IoT Based Automatic Vehicle Accident Detection And Rescue System

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Abstract- *The objective of this paper is to identify the accident near to the traffic area. In this paper two sections have been developed for the vehicle safety and automation system. The paper is to monitor the accidents which occur on the highways using IOT. The purpose is to report the monitoring section whenever accident occurs on the highways and providing fastest helpline. Accidents which occur on the highways can be monitored using microcontroller, accident identifier circuit and IOT. The accident information along with location will be sent to the user and the ambulance service when accident occurs. paper also monitors and provides the safety guidelines to passenger at the vehicle. The information of occurrence of the accident will be transmitted to the user and the police patrol room with the exact location of the vehicle. Paper enhances with the panic switch for the passenger at vehicle which makes the safest journey for all users. This type of system has a variety of applications and can be used for other purposes such as guiding completely autonomous vehicles.*

Keywords- Microcontroller Atmega328, accelerometer, Gps, Radio frequency, Fire sensor, Tilt sensor

I. INTRODUCTION

Driving is very sensitive task which needs to bed one and More than 70% of the people in India use public transport for travel out of which mostly used in travel vehicle it is through buses. Past years survey shows that bus accidents contribute more in total accidents happened on road. Some of major reasons for these accidents are inadequate road infrastructure compared to traffic density, rash driving and unsafe overtaking. Several attempts have been made by public transport system authority and also by road transport department of state government to educate and aware drivers to drive vehicles safe but that did not helped much to prevent the accidents happening every year. There are some systems already available to control speed of bus like-speed governor but that increases the travelling time and in some cases drivers overload the engines to gain speed which cause reduction in uptime and performance of the vehicle. Some solutions have been designed which detects rash driving and gives intimation using some or other kind of wireless media but most of them failed due to reliability issues and most of them are just indicative systems and not preventive. There is need of self control system which detects overtaking intention of driver, guide driver for safe overtaking condition and based on drivers response takes necessary action.

II. RELATED WORK

The intense interest of vehicles has additionally expanded the traffic perils and the street mishaps. The general population life is under high hazard. If there should arise an occurrence of mishap, long reaction time to go to the unfortunate casualty may prompts increment number of death. As indicated by the overview in 2017, around the aggregate of 2,076 individuals kicked the bucket in street mishaps. The interest of the vehicles has expanded the street mishaps. Because of the absence of crisis offices in our nation, we are presenting the programmed ready gadget for vehicle mishaps. A programmed alert gadget for vehicle mishaps is presented in here. The proposed structure is a framework which can identify mishaps in essentially less time and sends the fundamental data to medical aid focus inside a couple of moments covering topographical directions, the time and point in which a vehicle mishap had happened. This alarm message is sent to the save group in a brief span, which will help in sparing the profitable lives. Switch is likewise given so as to end the sending of a message in uncommon situation where there is no loss, this can spare the valuable time of the medicinal safeguard group. The proposed framework distinguishes the mishap and sends the data in less time to close by medical aid focus. The street mishap in many creating nations is described by human fueled vehicle without embracing traffic isolation assets. This made extraordinary concern designers and organizers. The street mishaps are anticipated to cause the main demise except if move is made. 'Mishaps are caused not characteristic', so surmised measures are produced. The uncontrolled occasion of an individual outcomes in close to home damage The most elevated level of all passings because of street auto collisions .It influences the accident as well as expands the hazard associated with it. With this undertaking, an application is made along side vehicle. An

IOT is the system of the physical gadget, vehicles and different things implanted with hardware, programming, sensors, actuators and system network which help in availability of information. IOT alludes to quickly developing system of associated articles that can gather and trade information utilizing installed sensors. It is utilized for observing occasions and changed in basic conditions which packs of hazard and booking fix and upkeep action in effective.

III. PROPOSED SYSTEM

In proposed system, the paper focuses accident less safety emergency guidelines to the vehicle. This can be implemented by the sensors vibration sensor which means of shock sensor. This project proposes a technique to detect & identify the accident zone immediately from the vehicle using wireless communication is achieved by IOT & GPS.

IV. SYSTEM DESIGN

This proposed IOT based accident detection system helps to reduce the loss of life due to accidents and also reduces the time taken by the ambulance to reach the hospital. To detect the accident there is accelerometer sensor present in this rescue system and the GSM module included sends messages about the location to the respective guardian and rescue team. The figure 3.2 shows the block diagram of IOT integrated air quality monitoring and controlling using 2NAOH chemical. Where the microcontroller is connected with different peripherals such as LCD, Sensor, IOT Module for data transfer to user for all accident alert.

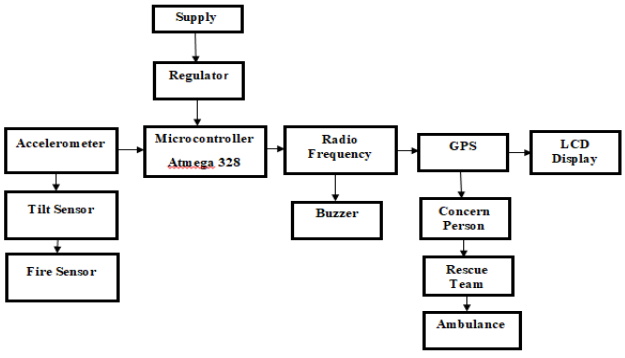

Figure 1.Block Diagram

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1.MICROCONTROLLER(ATMEGA328) Atmega328 is an Advanced Virtual RISC (AVR) microcontroller. It supports 8-bit data processing. ATmega-328 has 32KB internal flash memory. ATmega328 has 1KB Electrically Erasable Programmable Read-Only Memory (EEPROM). This property shows if the electric supply supplied to the micro-controller is removed, even then it can store the data and can provide results after providing it with the electric Random Access Memory (SRAM). Other characteristics will be explained later. ATmega 328 has several different features which make it the most popular device in today's market. These features consist of advanced RISC architecture, good performance, low power consumption, real timer counter having separate oscillator, 6 PWM.ATmega328 is an 8-bit, 28-Pin AVR Microcontroller, manufactured by Microchip, follows RISC Architecture and has a flash-type program memory of 32KB. Atmega328 is the microcontroller, used in basic Arduino boards.

Figure 2. Microcontroller Atmega328

USART, Programming lock software security, throughput up to 20 MIPS etc. Further details about ATmega 328 will be given later in this section.

2.ACCELEROMETER

An accelerometer is a device that measures the vibration, or acceleration of motion of a structure. The force caused by vibration or a change in motion (acceleration) causes the mass to "squeeze" the piezoelectric material which produces an electrical charge that is proportional to the force exerted upon it. Since the charge is proportional to the force, and the mass is a constant, then the charges that

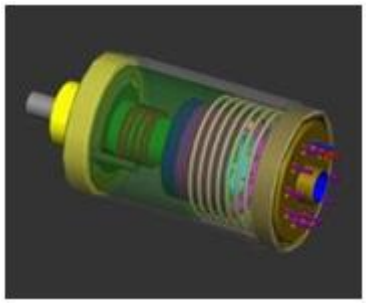

Figure 3. Accelerometer

also proportional toacceleration. These sensors are used in a variety of ways from space stations to handheld devices, and there's a good chance you already own a device with an accelerometer in it. For example, almost all smartphones today house an accelerometer. They help the phone know whether it undergoes acceleration in any direction, and it's the reason why your phone's display switches on when you flip it. In an industry setting, accelerometers help engineers understand a machine's stability and enable them to monitor for any unwanted forces/vibration.

3.TILT SENSOR

Tilt sensor is an instrument that is used for measuring the tilt in multiple axes of a reference plane. Tilt sensors measure the tilting position with reference to gravity and are used in numerous applications. They enable the easy detection of orientation or inclination. Similar to mercury switches, they may also be known as tilt switches or rolling ball sensors.

Figure:4 Tilt sensor

The Tilt Sensor Vibration Alarm Vibration Switch Module for Arduino come with the basic components for operation. Supplying power and it is good to be used. Attach it to object and it will detect whether the object is tilt. Simple usage as it is the digital output, so you will know the object is tilt sensor.

4.FIRE SENSOR

A sensor which is most sensitive to a normal light is known as a fire sensor. That's why this sensor module is used in fire alarms. This sensor detects flame otherwise wavelength within the range of 760 nm – 1100 nm from the light source. This sensor can be easily damaged to high temperature. So this sensor can be placed at a certain distance from the fire. The flame detection can be done from a 100cm distance and the detection angle will be 600. The output of this sensor is an analog signal or digital signal. These sensors are used in fire fighting robots like as a flame alarm.

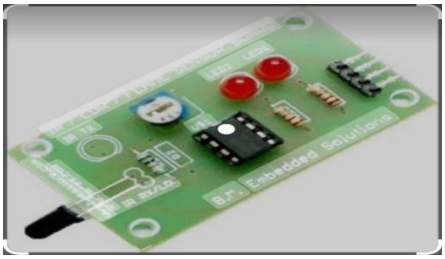

Figure 5. Fire Sensor

A fire-sensor is one kind of detector which is mainly designed for detecting as well as responding to the occurrence of a fire or fire. The fire detection response can depend on its fitting. It includes an alarm system, a natural gas line, propane & a fire suppression systems.

5.RADIO FREQUENCY

An RF module (short for radio-frequency module) is a (usually) small electronic device used to transmit and/or receive radio signals between two devices. In an embedded system it is often desirable to communicate with another

device wirelessly. In an embedded system it is often desirable to communicate with another device wirelessly. This wireless communication may be accomplished through optical communication or through radio-frequency (RF) communication. For many applications, the medium of choice is RF since it does not require line of sight. RF communications incorporate a transmitter and a receiver. They are of various types and ranges. Some can transmit up to 500 feet. RF modules are typically fabricated using RF CMOS technology.

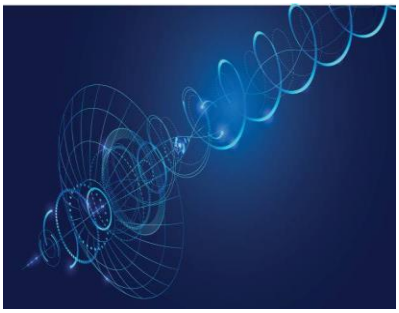

Figure 6. Radio Frequency

6.ARDUINO UNO

Arduino is a single-board microcontroller to make using electronics in multidisciplinary projects more accessible. The hardware consists of an open-source hardware board designed around an 8-bit AtmelAVR microcontroller, or a 32-bit Atmel ARM. The software consists of a standard programming language compiler and a boot loader that executes on the microcontroller. An Arduino's microcontroller is also pre-programmed with a boot loader that simplifies uploading of programs to the on-chip flash memory, compared with other devices that typically need an external programmer.Further information: List of Arduino boards and compatible systems.There are many Arduino-compatible and Arduino-derived boards.

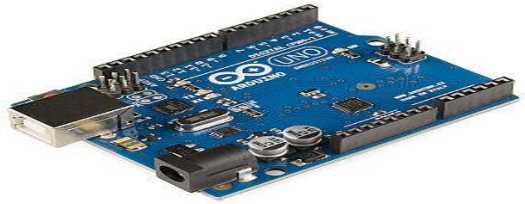

Figure 7.Arduino uno

Arduino boards can be purchased pre-assembled or as do-it-yourself kits. Hardware design information is available for those who would like to assemble an Arduino by hand. It was estimated in mid-2011 that over 300,000 official Arduino had been commercially produced Arduino started in 2005.An Arduino board consists of an Atmel 8-bit AVR microcontroller with complementary components to facilitate programming and incorporation into other circuits. An important aspect of the Arduino is the standard way that connectors are exposed, allowing the CPU board to be connected to a variety of interchangeable add-on modules known as shields.

V. CONCLUSION

This system is designed in order to address one of the major reasons of bus accidents observed majority of time. Based on simulated testing after applying certain testing conditions, results shows that system is responding good to all the scenarios that are been considered while designing this system.Thus this system is self-decision making driving supervisor which helps drivers to improve their driving skills and also prevent accidents caused due to driver carelessness.

VI. FUTURE SCOPE

This system can be interfaced with vehicle airbag system that prevents vehicle occupants from striking interior objects such as the steering wheel or window. This can also be developed by interconnecting a camera to the controller module that takes the photograph of the accident spot that makes the tracking easier. The proposed program deals with detecting accidents 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 accident. This can be extended through providing the victim with medication at the spot of the accident.

VII. ADVANTAGES

It will save the people from wasting their time searching for the location and lives of the victims of accidents. The victim's condition can be known by the temperature sensor which measures the temperature of the victim, pulse sensor which senses the heartbeat of the victim, and glucose level monitoring. Automatically detect accidents and knowledge to the most controller is shipped relatively and therefore the traffic unit is additionally controlled by the ambulance unit.

VIII. RESULT COMPARISON

Table 1:Result Comparison

Existing Method	Proposed work
• It can only be used where the network and communication is available. • It will only monitor the vibration. • We only use GPS and GSM. • This operation will take a few seconds to take place.	• It can also be used where there is no network and communication place. • It also detects the vibration and temperature. • In this we use GPS, GSM and RF. • Quick operation.

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