

Exploring The Possibilities of Iot In Road Safety Measures

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Abstract-Major causes of death in most countries are road accidents which may lead to loss of human life as well as property. Many people also suffer due to lack and delay in assistance provided after the occurrence of incident which could have saved their life. So, providing information of such incidents on time is very crucial which can help to save people from severe injuries or even help to save life .This paper proposes a Smart Vehicle with Surveillance which sends a cautioning message to crisis and alleviation offices regarding mishap's time and area from a specific gadget inserted in a vehicle. This system sends an e-mail to the registered user who has met with an accident to a remote hospital which will then send an ambulance to the location and help provide aid to the victim.

1. INTRODUCTION

As per the Top 10 Causes of Death Report by CDC[1], Road Injuries hit in a few nations, Thailand that 4 percent of death is a consequence of the vehicle mishap. As often as possible, the genuine mishaps happen at evening time; all things considered, it may be not gotten a quick look at other individuals then the unfortunate casualty who can't call some crisis benefits without anyone else's input don't find support at the opportune time. Despite of various efforts done by government as well as non-governmental bodies in different nations, yet such accidents take place very often and most of the times, situation is not reported on time which results in extreme conditions such as loss of life and property. So, there is requirement of system which can help to detect any accidents occurring and to report nearby hospitals or can send message directly to call an ambulance.

This paper proposes a system, used for detecting the location of the vehicle which has met with an accident. This system sends an e-mail to the registered user who has met with an accident to a remote hospital which will then send an ambulance to the location and help to provide aid to the passengers. It consists of a GPS module[2] which would provide the location details to the

registered user or the remote hospital for immediate first aid and it also consists of piezoelectric sensors which could help us in measuring the intensity with which the object (vehicle in this case) has been hit.

EQUIPMENTS

➤ ARDUINO UNO

Arduino[3] is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board.

➤ GPS MODULE

The Global Positioning System (GPS)[4] is a space-based satellite navigation system that provides location and time information in all weather conditions, anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. The system provides critical capabilities to military, civil and commercial users around the world. It is maintained by the United States government and is freely accessible to anyone with a GPS receiver.

➤ 16x2 LCD

A liquid-crystal display is a flat-panel display or other electronically modulated optical device that uses the light-modulating properties of liquid crystals. Liquid crystals do not emit light directly, instead using a backlight or reflector to produce images in color or monochrome.

➤ RASPBERRY-PI

The Raspberry Pi[5] is a proficient little gadget that empowers individuals of any age to investigate figuring, and to figure out how to program in dialects like Scratch and Python. It can do all that you would anticipate that a personal computer should do, from perusing the web and playing top quality video, to making spreadsheets, word-handling, and messing around.

➤ BUZZER

A buzzer is a gadget which makes a humming or blaring clamor. Progressively unpredictable bells incorporate the oscillator circuit and the piezoelectric component or speaker in a solitary bundle, so you should simply apply a voltage and you will get an irritating signaling or humming sound.

➤ PIEZO KNOCK SENSOR

Piezo sensor[6] are adaptable gadgets that create electric charge when they're pushed. This trademark makes piezos a perfect answer for low-control flex, contact, and vibration detecting. In further developed applications, piezos can be the establishment for vitality collecting. Piezo's

are the ideal sensor for getting when your refrigerator is running or as the power hotspot for vitality gathering shake-lights.

➤ JUMPER WIRES

Jumper wires are just wires that have connector pins at each end, enabling them to be utilized to associate two to one another without binding. Jumper wires are commonly utilized with breadboards and other prototyping apparatuses so as to make it simple to change a circuit as required.

➤ LED

LED, in full light-emitting diode, a semiconductor device that emits infrared or visible light when charged with an electric current. Infrared LEDs are employed in autofocus cameras and television remote controls and also as light sources in fibre-optic telecommunication systems.

2. LITERATURE SURVEY

[7]this paper detects traffic accidents by using microcontroller which is based on GSM communications. A predefined mobile number and some other parameters of authorized person is set in GSM modem. Whenever the vehicle seems missing, then movement of vehicle is blocked and to find the location of the vehicle, GPS modem is used. From GPS modem location of the vehicle is send to microcontroller [8]designs smart Display and control system(SDC) which works on the different zones. SDC works on two different units namely, transmitter and receiver unit. The system consists of three module, speed detection module, security enabling module and automatic speed controlling module. Speed is controlled with radio frequency (RF) sensor placed in particular location and RF receiver deployed in vehicle. For detecting accidents GPS and GSM technology is used. Sensory units are included to enable security module. There is another model proposed ADRS[9](accident detection and reporting system) using wireless networks. This system is placed in the vehicle and information regarding accident is gathered with the help of sensors. Information collected by sensors are send to microcontroller which takes decision whether the accident happens or not. Microcontroller is also interfaced with RF sensors which will transmit the information of the accident to nearby service provider. Service provider further alerts the police and hospital so that aid can be provided on time.

[10]has successfully detects the false positives i.e. it reduces the inaccuracies of detecting accidents. Author uses match mapping algorithm in which GPS technology is used to match the

position and speed of the vehicle and if there is any alteration in speed and position, an alert message is generated. Every 0.1 second, speed of the vehicle is noted and is compared with speed captured before.[11]developed a low cost and reliable system to prevent the theft of the vehicle. With the use GPS and GSM, the location of the vehicle is tracked. The behavior of the driver is also detected using sensors so as to avoid the occurrence of any accidents. When an interrupt occurs, IR sensor sends a SMS to microcontroller which in turns issues the signals to slow the speed of the vehicles and lock all the doors. These doors can be opened by authorized user or remotely. Thus, vehicle is prevented from accident as well as from theft.

Problem statement -Various mechanical and sociological upgrades have diminished traffic fatalities during the previous decade, e.g., each 1% expansion in safety belt utilization is evaluated to spare 136 lives. The street mishaps lead to loss of human life as well as debilitation. It was noted, with profound worry that the majority of these happening because of lack of attention given to reporting of such incidents and such mishaps occurs particularly in remote territories or around evening time where there is no observer or a method for alarming the dependable specialists, for example, police, crisis administrations responders and additionally family members. As a result, there is need of such system which can help to send information of these incidents in short period of time to nearby services.

3. METHODOLOGY



Figure 1 Vehicle as a Prototype

In figure 1, all the equipment are deployed in small truck and the working of the system is depicted.

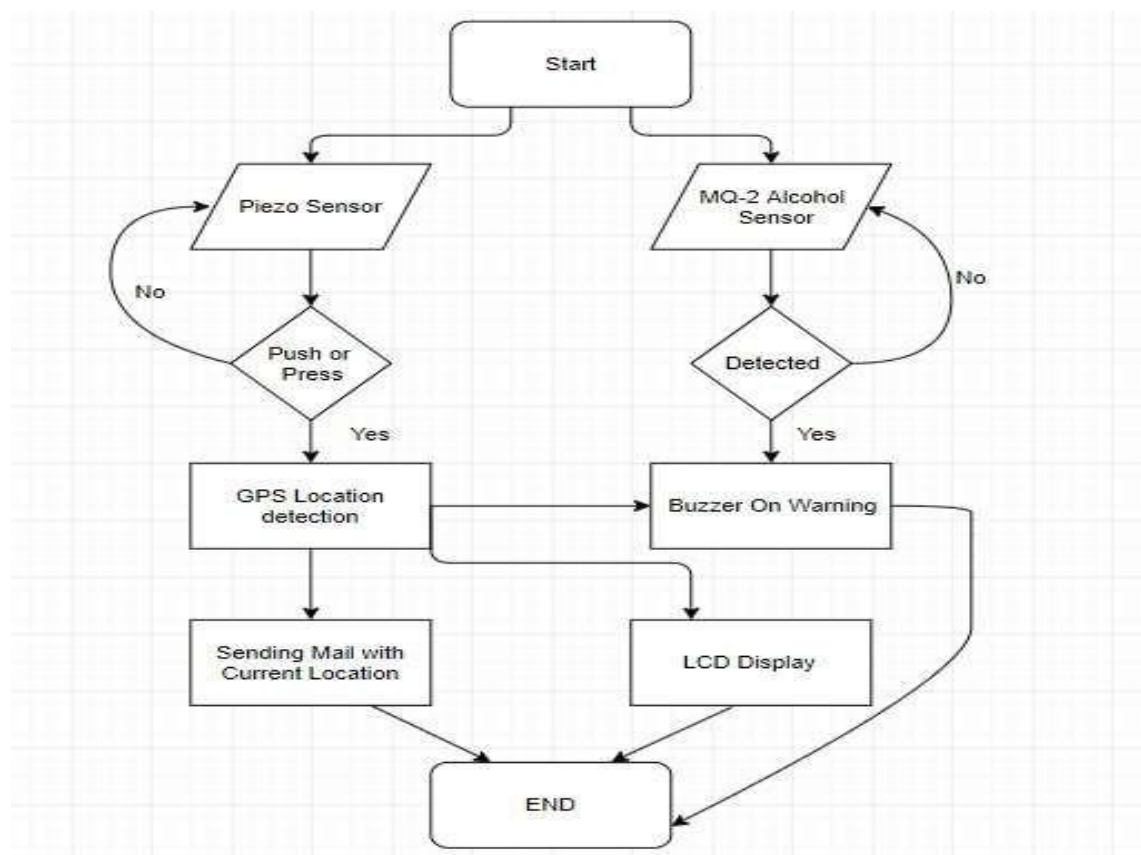


Figure 2 Flowchart of the proposed process

The prototype is equipped with Piezo electric sensor and MQ-2 Alcohol sensor. Piezo electric sensor is used to measure to intensity if there is any collision of vehicle with any other object and if the intensity is high, push button will get activated which will sends the location of the vehicle by GPS via email. For displaying location, LCD display is used. MQ-2 Alcohol sensor detects whether the driver is drunk or not. If the driver is drunk alarm will be generated using buzzer.

4. TESTS AND RESULTS

The prototype is working well in every condition tested. All the readings recorded by sensors are accurate and transferred safely over the network. It has not been developed using real world circuits and AC main power supply.

192.168.43.125 (raspberrypi) - VNC Viewer

pi@raspberrypi: ~/Desktop

File Edit Tabs Help

```

0
0
0
0
0
0
0
0
1
SGPRMC,094100.00,A,3115.16439,N,07541.73561,E,0.38
2
SGPRMC,094101.00,A,3115.16440,N,07541.73562,E,0.45
31.25274
75.695593666666666666666666666667
it worked!
Mail sent
0
0

```

Once the vehicle hits any of the walls, the push button in it gets activated and returns 1 on the code which later calls the function (detct_loc) which is integrated with servers to detect location. Thereafter the location is detected using triangulation method of GPS which later displays the output on the screen and also sends an email to the registered user saying it worked.

One of the primal causes of death, being alcohol consumption has resulted in this idea of creating a model which can help in detecting probable cause of accidents. The proposed model is based on IoT which will trigger and alarm upon detecting the collision between the vehicles and informing the nearby control units. In future, this model could be adopted on a large scale if

the cost factor associated were able to reduce to an affordable price. Moreover, this model can be integrated with hand-held devices like mobile phones, which in turn will increase the chances of detection and survival of victims of road accident.

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