Advance Traffic Control Safety and Security in Vehicle Using IOT

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Abstract: 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. Even security and safety, that should be given to the people on roads as well as on off-roads is can't be managed by an individual at a time. To focus on creating safe environment on roads. To focus on some part of the safety that can't be managed by an individual. To create safety in the areas like-Silence zone like- Residential areas at night, Hospitals, Schools, Colleges, Court, etc. No Speeding zone (like-Residential Areas, schools, Danger Path (Sharp turns), etc.

Keywords: RFID tag, RFID Reader, Raspberry Pi3 B model, Arduino, Piezoelectric Sensor, GSM Module 900A, GPS Receiver ,(SIM28ML) ,ADXL345 Accelerometer Sensor.

INTRODUCTION

I. INTRODUCTION

The project uses a number of hardware components for its working. Each component has their individual importance. The architecture and the design of the system is very simple as compared to the other system and the implementation of this system is also very efficient and the installation cost is also low. From the present issue area, it can be seen that, current advancements are inadequate to deal with the issues of over speeding, high intensity Horn, and to prevent the accidents which are taking place on the roads. To take care of these issues, we propose to execute our Advanced Traffic Control Safety and Security in vehicles.

Figure 1: Traffic Control System

II. LITERATURE SURVEY

To give safety and to give secure environment to other people, that there is no problem to others due to our driving of car across urban and rural areas of India, is not possible as the traffic police is not there everywhere to monitor the speed and to monitor the intensity of the horn at strict areas like schools, Courts, Hospitals, etc. Also, after the accident if someone is not present near to the area where accident has already occurred, then the driver and the people which were

there inside the car, will die on the spot as there were no people to help the casualties. Many people in India do not follow traffic rules, due to this many victim and nonvictim people face the problems.

The advantage of the system is that it can control the speed of the car and the intensity of the horn while passing through the strict areas like School, Courts, Hospitals, etc. Also, it will send the message to Police Station and to Hospital automatically after accident and the Buzzer will get activated after the accident as to aware the people that accident has occurred near to your location. These are the features of our system.

Shubham Swaraj el.at [1] Designed system for "RFID Based Automatic Vehicle Identification for Access Control. RFID (Radio Frequency Identification)" is one of the solid and fast strategy for perceive the material article. In the long-earlier the institutionalized labels are best when diverged from RFID because of their cost however now a day's RFID are easily open and are more useful to use. Paper is based upon security get to and Control structure using RFID and with GSM module.

R.Aishvarya1el.at [2] proposed "Automatic and Effective Tracking of Hit & Run Misbehavior Driver with Emergency Ambulance Support". The Instantaneous development of innovation has made our lives simpler. On the off chance that a mishap has happened at a specific area and it is expected that two vehicles are included, then the vibration sensor set before these vehicles detects the vibration furthermore, gives the caution to the activity police control.

Sumit S. Dukare el.at [3] Explained about "Vehicle Tracking, Monitoring and Alerting System". There are different difficulties experience in vehicle following, checking and cautioning because of insufficiency in appropriate ongoing vehicle area and issue of alarming framework. GPS (Global Positioning System) is most broadly utilized innovation for vehicle following and keep standard checking of vehicle. The goal of following framework is to oversee and control the vehicle utilizing GPS trans receiver to know the present area of vehicle.

Murtadak T.A. el.at [4] Designed about "RFID based vehicle identification during collision". It is helpful to be used track down rash drivers in hit and run cases. It also useful in traffic control. The use of RFID for vehicle identification has already been implemented worldwide. Moreover, at the time of manufacturing of vehicles by insertion of RFID tag and readers it helps in exchanging the information between two vehicles which get in collision. With the help of exchanged information police can track the criminals who lead to collision and also hospital, family of injured person get informed through the message and through this treatment served to the injured person as early as possible. When the accident occurs at any time any place between two vehicles. The information of RFID tag exchange between two vehicles. And message containing the location will be send to their relatives & care units.

Vengadesh, K. Sekar, el.at [5] Designed about "Automatic Speed Control Of Vehicle In Restricted Areas Using RF And GSM". It is a new design to control the speed of the automobiles. In normal driving mode, we can expect other vehicles interfering nearby and possibly blocking or attenuating RF signals. In this aspect, we are going to use GPS location for restricted areas. In this, there are two case: First, the current speed is less than the transmitted speed the vehicle goes normally no action is required. Second, the information from the speed meter is greater than the transmitted speed by the transmitter module the controller waits for few second whether the driver reduce the speed to the below value if the driver does not reduce the speed means it automatically takes the control and reduce the speed according to it. At the same time the information is transmitted to the nearest police station. The information contains the vehicle number and the time. The time denotes that at which time the vehicle crosses that area, then the fine or penalty amount is collected by the nearest tollgate or the check post. After that at the end of the speed limit area there is another transmitter that contains a stop information means the control releases by the controller to driver.

III. HISTORY

The Internet of Things, as a concept, wasn't officially named until 1999. One of the first examples of an Internet of Things is from the early 1980s, and was a Coca Cola machine, located at the Carnegie Melon University. Local programmers would connect by Internet to the refrigerated appliance, and check to see if there was a drink available, and if it was cold, before making the trip. By the year 2013, the Internet of Things had evolved into to a system using multiple technologies, ranging from the Internet to wireless communication and from micro-electromechanical systems (MEMS) to embedded systems. The traditional fields of automation (including the automation of buildings and homes), wireless sensor networks, GPS, control systems, and others, all support the IoT.

IV. SYSTEM DESIGN

A. Raspberry Pi3 B model:

Fig2: Raspberry pi 3 B Model

The Raspberry Pi 3 Model B is the earliest model of the third-generation Raspberry Pi. It replaced the Raspberry Pi 2 Model B in February 2016. Its features are-

Features:

- Quad Core 1.2GHz Broadcom BCM2837 64bit CPU
- 1GB RAM
- BCM43438 wireless LAN and Bluetooth Low Energy (BLE) on board
- 100 Base Ethernet
- 40-pin extended GPIO
- 4 USB 2 ports
- 4 Pole stereo output and composite video port
- Full size HDMI
- DSI display port for connecting a Raspberry Pi touchscreen display
- Micro SD port for loading your operating system and storing data
- Upgraded switched Micro USB power source up to 2.5A

B. RFID tag:

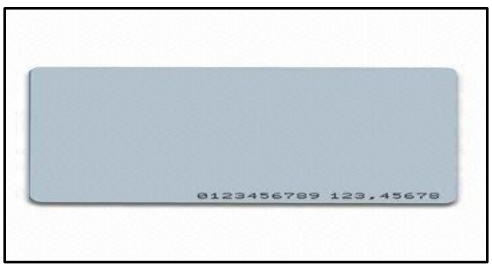


Figure 3: RFID tag

A radio-frequency identification system uses tags, or labels attached to the objects to be identified. Two-way radio transmitter-receivers called interrogators or readers send a signal to the tag and read its response.

RFID tags can be either passive, active or battery-assisted passive. An active tag has an on-board battery and periodically transmits its ID signal. A battery-assisted passive (BAP) has a small battery on board and is activated when in the presence of an RFID reader. A passive tag is cheaper and smaller because it has no battery; instead, the tag uses the radio energy transmitted by the reader. However, to operate a passive tag, it must be illuminated with a power level roughly a thousand times stronger than for signal transmission. That makes a difference in interference and in exposure to radiation.

Tags may either be read-only, having a factory-assigned serial number that is used as a key into a database, or may be read/write, where object-specific data can be written into the tag by the system user. Field programmable tags may be write-once, read-multiple; "blank" tags may be written with an electronic product code by the user.

RFID tags contain at least three parts: an integrated circuit that stores and processes information and that modulates and demodulates radio-frequency (RF) signals; a means of collecting DC power from the incident reader signal; and an antenna for receiving and transmitting the signal. The tag information is stored in a non-volatile memory. The RFID tag includes either fixed or programmable logic for processing the transmission and sensor data, respectively.

An RFID reader transmits an encoded radio signal to interrogate the tag. The RFID tag receives the message and then responds with its identification and other information. This may be only a unique tag serial number, or may be product-related information such as a stock number, lot or batch number, production date, or other specific information. Since tags have individual serial numbers, the RFID system design can discriminate among several tags that might be within the range of the RFID reader and read them simultaneously.

C. RFID Reader:

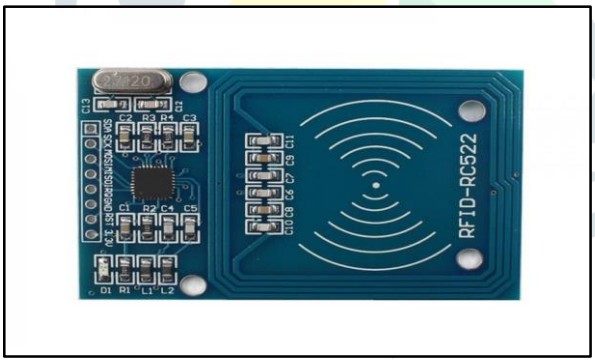


Figure 4: RFID Reader

RFID systems can be classified by the type of tag and reader. A **Passive Reader Active Tag** (**PRAT**) system has a passive reader which only receives radio signals from active tags (battery operated, transmit only). The reception range of a PRAT system reader can be adjusted from 1–2,000 feet (0–600 m), allowing flexibility in applications such as asset protection and supervision.

1. An **Active Reader Passive Tag** (**ARPT**) system has an active reader, which transmits interrogator signals and also receives authentication replies from passive tags.
2. . An **Active Reader Active Tag** (**ARAT**) system uses active tags awoken with an interrogator signal from the active reader. A variation of this system could also use a Battery Assisted Passive (BAP) tag which acts like a passive tag but has a small battery to power the tag's return reporting signal.

3. Fixed readers are set up to create a specific interrogation zone which can be tightly controlled. This allows a highly defined reading area for when tags go in and out of the interrogation zone. Mobile readers may be hand-held or mounted on carts or vehicles.

E. GSM Module (Sim900A):

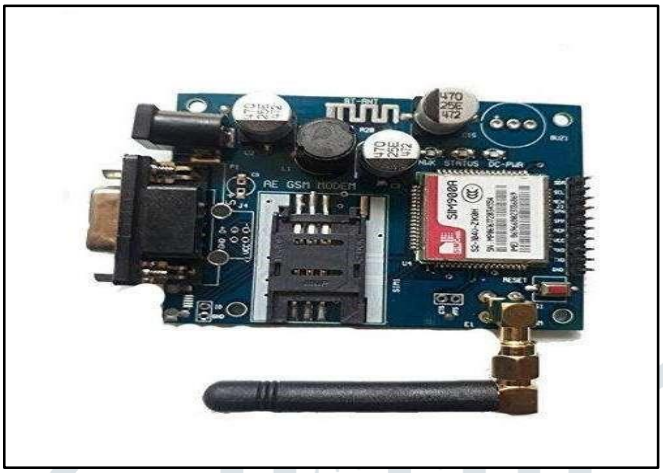


Figure 7: GSM Module.

GSM is a mobile communication modem; it is stands for global system for mobile communication (GSM).

It is widely used mobile communication system in the world. SM system was developed as a digital system using time division multiple access (TDMA) technique for communication purpose. For our project GSM module is use to alert consumers via SMS on mobile phone.

F. Piezoelectric Sensor:

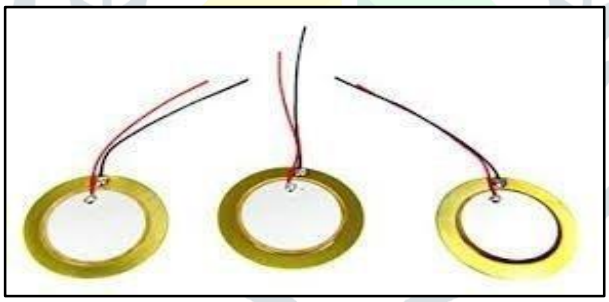


Figure 8: Piezoelectric sensor

A **piezoelectric sensor** is a device that uses the piezoelectric effect, to measure changes in pressure, acceleration, temperature, strain, or force by converting them to an electrical charge.

G. GPS Receiver:

Figure 9 : GPS Receiver

A **GPS navigation device**, **GPS receiver**, or simply **GPS** is a device that is capable of receiving information from GPS satellites and then to calculate the device's geographical position. Using suitable software, the device may display the position on a map, and it may offer directions. The Global Positioning System (GPS) is a global navigation satellite system (GNSS) made up of a network of a minimum of 24, but currently 30, satellites placed into orbit by the U.S. Department of Defence.

The GPS was originally developed for use by the United States military, but in the 1980s, the United States government allowed the system to be used for civilian purposes. Though the GPS satellite data is free and works anywhere in the world, the GPS device and the associated software must be bought or rented.

H . ADXL345 Accelerometer sensor:

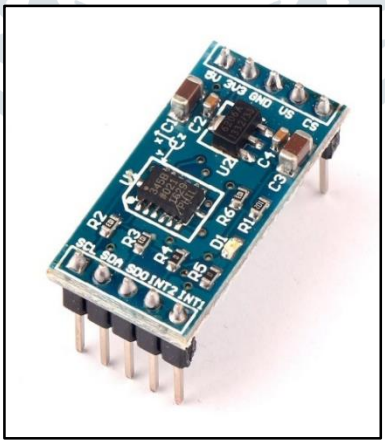


Fig 10. ADXL345 Accelerometer sensor

Accelerometer is a sensor that can measure velocity, detect and measure vibration, and measure acceleration due to gravity. One of its uses is to detect motion, such as feet when people are walking. It is also used to detect hand motion for game consoles, as accelerometer sensors can be attached to a hand and detect the velocity of that hand motion. Distance and direction of a movement can be measured from the velocity detected by an accelerometer. This

measured acceleration is the result of recorded object movement related to changes in mass the accelerometer sensor detects.

I. L293D Microcontroller Driver:

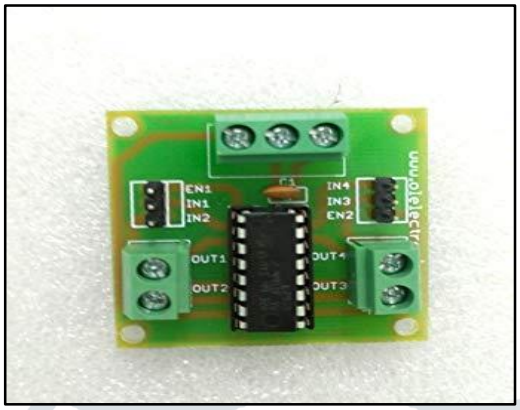


Fig. 11 . L293D Microcontroller Driver

L293D is a typical Motor driver or Motor Driver IC which allows DC motor to drive on either direction. L293D is a 16-pin IC which can control a set of two DC motors simultaneously in any direction. It means that you can control two DC motor with a single L293D IC.

V. METHODOLOGY

1 1. HARDWARE IMPLEMENTATION :

To make the system hardware we gone through below block diagram.

The approach used for system development is that we are using Raspberry pi3 and Arduino is used to read the RFID tag using Reader .and hall sensor is used to Hall effect sensors are used for proximity switching, positioning, speed detection, and current sensing applications.

A **piezoelectric sensor** is a device that uses the piezoelectric effect, to measure changes in pressure, acceleration, temperature, strain, or force by converting them to an electrical charge.

A **GPS navigation device**, **GPS receiver**, or simply **GPS** is a device that is capable of receiving information from GPS satellites and then to calculate the device's geographical position.

ADXL345 Accelerometer sensor (sometimes known as **speed control** or **autocruise**, or **tempo mat** in some countries) it helps system automatically controls the speed of a motor vehicle.

2. Software implementation:

Programming is done using Embedded C and micro python. Micro Python is a lean and efficient implementation of the Python3 programming language that includes a small subset of the Python standard library and is optimised to run on microcontrollers and in constrained environments.

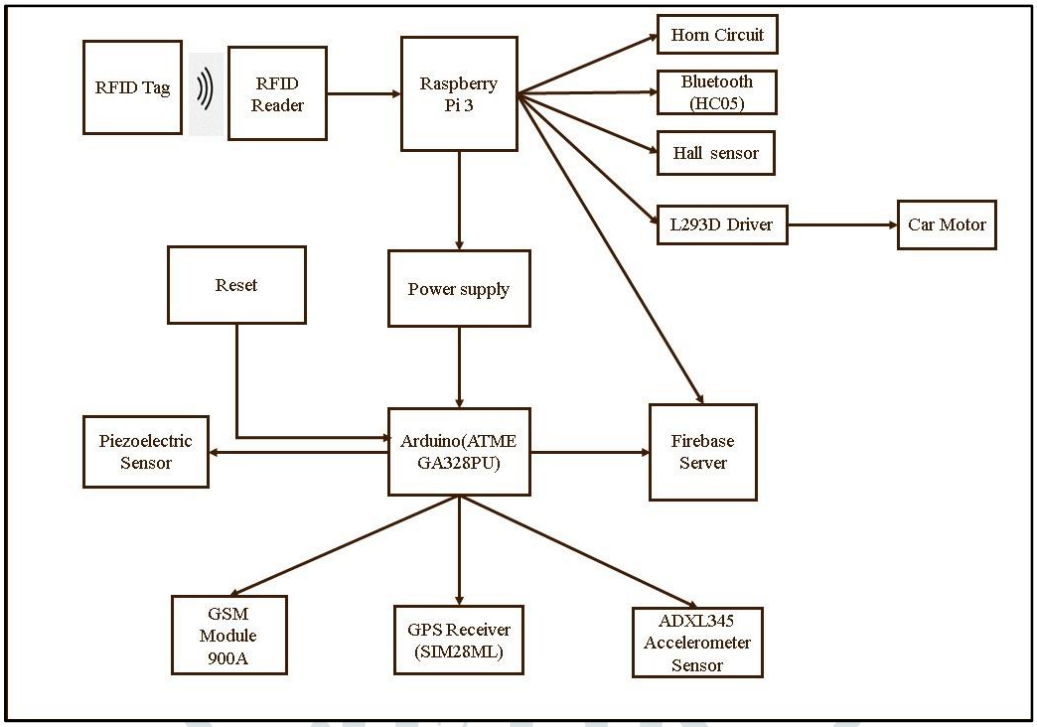


Figure 12 : Block diagram of system

VI. SIMULATION AND RESULT

1. WORKING OF TRAFFIC CONTROL SAFETY AND SECURITY IN VEHICLE:

Figure 13: Working of Safety And Security In Vehicle System

Working:

Initially every vehicle has RFID reader and every Sign board has RFID tag. In these the RFID reader of the vehicle hits the first RFID tag. Due to which the L293D Microcontroller will get activated and it will

bring the speed of car in required speed and also the Microcontroller will send the messages to the horn circuit to reduce the intensity of the horn.

Also, when the vehicle hits the obstacles then the piezoelectric sensor will get activated and the threshold voltage will be sent to the microcontroller . it will send the message through the GSM SIM900A to the Police Station and Hospital and Buzzer will get activated. If no accidents have taken place then user can deactivate the buzzer by clicking the button on the system or through using the application so that the buzzer will get deactivated and message will get aborted as the message should be disabled within 5 minutes.

2. Layout of Android Application:

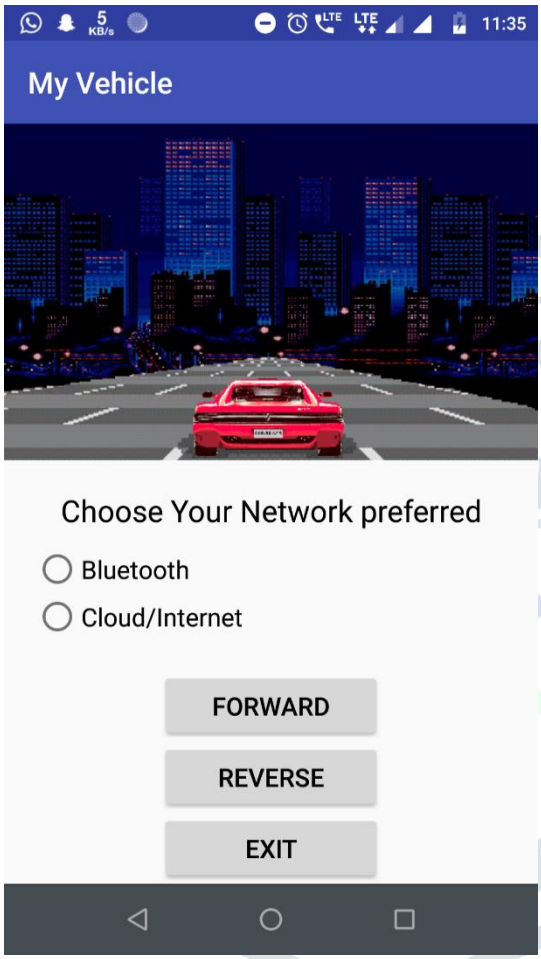
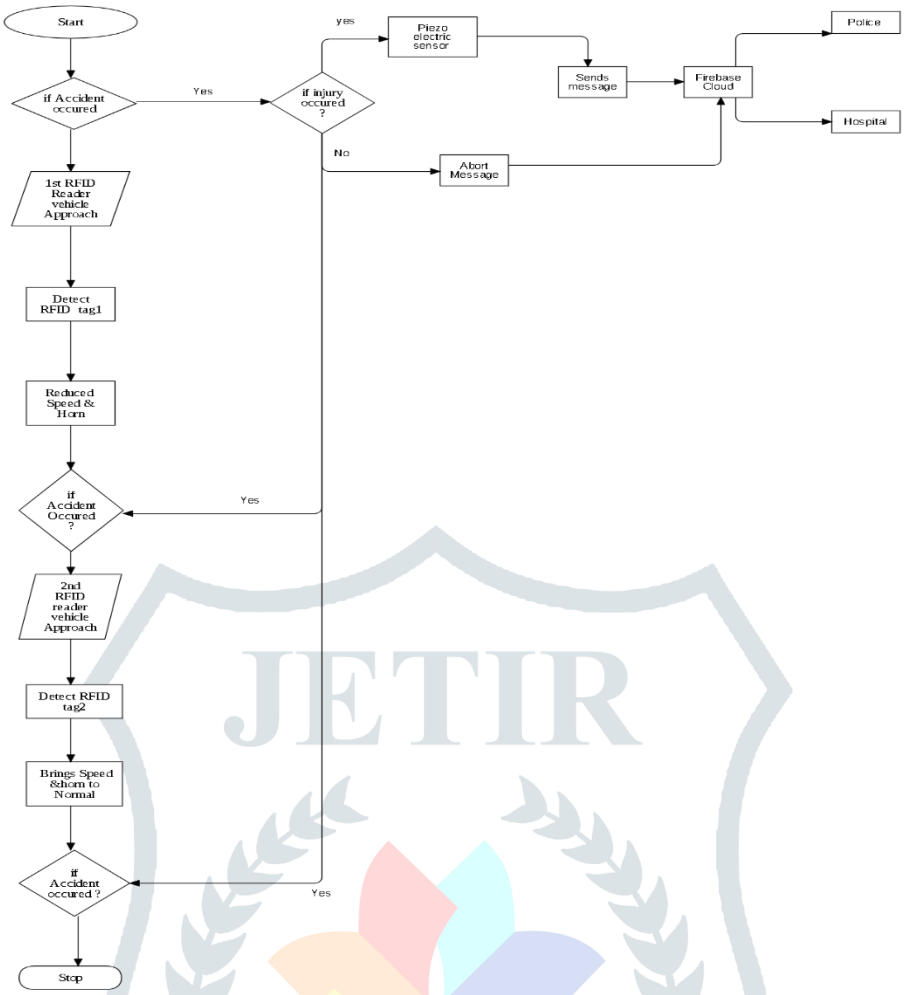


Fig14. Android Application

3.FLOW DIAGRAM:



VII. CONCLUSION:

From this system we will be able to control the speed of car as well as to reduce the intensity of the horn in the car. System will get activated during first RFID tag hitting and after the second RFID tag hitting, the system will get deactivated. Also, it will send the message to the police station and hospital after accident and also it will activate the buzzer in order to give the information of accident occurred to the near surrounding.

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