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INTELLIGENT BUS TRANSPORT

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Abstract - *The boom of technology and infrastructure has made our lives easier. Technology has created amazing tools and resources, putting useful information at our fingertips. The advent of technology has also increased the traffic threats and the road accidents take place frequently which causes huge loss of life and property because of the poor emergency facilities. This motivates us to do an extensive research to rescue people in accident and provide emergency facilities. In this project, vehicle accident detection and rescue information system is developed in order to detect vehicle accident and send the location information of the accident place and pictures captured by camera to control room of bus stand, nearest hospital and police station through message service. This project is also responsible to work automatically and send the information to respective sections. Those sections can also request for the information to the driver and access the required information.*

Key Words: **Accident, Rescue people, Sensors, Remote monitoring.**

1. INTRODUCTION

The evolution within the field of automobiles is very incrementing and which results in the accidents therefo re many hazards takes place because of traffic. People's lives are under high risk this example prevails, simply because there's a scarcity of emergency facilities in our country. In our country, many of us lose their life due to accidents. Thanks to the rescue team. We are within the process of solving this issue by proposing an efficient solution and to scale back the loss of lives at maximum amount as possible. In our project, the planning of the system help us to detect accidents in significantly minimum time and transfer the elemental information to the primary aid centre within a couple of seconds covering the geographical coordinates, the time and therefore the angle where the vehicle had met with an accident. This alert message is shipped to the rescue team and therefore the registered mobile number within short period. This real time application saves many valuable lives .The message is shipped through the GSM module and therefore the location of the incident. The essential idea is to localize the vehicle system by receiving the important time position of the vehicle through GPS and send the information through GSM module through SMS service. This technique also works automatically through the sensor. If accident goes to occur and bus get collided then the vibration sensor cross its intensity and hence the situation and pictures captured by camera are send to respective sections. Th is project is additionally helpful when the robbery cases happen in bus. Because the camera is present so images are often sent to the police headquarters and actions are often taken. Driver also can press the push buttons to capture and send the information. The main motto of the project is to rescue the bus passengers and bus driver by providing an emergency facility

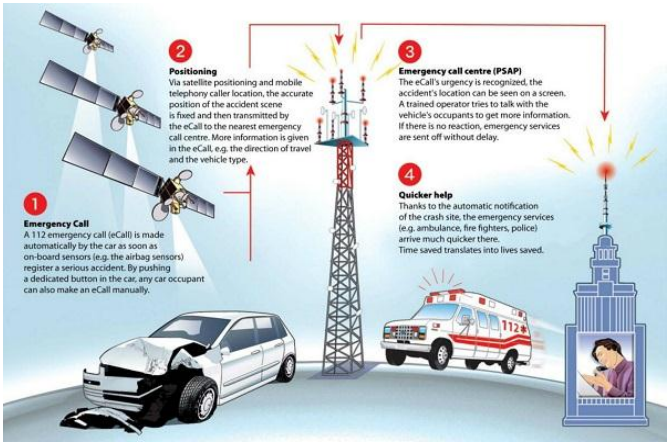


Fig1.(a) Quick response via GPS

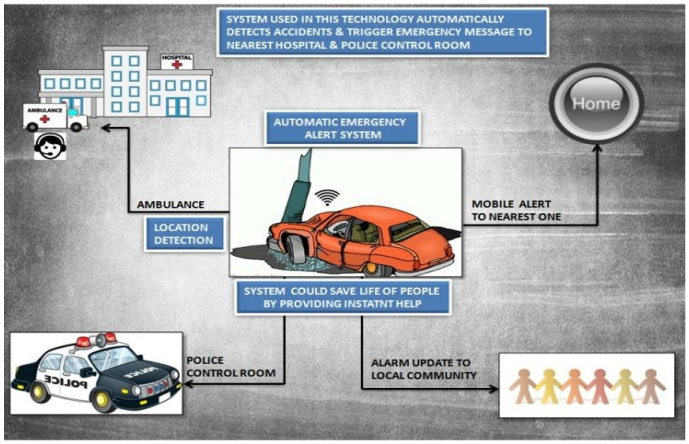


Fig1.(b) SOS call to various sections

Objectives of developed work are,

1. To detect the occurrence of the accident.
2. To help in cases of Robbery in Bus.
3. To provide an emergency facility to the passengers and Driver and rescue the victims.
4. Server can track out where the Bus is present via GPS module.

BLOCK DIAGRAM:

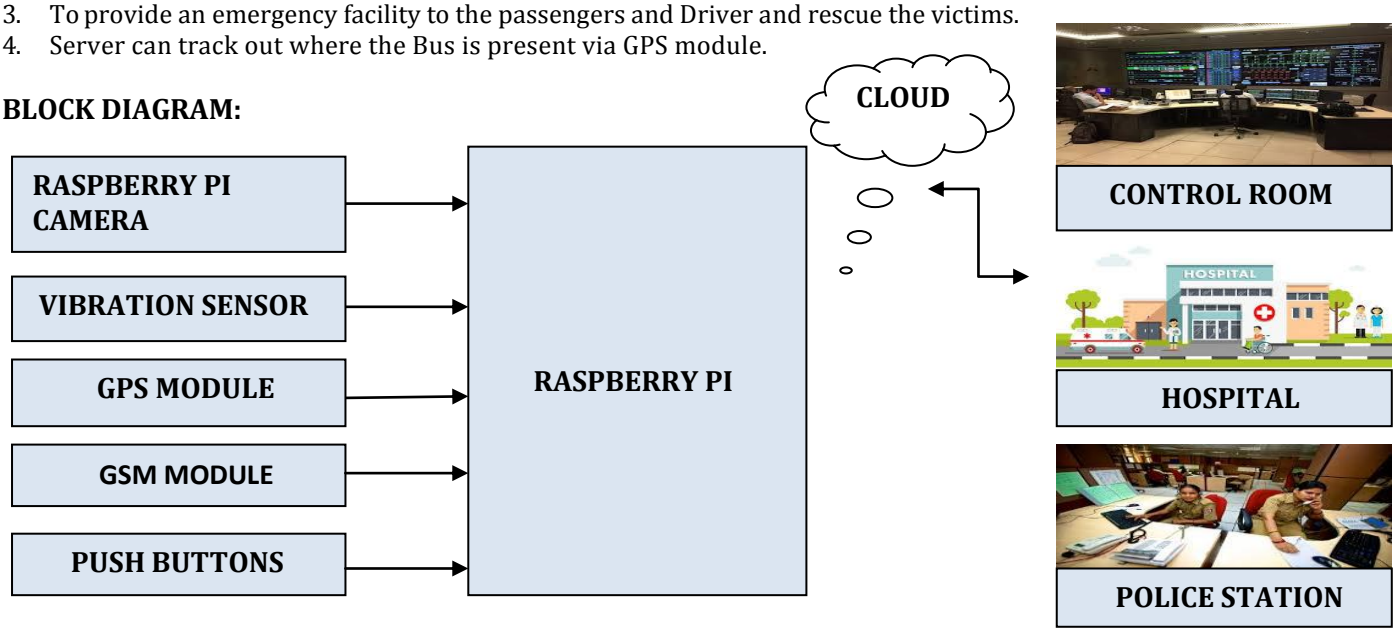


Fig 2: Block diagram of proposed project

A block diagram reveals how **Intelligent Bus Transport** works. The vibration sensor is employed in the Bus for sensing the level of vibration when collision occurs. The sensor is integrated with the single chipped microcontroller which is used to calculate and process the data from the sensor. The sensed information is send to the microcontroller in the form of digital signals. The microcontroller processes the digitalized data and takes relevant actions. In the similar manner the other hardware components namely GPS, GSM, Raspberry Pi Camera, and Push buttons are interfaced to the microcontroller which is Raspberry Pi. Raspberry Pi is the main controller of the whole system which controls all these hardware components. This is how the block diagram is designed of the Proposed Project.

A. Vibration Sensor

The vibration sensor is also called a piezoelectric sensor. These sensors are flexible devices which are used for measuring various processes. This sensor uses the piezoelectric effects while measuring the changes within acceleration, pressure, temperature, force otherwise strain by changing to an electrical charge. This sensor is also used for deciding fragrances within the air by immediately measuring capacitance as well as quality. The working principle of vibration sensor is a sensor which operates based on different optical otherwise mechanical principles for detecting observed system vibrations. The sensitivity of these sensors normally ranges from 10 mV/g to 100 mV/g, and there are lower and higher sensitivities are also accessible. The sensitivity of the sensor can be selected based on the application.

Fig 3: Vibration Sensor

B. GSM-

GSM abbreviates global system for mobile communication, this is a second generation (2G) mobile network. This is widely used in all over the world for mobile communication. This GSM device consists of SIM slot in which a SIM can be inserted which has a unique number, this unique number is used for contact. This GSM device consists a unique number called IMEI number and this is different for each and every hardware kit. In our project it is used to send message to hospital, control room and police station

Fig 4: GSM Module

C.GPS-

GPS abbreviates global positioning system and this is used to detect the latitude and longitude of the particular position and it also shows the exact time. It detects these values anywhere on the earth. In our project it plays main role and it is the main source of the latitude and longitude of the vehicle to know the accident occurred location, or even for theft tracking of the vehicle. This gadget gets the coordinates from the satellite for each and every second. This device is the main component of vehicle tracking project

Fig 5: GPS Module

D. Raspberry Pi Camera-

The Raspberry Pi camera module can be used to take high-definition video, as well as stills photographs. The Raspberry Pi Camera Module v2 is a high quality 8 megapixel Sony IMX219 image sensor custom designed add-on board for Raspberry Pi, featuring a fixed focus lens. It attaches via a 15cm ribbon cable to the CSI port on the Raspberry Pi. It can be accessed through the MMAL and V4L APIs, and there are numerous third-party libraries built for it, including the Pi camera Python library. The camera consists of a small (25mm by 20mm by 9mm) circuit board, which connects to the Raspberry Pi's Camera Serial Interface (CSI) bus connector via a flexible ribbon cable. The camera's image sensor has a native resolution of five megapixels and has a fixed focus lens. The software for the camera supports full resolution still images up to 2592x1944 and video resolutions of 1080p30, 720p60 and 640x480p60/90.

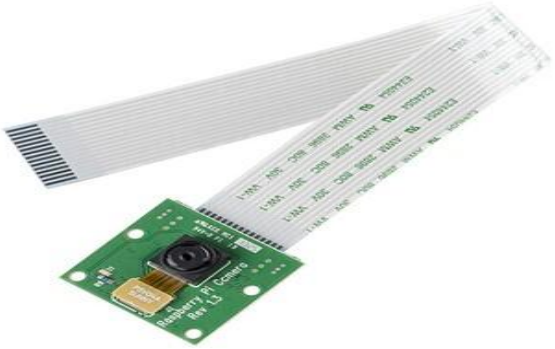


Fig 4: Raspberry Pi Camera Module

Features-

- 5MP sensor
- Wider image, capable of 2592x1944 stills, 1080p30 video
- 1080p video supported
- CSI
- Size: 25 x 20 x 9 mm

2. METHEDOLOGY: A vibration sensor will first sense the occurrence of an accident and give its output to the microcontroller. Microcontroller receives message from sensor that is, it checks whether the vibration is below or above threshold. If the vibration output reaches up to predefined threshold then the controller controls further operation of capturing live image and location. The GPS detects the latitude and longitude position of a vehicle. The latitude and longitude position of the vehicle is sent as message through GSM. In rural areas as there is hindrance of network so these positions are also sent via GSM. GSM send the accident alert message to rescue team and various sections like police station, hospital and control room. Three Push buttons present near to driver are accessed to three sections. Those three sections can also request to driver to access the information which stored on Cloud.

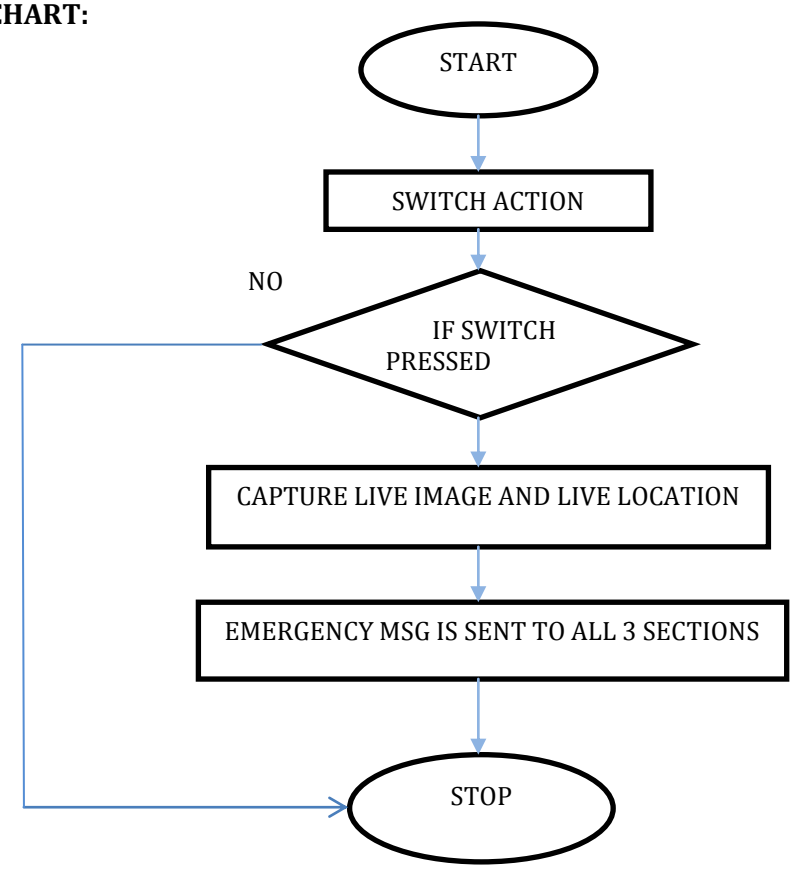
A.CONTROLLING UNIT: The control unit consists of microcontroller which controls the execution of operation and the sensing unit consists of sensor named as Vibration Sensor. The microcontroller used in this project is Raspberry Pi. The vibration sensor, GSM, GPS and push buttons are interfaced with Raspberry Pi.

B. SENDING MESSAGE USING GSM: The GSM module is interfaced with the output of the microcontroller. The microcontroller sends message to the respective sections. The microcontroller sends an alert SMS to the rescue system.

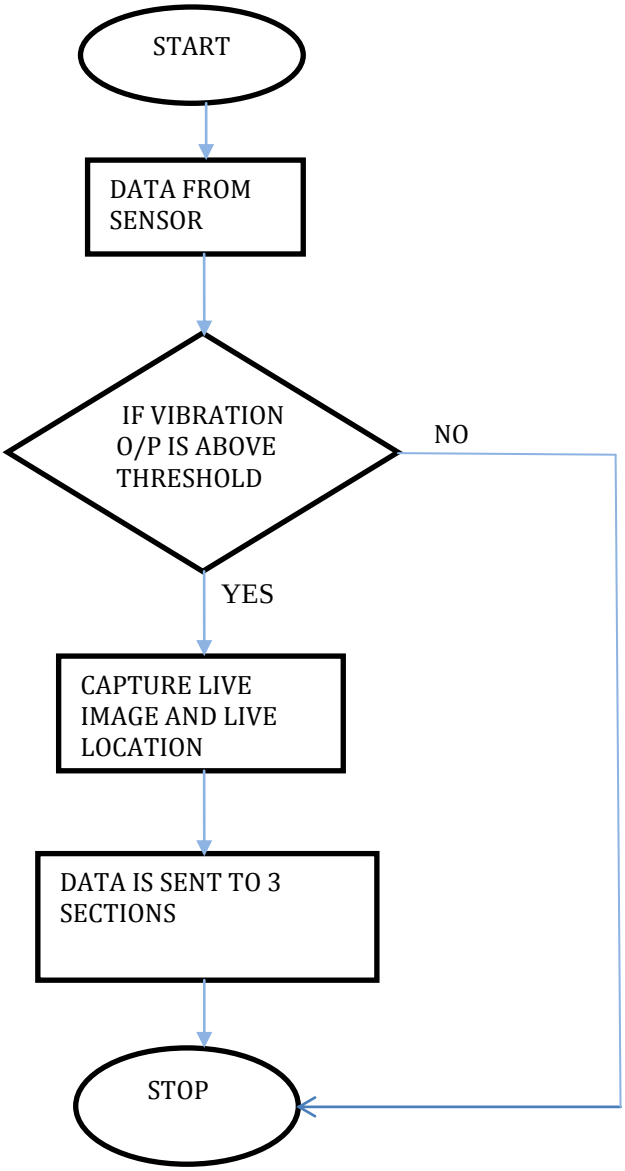
C. SENDING MESSAGE USING GPS: The GPS module is interfaced with the output of the microcontroller. The microcontroller sends latitude and longitude to the respective sections. So that they can the track the current location

FLOW CHART:

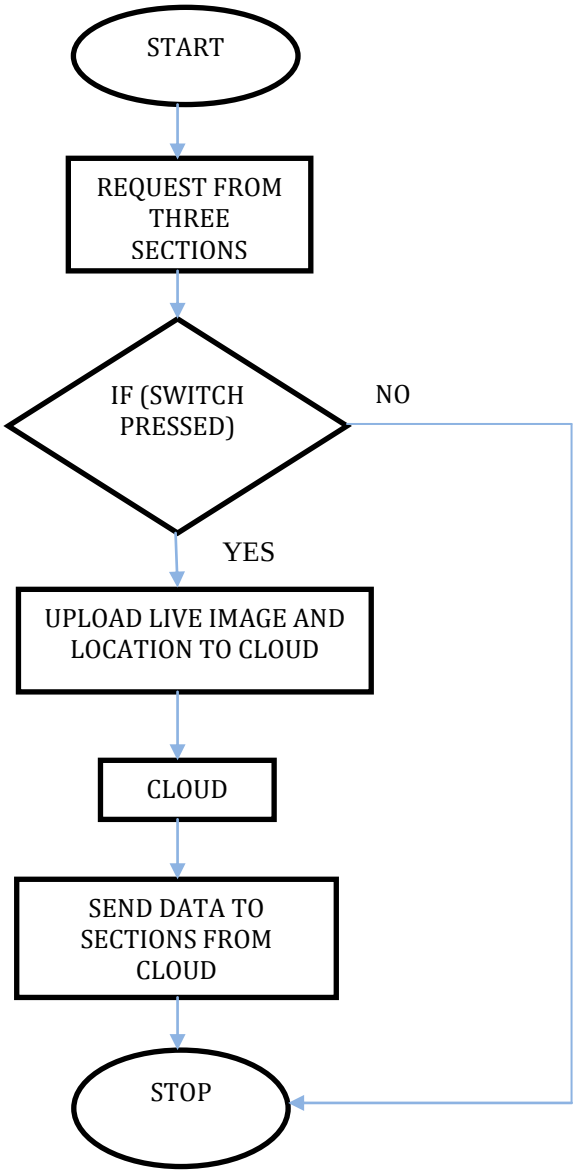
CASE I:



CASE II:



CASE III:



CASE I: If driver press the switch in case of Robbery in Bus then system automatically captures images by camera and send it to Police station. Even in case of accident occurrence if driver is cautious then he can take action by pressing push buttons and intimate to quick emergency facility from hospital and control room.

CASE II: In this case the sensor is active it detects the vibration when collision is going to take place. When the bus get collided then the vibrations are generated. If the vibrations reach above the predefined threshold then the system captures pictures and current live location is intimated to hospital so that hospital can provide an emergency facility and save lives of passengers.

CASE III: In this case the communication is bi-directional that is if server wants to get information such as images, live location, etc then he can request to driver by pressing a switch. This message goes to driver and hence driver can share the information by uploading it to cloud. Therefore server can access the data from cloud

3. CONCLUSION:

The proposed system deals with the accident alerting and detection. Raspberry Pi microcontroller is the heart of the system which helps in transferring the message to different sections in the system. Vibration sensor will be activated when the accident occurs and the information is transferred through GSM module .Using GPS the location can be sent through tracking system to cover the geographical coordinates over the area.

By using this advanced system we can save lives of many people in accident.

4. FUTURE SCOPE:

This project can be extended by making use of emergency Airbags in the Bus, and also we can make use of water sprinklers at appropriate places of probable Fire Spots. By using artificial Intelligence we can minimize and predict the occurrence of head on collisions. Also it can alert the system by observing the driver's eyes when he feels drowsy or fatigued after driving for long hours.

5. ACKNOWLEDGEMENT:

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