsiness level detection system that integrates image processing was developed with the use of Raspberry Pi3 with the Open CV library; and sensors such as MQ-3 that measures the percentage of alcohol and the S9 sensor that measures the heart rate. In addition, it has an alert system and as an interface for the visualization of the data measured by the sensors a touch screen. With the image processing technique, facial expressions are analyzed, while physiological behaviors such as heart rate and alcohol percentage are measured with the sensors.

5) IOT based Real-time Drowsy Driving Detection System for the Prevention of Road Accidents

Md. Yousuf Hossain

Abstract: At present time, drowsy driving has become one of the major issues of the traffic collision. According to statistics, a large number of road accidents occur due to drowsy driving which results in severe injuries and deaths.

For this reason, various studies were done in designing systems that can examine the driver fatigue and alert him beforehand, thus preventing him to fall asleep behind the wheel and cause an accident. Some traditional approaches used vehicle-based measures to design their system, however, such measurements are highly influenced by the structure of the road, type of vehicle and the driving skill.

6) Image Processing for Driver's Safety and Vehicle Control using RaspberryPi and Webcam

Mr. S. S. Kulkarni1 (PG Student)

Abstract: This paper gives real time approach for detection of driver drowsiness dueto fatigue or intoxication. According to survey made by government, 22% accidentsare due to drowsiness and 33% accidents are due to alcohol drinking. Actually to develop such a technique in car which can detect the drowsiness of driver is a big task. To complete this task image processing technique can be more useful.

7) A Survey on IoT based Road Traffic Surveillance and Accident Detection

Rickin Patel, Vipul K. Dabhi

Abstract: Road Traffic is one of the most vital problem in our hastily developing world. This paper presents of study of different aspects and issues related to the problem. This paper emphasizes on using prominent technology -Internet of Things (IoT) for developing smart system to monitor various parameters related to road traffic and using it for effective solution. The survey of the existing systems and concerned techniques related to the problem area are discussed.

8) Camera based Driver Distraction System using Image Processing

Vaibhav Rathod

Abstract: Distraction is nothing but the lacking of the attention to activities necessary for secure driving. Inattention can either be an intended or an unintended diversion of concentration from drivers side. Driver distraction can be defined as anything thatisnecessary for identification of information to securely sustain the lateral and lon- gitudinal control of the vehicle due to any some event, the persons, inside or outsidethe vehicle that might be forced or tends cause the drivers shifting attention to an- other place from the fundamental driving task. The main cause of driver distractionis to compete for event activity that turns to reduce driving performance that outcomein road traffic crashes.

9) Implement Traffic Rules Violation Detection and Accident Detection Units

Siddharth Tripathi, Uthsav Shetty, Asif Hasnain, Rohini Hallikar

Abstract: The urbanization process has marked an ever increasing growth in the number of on-road vehicles which has led to a decline in the air quality while an increase in the number of road accidents. In this paper an intelligent system called CBITS has been proposed. CBITS follows a holistic approach as it is well equipped
with a network of sensors that provide real-time emission levels as well as it alerts theauthorities with location in case of an accident. The system has three main functions: emission monitoring; accident detection; and unique vehicle identification

III. BLOCK DIAGRAM

The photographs originate from the registration procedure, where we store a person's live face shots. A SQLite database is used to store images. Criminal records are kept on file, along with identification documents and pictures of the individuals. The features are compared using the function of the face-recognition library. We are developing a desktop program that will be intuitive and To begin with, we must register criminals and store their face photographs in the database. Then we use CNN to perform real-time training, and the training images are then saved in a folder. Then, if the criminal appears in front of the camera, the Harr Cascade Algorithm is used to recognize the person, records are retrieved from a database, and the output is displayed on screen.

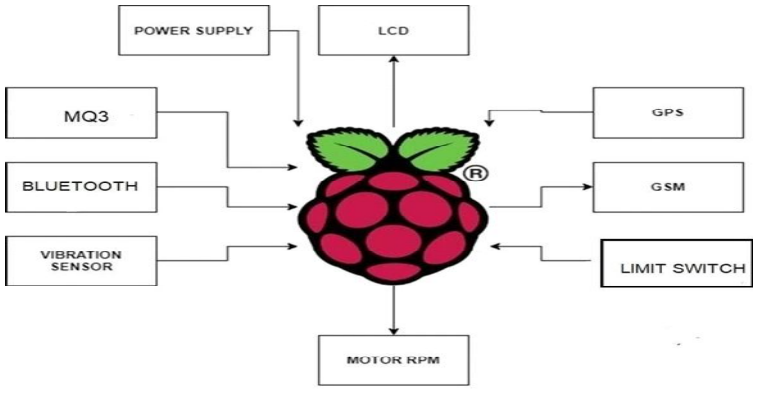


Fig 4.1 : System Architecture

IV. ADVANTAGES

When the accident occurs the alert message is been sent automatically to emergency server. The message is sent through the GSM module and the location is been detected with the help of GPS module. The accident can be detected precisely using vibration sensor.

V. DISADVANTAGES

1) There is a possibility of false reporting of an accident at low speed.
2) Damage to the sensor cannot be detected.
3) In some places where there is no provision of GSM networks, it is difficult for communication.
4) The application does not have an offline mode.
5) The biggest problem is the blockage of signal transmission by mountains, high buildings, and tunnels.

VI. RESULTS

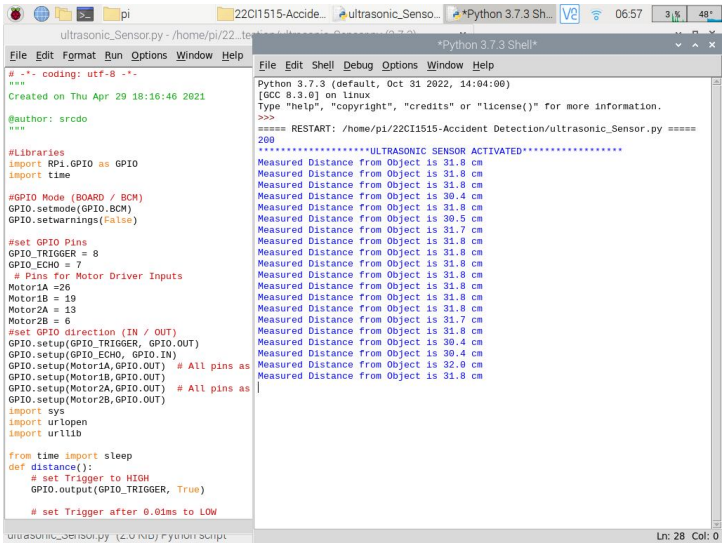


Fig 7.1 : Ultrasonic Sensor

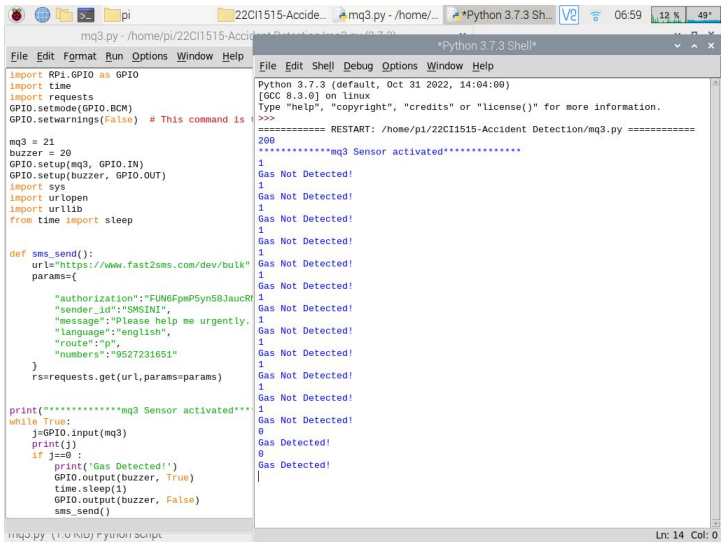


Fig 7.2 : Mq3

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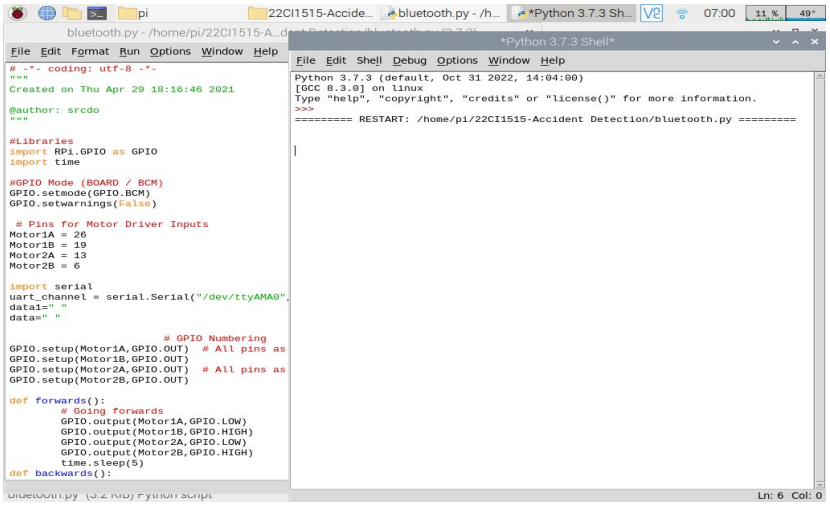


Fig 7.3 : Bluetooth

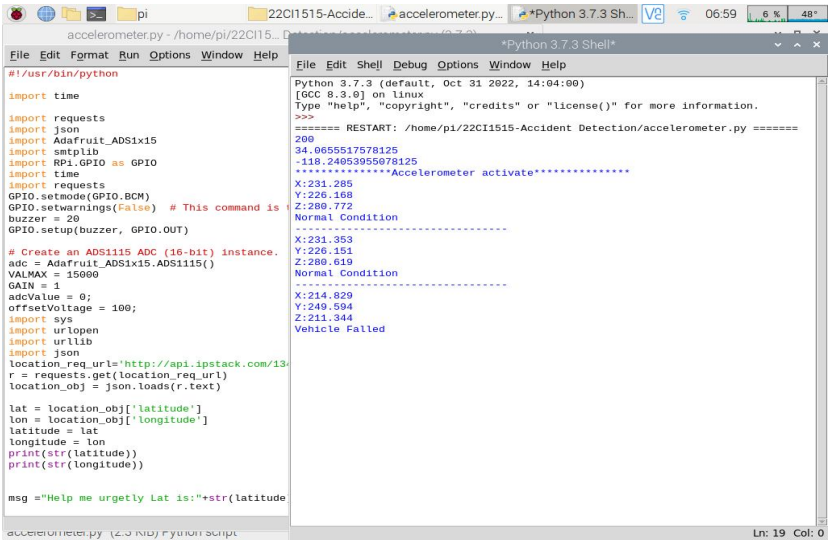


Fig 7.4 : Accelerometer

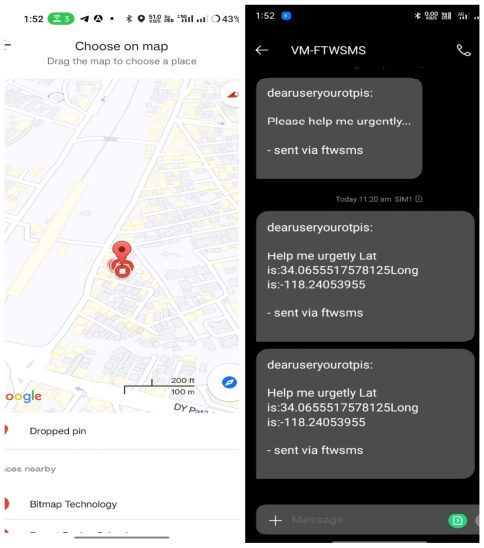


Fig 7.5 : Location & Accident Detection

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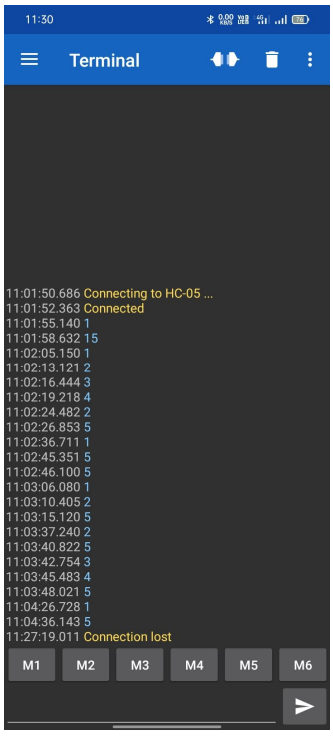


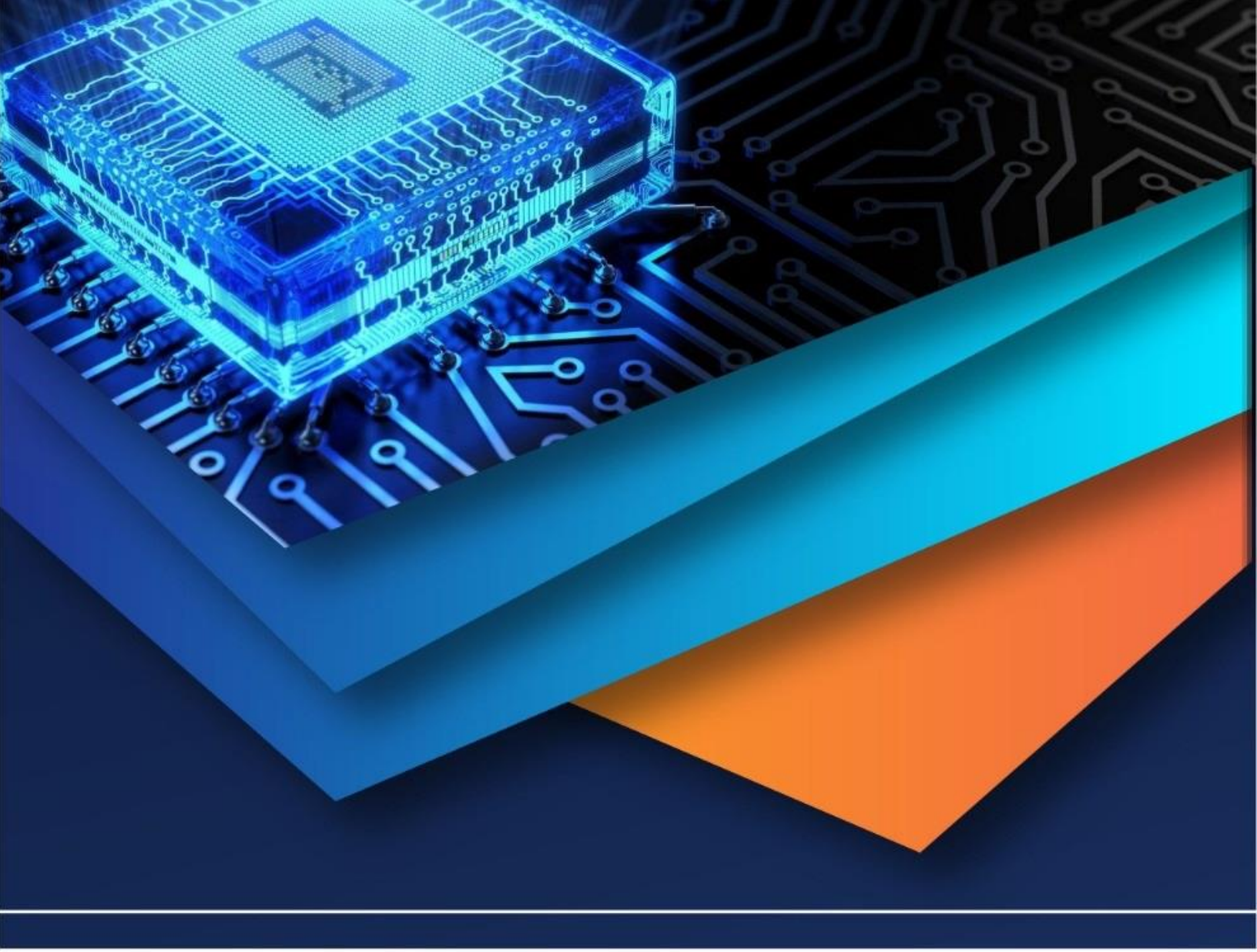
Fig 7.5 : Bluetooth

VII. CONCLUSIONS

The proposed system provides the emergency medical service as soon as possibleand to avoid the mortality. It is to provide the details of the accident occurred andarea of the accident with other information. It helps to easily provide facility andhelp to the victim of the accident. GSM is used to provide information regardingtheaccident and GPS module is used to traces the location of the vehicle.

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