

Research Article

## ACCIDENT LIFE SAVING KIT

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### Abstract

Road accidents are one of the most common reasons of fatality. The time between the occurrence of an accident and the emergency medical facility provided to the accident location is the important factor in the survival rates after the accident. Often the medical history of a patient is unknown which delays the treatment time. To reduce the time between the accident and medical facility provided One approach to eliminate that delay is to use Accident Detection using Raspberry Pi, which gives alert if the accident occurred and immediately notify the emergency services. The system's main application is to recognize the accident using the vibration sensor, and give an alert message to the respective places. Alert message includes location of the accident, vehicle impact side and details of members in the vehicle including their personal and medical history accessed via RFID tag. 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 the message to the GSM device, so that it gets activated. It also gets activated by detecting the accident on the vibration sensor and integrated together connected to the Raspberry pi controller. Once a journey begins RFID is scanned, the details are stored and if an accident occurs the latitude and longitude position known via GPS and RFID containing ID and password is sent to emergency services via GSM in SMS, whereby they can gain knowledge about patient history and inform insurance company using the information present in database securely.

**Index Terms**—IOT, RFID, GPS, GSM, Raspberry pi, SMS, coordinates

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# ACCIDENT LIFE SAVING KIT

## I. INTRODUCTION

A growing trend in computing is the “Internet of Things” devices connected to the internet (and/or to other devices) which interact with the physical world by gathering, processing, and sharing data. IoT devices also are brought up as connected devices or as sensible devices. Things have evolved because of the convergence of multiple technologies, period of time analytics, machine learning, goods sensors, and embedded systems. ancient fields of embedded systems, wireless sensing element networks, management systems, automation (including home and building automation), et al all contribute to facultative the net of things.

### Features

The major features of this IoT integration system are:

- Passenger details collected by RFID technology
- Locates the coordinates of the vehicle
- Detects accident using accelerometer and vibration sensors
- Sends SMS to Emergency Services
- Secure Database

### B. Project Description

Our project is an IOT project which is used to detect accidents and save lives for which we have integrated an accident detection system along with RFID technology by which the passenger insurance details are gathered it even contains the passenger contact details in case of emergency and their address Major role of this project is to save people after an accident and take care of all the hospital expenses from their health insurance and to inform their relatives or friends immediately after the accident By using this project we can reduce fatality due to road accidents due to delay in time This project makes the recovery process faster

## II. LITERATURE SURVEY

1. **Accident Detection Using Raspberry Pi** [Hemangi S. Badhan and Shruti K. Oza, 2019]. The system monitors the safety of passenger ensures that the driver is wearing seatbelt using limit sensor, driver has not consumed alcohol using alcohol sensor and warns the driver. It detects accidents using vibration sensor, CO sensor to detect smoke in case of fire. This system has various features to ensure safety in case of daily commute but the GPS technology is old and using vibration sensors alone for accident detection is inaccurate.

2. **Sign Board Monitoring and Vehicle Accident Detection System Using IoT** [K. Ashokkumar, 2019]. The system offers various safety features like eye blink monitoring, alcohol sensors, webcam, buzzer for safety and detection of accidents. If the driver is drowsy, an eye blink sensor detects it and communicates to the owner and also alerts the driver using the buzzer and if the driver is drunk it detects it using an alcohol sensor and the buzzer is triggered. This system uses the internet to communicate and keep the owner alert in case of any accident or driver . The Raspberry pi has total control of all the sensors and it monitors the car.

3. **Accident Detection and Ambulance Rescue using Raspberry Pi**[Kavya K and Dr. Geetha C R, 2016] This system identifies the owner using an RF transmitter and receiver to grant and revoke entry from the vehicle. It also detects accidents using an accelerometer and detects axis change, alerts nearby emergency services with the GPS position using GPS sensors. This system is

designed with the latest sensors but it is inefficient because not all accidents occur with a change in axis.

**4. IOT Based Vehicle Accident Detection & Rescue Information System** [Dr.Nalini C andSwapnaRaaga N, 2019] . In this paper IoT based vehicle smash detection and rescue in order system is developed. This is old to discover the vehicle mistake and send out the place in rank of the calamity residence to vehicle owner, nearby sanatorium and police force locate by the use of a network service. The announcement between the web server and hardware trick is customary by way of GSM/GPRS shield, and the place is traced by means of the GPS shield. In this thesis manufactured a novel factor based vehicle tracking algorithm, accordingly make something stand out and footprint a hardly any poignant articles. The hardware artifice by suggests that of sensors and mass within the mesh server, and hearth notification to numerous users by suggests that of network application. Catalog head waiter and API and fulfill each to be associate IoT based mostly framework.

**5. IOT based mostly Accident interference And pursuit System** [Pankaj Chourasia et al., Sakshi Choubey, Riya Verma, 2018]. This text provides the command pressure cluster that alerts the subject throughout the dominion of drowsiness. The associated embedded system supported psychological formality of the topic by observation be in 1st place travels is of use in word drivers throughout the original catnap spherical phase of temporary state. An online of belongings enabled sensors area unit recent to transmit the entire numbers composed by sensors over a sensible grid meet individuals for fast on the uptake answer aspect to assume events below tragedy ||A 5V offer is provided to power on Raspberry pi.

**6. Automatic Accident Detection And Ambulance With Intelligent Traffic Light System** [Mr.S.Iyyappan and Mr.V.Nandagopal, 2013]. In this paper, they institute a format called ITLS (Intelligent transfer set alight system). The key theme behind this representation is to bestow an iron flood for the crisis vehicles like ambulance to stretch to the hospitals in time and in consequence minimizing the impede caused by interchange congestion. The objective behind this is to put into action ITLS which would power involuntarily the transfer illumination in the lane of the ambulance. The controller identifies the site of the bump blackhead through the sensor systems in the vehicle which strong-minded the bump and along these lines the controller walks through the ambulance to the spot.

### III. PROPOSED SYSTEM

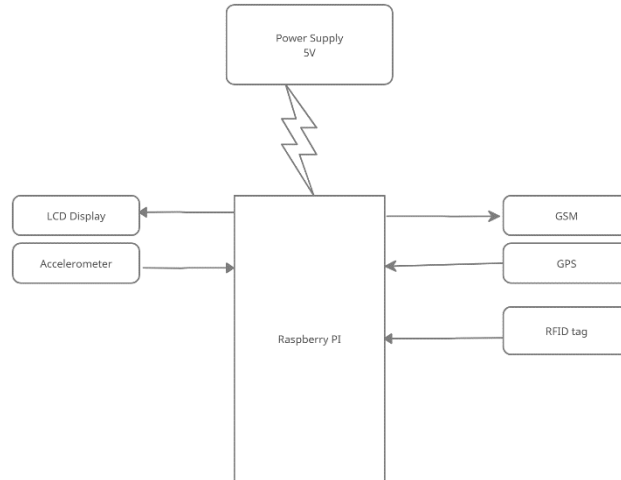
The proposed system uses RFID technology to read the passenger while boarding in the vehicle and accelerometer and vibration sensors to detect the accident, the GPS sensor detects the coordinates once an accident is detected and sends the coordinates along with passenger details via SMS. The passenger details can be retrieved from the website when provided with id and password.

#### A. Proposed System Advantages

- The passenger details can be retrieved ensuring timely treatment
- Advanced sensors and new technology to ensure accuracy
- Live tracking of vehicle from anywhere in the world.

#### B. SYSTEM DESIGN

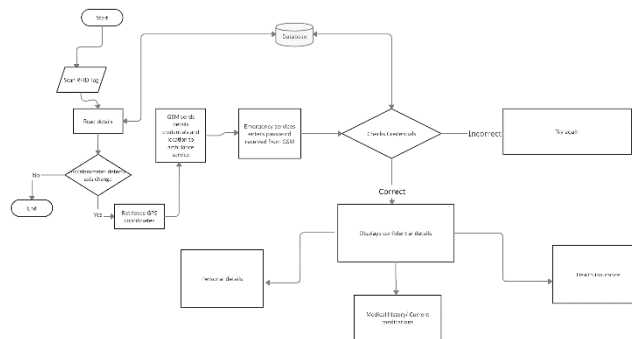
## ACCIDENT LIFE SAVING KIT



||A 5V supply is provided to power on Raspberry pi. The GPIO pins of Raspberry pi are connected to the appropriate sensors for establishing communication between the sensors and Raspberry pi. The GPIO vcc pins provide power supply to the sensors. All other sensors connected to the Raspberry pi provide data to the kit which is then given to GSM sensor form the Raspberry pi.

### C. Flow Diagram

This flow diagram represents the project flow from start to finish in a diagrammatic way for ease of understanding.



At the beginning of the journey the RFID tag must be scanned in the RFID reader which gets stored in the program .The accelerometer and vibration sensors detect an accident then Raspberry pi retrieves coordinates from GPS sensor which is then sent as SMS to the emergency service through GSM. The RFID details are also sent through GSM which is used to retrieve the passenger details from the web portal.

#### D. Algorithm:

STEP 1 START

STEP 2 Turn ON the life saving kit using push button

STEP 3 Scan passenger RFID tags in the RFID scanner

STEP 4 Detect accident using accelerometer and vibration sensor

STEP 5 If accident detected get the location using GPS

STEP 6 Send location and RFID details using GSM

STEP 7 Enter RFID ID and password in the portal

STEP 8 If details entered in the portal is correct then the web page shows

STEP 9 If the details entered are incorrect then the portal asks to re enter details

STEP 10 The web page shows the passenger details

STEP 11 END

As shown in the algorithm our project follows certain steps which has to be followed for the project to be helpful for the passengers . First when a passenger enters the vehicle the passengers must scan in the RFID tag in the RFID reader if not the kit does not know about the passenger . The accident is detected using an accelerometer and vibration sensor which is the next step . If accidents occur the GPS gets location and the Raspberry pi sends the location and RFID details to the emergency service using GSM . The next step happens at the hospital where they can access the web page containing passenger details with the help of RFID ID and password sent through SMS to the emergency service . If the details entered are correct then the web page shows passenger details otherwise it says incorrect and the details has to be entered again. By following all the above steps our project comes to an end .

### **IV. SYSTEMS AND IMPLEMENTATION**

#### A. RFID RC522

First we must set up the connection of RFID and Raspberry pi. The connection is set up as follows:

Connecting RFID RC522 to Raspberry pi

- SDA connects to CE0 Pin 24
- SCK connects to SCLK Pin 23
- MOSI connects to MOSI Pin 19
- MISO connects to MISO Pin 21
- GND connects to GND Pin 6

## ACCIDENT LIFE SAVING KIT

- RST connects to GPIO25 Pin 22
- 3.3V connects to VCC Pin 1

The connection is set up as shown in the above figure.

### Setting dependencies

The Raspberry pi environment has to be set up so that Python script can interact with the chip.

- Updating Raspberry pi software to the latest version.

```
sudo apt-get update
```

```
sudo apt-get upgrade
```

- Installing python3-dev, pip and git packages

```
sudo apt-get install python3-dev python3-pip
```

- Installing spidev library which is used to interact with RFID-522

```
sudo pip3 install spidev
```

- Installing MFRC522, it contains many functions and simplifies Pi's SPI interface

```
sudo pip3 install mfrc522
```

### B. GPS NEO 6M

Neo 6M is connected to Raspberry pi and then it is communicated to check if transmission of data is successful.

### Connecting NEO 6M to Raspberry pi

- VCC connects to 5v Pin 2
- GND connects to GND Pin 6
- TX connects to RX Pin 10

### Getting data from NEO 6M

- We need to enable SPI interfacing, turn off bluetooth, set the frequency, enable UART communication and enable the GPIO to achieve that these have to be changed in cmd of Raspberry pi

```
dtoverlay=spi=on
```

```
dtoverlay=pi3-disable-bt
```

```
core_freq=250
```

```
enable_uart=1
```

```
force_turbo=1
```

- Checking if the communication is active, this can be done by the following command in cmd.

```
sudo cat /dev/ttyAMA0
```

- To use serial port to get data we need to disable the console login of Raspberry pi

```
sudo systemctl disable serial-getty@ttyAMA0.service
```

Now the communication has been set up and python code can be written to access the serial port and read the data transmitted by the NEO 6M.

### C. Accelerometer ADXL345

ADXL345 is a digital sensor so it can be connected directly to the Raspberry pi. Accelerometer supports I2C and SPI interfacing. We are going to use I2C interfacing.

#### Connecting Accelerometer ADXL345 to RPI

Wire connection:

- GND pin of the Accelerometer to Pin 6 (GND) of RPI
- VCC pin of the Accelerometer to Pin 1 (3v3) of RPI
- SDA pin of the Accelerometer to Pin 3 (SDA) of RPI
- SCL pin of the Accelerometer to Pin 5 (SCL) of RPI

#### Setting dependencies

- Ensure everything is updated and running on the latest version.

```
sudo apt-get update
```

```
sudo apt-get upgrade
```

- Enable I2C on the Raspberry Pi.

```
sudo raspi-config
```

Select "P5 I2C"

- Installing packages to communicate with accelerometer

```
sudo apt-get install python3-dev python3-pip python3-smbus i2c-tools -y
```

- Check if Raspberry pi can detect accelerometer

```
sudo i2cdetect -y 1
```

- Importing Adafruit ADXL4x python library using pip.

```
sudo pip3 install adafruit-circuitpython-ADXL34x
```

Now all the dependencies have been installed and Raspberry is also configured to enable communication.

### D. Vibration sensor

Vibration sensor can detect acceleration, pressure and vibrational changes of a device. In our project we have used a vibration sensor as an additional sensor to detect accidents.

#### Connecting vibration sensor to Raspberry pi

## ACCIDENT LIFE SAVING KIT

- Connect SW420 VCC to Pin 2 VCC of RPI
- Connect SW420 GND to Pin 6 GND of RPI
- Connect SW420 DO to Pin 10 PCM\_CLK of RPI

### A. GSM 900A

GSM 900A is an module used to send SMS which we have used in our project to send the accident details through SMS to the emergency service when an accident is detected .The module should be connected to the Raspberry pi which can be done as shown below -

### B. Connecting GSM 900A to Raspberry pi

- Connect GSM TXD to Pin 15 RXD of RPI
- Connect GSM RXD to Pin 14 TXD of RPI
- Connect GSM GND to Pin 6 GND of RPI
- Supply power to GSM using 12 v 2A adapter

## V. CONCLUSION

We can conclude that this system can reduce fatality due to accidents and the speed of accident alert and recovery will be increased , as there is a quick response from the system. There may be some flaws in the system which will be resolved in the future with some inclusion and update the project .Thus we can conclude that this project

## VI. FUTURE SCOPE :

In addition to the ideas proposed above a few other inputs can be added like Iris detection to detect drowsiness. Thus in case the person is identified to be drowsy an alert is sent. Also in case of near accidents, vehicle to vehicle(V2V) communication can be used to avoid collision between vehicles.

## VII. REFERENCES

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