Advanced Vehicle Tracking System with Cloud Based Geo-Position Monitoring System

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ABSTRACT— Internet of things (IoT) has become a major technology in this modern life. Real time system is used for constant monitoring and effectively secure. Accidents often occur frequently nowadays and the fatality rate has been drastically increased about 4.6% on the last year. Half of the people killed in these accidents are youngsters of teenage and middle aged. In India road accidents has become common and the reasons are due to poor driving and badly maintained roads and vehicles. This system provides vehicle control and navigation for the user. In this paper, we present an IoT enabled system to avoid the vehicle accident and theft. Using IoT in designing some special services can make a lifesaver system. In this paper, we have presented an IoT enabled approach that can provide emergency communication and location tracking services in a remote car that meets an unfortunate accident or any other emergency situation. Immediately after an accident or an emergency, the system either starts automatically or may be triggered manually. Depending upon type of emergency it initiates communication and shares critical information. Provision of interactive real-time multimedia communication, real-time location tracking etc. have also been integrated to the proposed system to monitor the exact condition in real-time basis. The system prototype has been designed with Raspberry Pi 3 Model B.

Keywords- IoT,M2M,GPS,GPRS,GSM,LED,Wi-Fi,LPG.

I. INTRODUCTION

Internet of Things (IoT) is the technology helping us to achieve the goal of a smart world. IoT and Cyber Physical system have the ability to change the vision of our way of living. All developing countries are aiming to transform their cities in to Smart City by taking several projects. In a smart city every device or better to say every 'thing' is connected 24×7 to the Ubiquitous network. They can communicate to each other regardless of their

communication protocols and hardware/software infrastructure. Machine to machine (M2M) communication is rapidly growing to make the machines more intelligent and shared in nature. In this paper, we have used the concept of a smart city to provide a life savior system for a smart vehicle in any kind of emergency situation occurredon road. Most of the modern cars are well equipped with several sensors, mechanical devices, software, embedded hardware etc .to pre-detect collisions or crashes and avoid them.

'Safety and security' is one of the most important criteria of a vehicle. The kinds of modern safety systems are very much useful and reliable for cabdrivers a swells passenger son road. But those safety system have one major limitation. These system scan only be used to avoid crashes. But unfortunately, if the system fails to avoid an accident or there is any other emergency situation other than accident, those system shaven provision to deal with them. If the driver get sick while driving or some road blockage occurs or some mechanical problem occurs, those systems can' the lap. So it is obvious that if the accident information can be sent other specter authorities immediately after a situation has occurred some of the lives could be saved.

An advanced vehicle monist oaring and tracking system is designed form omit oaring the school vehicle from any location At location Batter altimeand provide safety environment to the traveler .The proposed system would make good use of new technology that based on Embedded Linux board namely RaspberryPi and its advanced feature of storing data baseatreal time. The proposed system work son Global Positioning System (GPS)and Global System for Mobile Communication (GSM) which is used for vehicle tracking and monitoring mechanism. ForthispurposeSIM908 Module is used which include all the three things namely GPS GPRS GSM .The GPS gives current location of the vehicle ;GPRS sends the tracking information to the server and the GSM is used for sending alert message to vehicle's owned mobile .The proposed system would place inside the vehicle who suppositions to be determined on the webpage and monitor edatreal time. In the proposed system ,there is comparison between the current vehicle path and already specified path inside the file system of Raspberrypi. The proposed system so took care of the traveler's safety by using LPG Gas leakage sensor MQ6 and temperature sensor DS18B20. For medical assistance of the user heart beat sensor is implemented in this system.

II. EXISTING SYSTEM

Exciting system provides emergency communication and shares the critical information after the accident or the event. It has three main stations. Car data base system has the details about the car. E.g. the vehicular database contains all very essential data about the vehicle. Here the car's registration number, owner's details etc. are pre-installed. Control room data base system has the details about the

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nearby hospital police stations, govt. offices, workshops etc along with their locations and respective emergency services are stored. Rescue center data base system has the details about the Individual rescue centers have their own databases to store all the records of emergency messages coming from the emergency control room. In this database, all incoming messages coming from control room are stored with the relevant information about the emergency situations. The information can be viewed on the web page and details can be identified easily.

Disadvantages

The System starts to operate only after the event.

No protection of vehicle from theft.

Manual effort is needed to know the mechanical fault.

III. PROPOSED MODEL

A. Introduction

In last decade, we observe the drivers fatigue driving and vehicle theft activity which causes social real time problem like accidents and many more hazards conditions. We daily see or read such type of activities which are raising the question of our safety and security in both public and private sectors. So there is a need of real time monitoring and tracking the vehicle also storing and updating its database of certain situations. In the urban areas, human help is somewhat difficult in providing the database of tracked

vehicle. Proposed system provides emergency communication and shares the critical information before the accident or the event. Ultrasonic sensor sense the distance between vehicles and sends the information to the Raspberry Pi. Raspberry-pi plays the voice announcement to the user. If any accident is occur, piezoelectric plate will detect the event and sends the information to the raspberry pi. Raspberry-pi has in build Wi-Fi which sends the information to the server. The GPS will track the position of the car and location of the car is send to server, to the nearest police station and hospitals Via Wi-Fi. In these, system there is possibility of five emergencies. Pressure of the driver is sensed by the pressure sensor. If any abnormal is detected, the information sends to the raspberry pi, Temperature sensor used to detect the temperature of the driver, Heartbeat of the driver is sensed by the heart beat sensor and it will pass the information to Raspberry Pi, it will receive the data and plays the voice announcement to the user and indicates which tablet he wants to take by using LED. If there is any dangerous problem raspberry pi sends this information to the nearest hospitals by using Wi-Fi. To avoid the vehicle accident the sensors are fixed in the on the vehicles. If any obstacle is sensed, the sensed information will be sent to the raspberry pi. Raspberry-pi plays the voice accouchement by using the voice playback system. In case, the accident is occurred the video are taken by the webcam, Raspberry-pi sent the video to the server. A video call will be connected nearest police station and relations. This system sends the information about the accident to the nearest hospitals. If any mechanical problem is occurred during the travel time it will be sent to the raspberry pi. Raspberry-pi announced this

information to the driver by using the voice play back system. Car door was partially locked means this information is send to the raspberry pi and also any gas leakage is detects in this system this is sent to the raspberry pi. Raspberry-pi will announce this to the driver via voice signal. If any natural calamity or the road is blocked by some barrier, the information is will be announced to the user in predefined manner, when they set the starting point and destination point. Raspberry-pi plays the voice to the driver corresponding to the barrier detected. Once driver update his vehicle details as stop then he only able to starts this vehicle. If any criminal activities occurred to the vehicle that information is send to the raspberry pi. Raspberry-pi sends this information to the driver and nearest police station by using GPS tracking system. The complete information can be viewed on the web page using internet of thing.
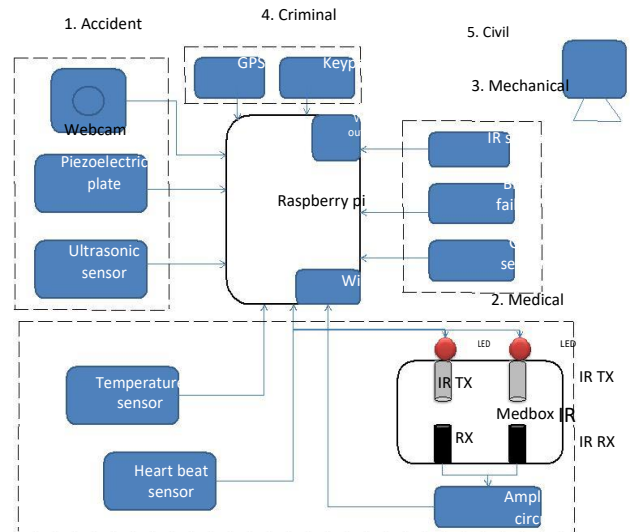
B. Block diagram

Figure 1.   Block diagram of proposed model
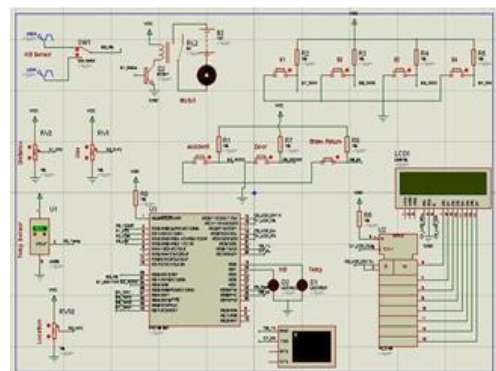
C. Circuit diagram

Figure 2.   Circuit diagram of proposed model

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IV. WORKING

Proposed system provides emergency communication and shares the critical information before the accident or the event. Ultrasonic sensor sense the distance between vehicles and sends the information to the Raspberry Pi. Raspberry-pi plays the voice announcement to the user. If any accident is occur, piezoelectric plate will detect the event and sends the information to the raspberry pi. Raspberry-pi has in build Wi-Fi which sends the information to the server. The GPS will track the position of the car and location of the car is send to server, to the nearest police station and hospitals Via Wi-Fi. In these, system there is possibility of five emergencies.

A.   Medical emergency

Pressure of the driver is sensed by the pressure sensor. If any abnormal is detected, the information sends to the raspberry pi, Temperature sensor used to detect the temperature of the driver, Heart beat of the driver is sensed by the heart beat sensor and it will pass the information to Raspberry Pi, it will receive the data and plays the voice announcement to the user and indicates which tablet he wants to take by using LED. If there is any dangerous problem raspberry pi sends this information to the nearest hospitals by using Wi-Fi.

B. Accident emergency

To avoid the vehicle accident the sensors are fixed in the on the vehicles. If any obstacle is sensed, the sensed information will be sent to the raspberry pi. Raspberry-pi plays the voice announcement by using the voice playback system. In case, the accident is occurred the video are taken by the webcam, Raspberry-pi sent the video to the server. A video call will be connected nearest police station and relations. This system sends the information about the accident to the nearest hospitals.

C. Mechanical emergency

If any mechanical problem is occurred during the travel time it will be sent to the raspberry pi. Raspberry-pi announced this information to the driver by using the voice play back system. Car door was partially locked means this information is send to the raspberry pi and also any gas leakage is detects in this system this is sent to the raspberry pi. Raspberry-pi will announce this to the driver via voice signal.

D. Civil emergency

If any natural calamity or the road is blocked by some barrier, the information is will be announced to the user in predefined manner, when they set the starting point and destination point. Raspberry-pi plays the voice to the driver corresponding to the barrier detected.

E. Criminal emergency

Once driver update his vehicle details as stop then he only able to starts this vehicle. If any criminal activities occurred to the vehicle that information is send to the raspberry pi. Raspberry-pi sends this information to the

driver and nearest police station by using GPS tracking system. The complete information can be viewed on the web page using internet of thing.

Advantages:
1. Using various sensors, the Medical support is given to the driver automatically.
2. Ultrasonic Sensors are used to product the vehicle from accident.
3. The predefined route and easy way can be determined.
4. Theft can be controlled using this system

V. SIMULATION OUTPUT

The assumed output for the proposed system is obtained by simulating the different cases of emergency in a software platform.

A.   System active

When the vehicle is not started the system monitors the status of the vehicle and informs the user that the system is locked and will prompt for password so that the system can start its function.The system becomes active only after the user provides the predefined password stored in the database.
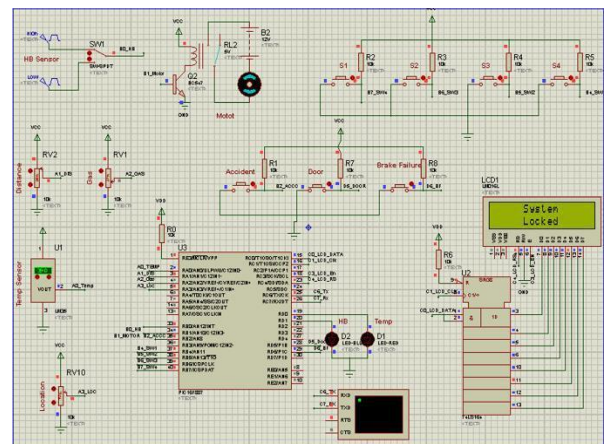

Figure 3.   System indicating active status

B.   Mechanical emergency

If any mechanical problem is occurred during the travel time it will be sent to the raspberry pi. Raspberry-pi announced this information to the driver by using the voice play back system.Door Lock malfunction is sent to the raspberry pi as door open and the alerts the user.Braking system of the vehicle is monitored if the brakes are malfunctioning the fault is alerted to the user before the vehicle breaks down.
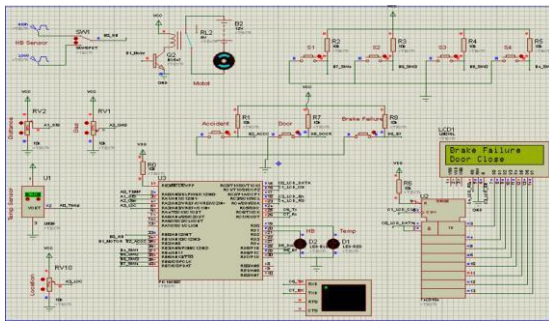
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Figure 4.   System detecting mechanical problems.

C.   Medical emergency

Pressure of the driver is sensed by the pressure sensor. If any abnormal is detected, the information sends to the raspberry pi, Temperature sensor used to detect the temperature of the driver, Heartbeat of the driver is sensed by the heart beat sensor and it will pass the information to Raspberry Pi, it will receive the data and plays the voice announcement to the user and indicates which tablet he wants to take by using LED. If there is any dangerous problem raspberry pi sends this information to the nearest hospitals by using Wi-Fi.
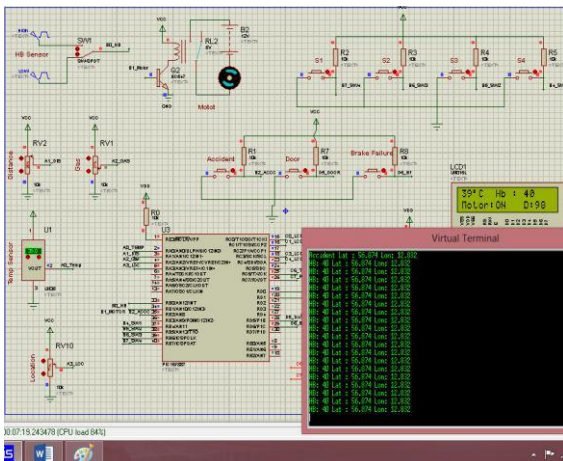

Figure 5.   System indicating medical emergency

D.   Accident emergency

To avoid the vehicle accident the sensors are fixedon the vehicles. If any damage to the vehicle is sensed, the sensed information will be sent to the raspberry pi. Raspberry-pi plays the voice announcement by using the voice playback system. In case, the accident is occurred the video are taken by the webcam, Raspberry-pi sent the video to the server. A video call will be connected nearest police station and relations. This system sends the information about the accident to the nearest hospitals.
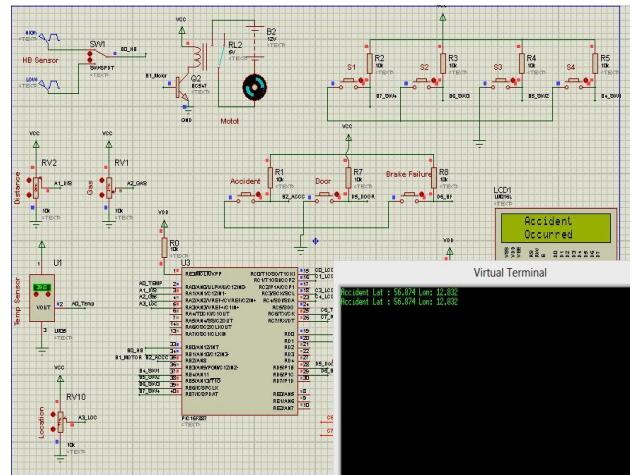

Figure 6.   System detects accident.

Once driver updates the vehicle details in stop condition only the user will be able to starts this vehicle. In case of any criminal activities details of the action is sent to the raspberry pi. Raspberry-pi sends this information to the driver and nearest police station by using GPS tracking system.
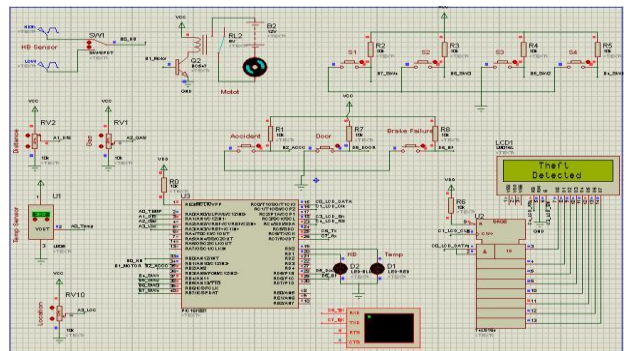

Figure 7.   System detects theft.

VI. RESULTS AND DISCUSSION

The proposed system simulation is performed in an embedded software platform and after obtaining the expected results it is then hardware implemented as a real time product for various application. Raspberry Pi provides support for further improvements in future.

VII. CONCLUSION

The proposed system plays an important role in real time tracking and monitoring of vehicle and also provides safety and secure solution to the traveler using sensors. Whenever there is a vehicle theft situation or accident situation, the proposed system provides the vehicle's current location, speed to the vehicle owner's mobile. Hence it is a benefit to track the vehicle as early as possible. In certain situations such as student's safety concern the proposed system gives an advantage of providing alert massage through voice. In this project, we have proposed an emergency contact and

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location tracking system for vehicular emergencies on road. The system is fully automatic in nature that can help us to minimize accidental and other emergency damages .This prototype is mainly designed for smart cities and IoT enabled vehicles. However, this system may also be used with existing infrastructure in any cities.

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