Self-Conscious IoT Smart Vehicle

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Abstract **-** *There are many accidents/incidents taking place because of the incontrollable speed by the driver and there are no devices to control the speed of the vehicle. Therefore, there is a need of an automated system which controls the vehicle and prevent it from hazards and maintain the speed of the vehicle using IoT. This project is based on the domain of IOT and the following major components are used: Cloud Storage as backend as a service, Raspberry Pi is used to control the whole system which is centralized processing unit and the Web page is designed by using Visual Studio to enter different rules which acts as a frontend.*

Key Words: **Cloud Storage, Raspberry Pi, Arduino Nano, GPS Module, LCD, Motor, Buzzer, LED.**

1. INTRODUCTION

Vehicle monitoring technology is rapidly increasing in the present years, with many different forms of this technology now available. In modern days, almost every country across the globe is facing the concern of accidents because of the carelessness of the driver. This paper is mainly focusing on the project which is basically a hardware prototype which will be deployed in the vehicle for securely monitoring and controlling the vehicle using IoT. This project will not only provide ease of driving or help in improving road safety but will also help the society by reducing the death rate due to the road accidents. This system adds a value to the urban lifestyle, thereby being one of the reasons for the evolvement of smart cities and safe travel.

IoT is a technology transition in which devices will allow us to sense and control the physical world by making objects smarter and connecting them through an intelligent network.[1].

IoT is an ecosystem of connected physical objects that are accessible to the internet. The "thing" in IoT could be a person with a heart monitor or an automobile with built-in sensors, which has the ability to collect and transfer data over a network without manual assistance or intervention [2].

The main target of this project is to control the speed of the over-speeding vehicle, to detect whether a particular area is for parking, to maintain "No Horn" rule wherever there is a restriction on blowing the horn and to detect the humps ahead in the way of the vehicle.

1.1 Existing System

Speed Controller: RF transmitter is used in the road zone areas and receiver is fitted in the vehicle which transfers the information to the controller [3]. The controller transfers the information automatically to the nearest traffic police station. Existing system just monitors only the speed of the vehicle and is not controlled automatically. The hardware i.e. transmitter that are fitted in the speed zoned areas may get damaged due to natural calamities which are expensive and requires more in numbers.

Traffic Rules Deployed: Currently traffic rule deployed using sign board mounted on roadside, due to environment condition and sunlight fade it is difficult to identify rule for drivers.

Parking Mode: In existing parking mode, sensor used is expensive and camera should sense for certain distance even if parking zone is filled.

NO HORN Zone: The system is capable of communicating with the microcontroller which is installed on the vehicle. Microcontroller will receive the signal using Zigbee or beacon Bluetooth transmitting technology, if vehicle is in NO HORN zone then buzzer will get disable.

Humps Detector: In the IR transmitter the IR LED passes current only in one direction, which when it is activated generates an invisible IR light beam signal and hits the obstacle [3].

1.2 Proposed System

Speed Controller: The information is given to the controller by the cloud which in turn automatically reduces the speed of the motor which is regulated by Arduino controller.

Parking Mode: The system is designed in such a way that it is applicable for street side parking. Based on the vehicle geo location, system will identify parking zone or not with an indication to avoid traffic jam or traffic rule violations.

NO HORN Zone: The information is received by Raspberry pi from the cloud when the vehicle enters the no horn zone. The information is given to the controller which in turn disables the Horn of the vehicle.

Humps Detector: The information is received by Raspberry pi from the cloud when the vehicle is nearer to the hump region. The information is given to the controller which gives caution to the driver.

2.IMPLEMENTATION

Speed Controller: In order to control the speed at the desired location, the workstation will feed the necessary values of longitude and latitude of that particular location along with the speed with which the vehicle has to be moved in that particular location and also the range of the distance up to which this rule should be satisfied from the Front-End. The entered values then will be stored at the backend. Now, the Hardware prototype will fetch the entered rule along with the values from the backend.

In Hardware prototype, Raspberry Pi is the main microcontroller. Arduino Nano is connected to Raspberry Pi and Motor is connected to Arduino Nano.

So, the values from Raspberry Pi is fetched by Arduino Nano and based on that the Motor will be controlled as per the rule fetched by Raspberry Pi.

Parking Mode: To check whether a particular location is suitable for Parking, the work-station will feed the necessary values of longitude and latitude of that particular location, along with range of the distance up to which this rule should be satisfied, from the Front-End.

The entered values then will be stored at the backend. Now, the Hardware prototype will fetch the entered rule along with the values from the backend.

In Hardware prototype, LED is connected to Raspberry Pi. If the vehicle is in the location where the Parking rule is satisfied, then the LED won't glow or else the LED will glow a red-light indicating NO-Parking Zone.

NO HORN Zone: To check whether a particular location is suitable for blowing the Horn, the work-station will feed the necessary values of longitude and latitude of that particular location, along with range of the distance up to which this rule should be satisfied, from the Front-End. The entered values then will be stored at the backend. Now, the Hardware prototype will fetch the entered rule along with the values from the backend.

In Hardware prototype, Buzzer is connected to Raspberry Pi. If the vehicle is in the location where the "No Horn" rule is satisfied, then the Buzzer won't blow the horn or else the Buzzer will blow the horn.

Humps Detector: In order to detect a Hump in the way of the vehicle, the work-station will feed the necessary values of longitude and latitude of that particular location, along with range of the distance up to which this rule should be satisfied, from the Front-End.

The entered values then will be stored at the backend. Now, the Hardware prototype will fetch the entered rule along with the values from the backend.

In Hardware prototype, LCD is connected to Arduino Nano. If the vehicle approaches near to the Hump, then the driver will get an alert message about the hump in the LCD which is deployed in his/her vehicle.

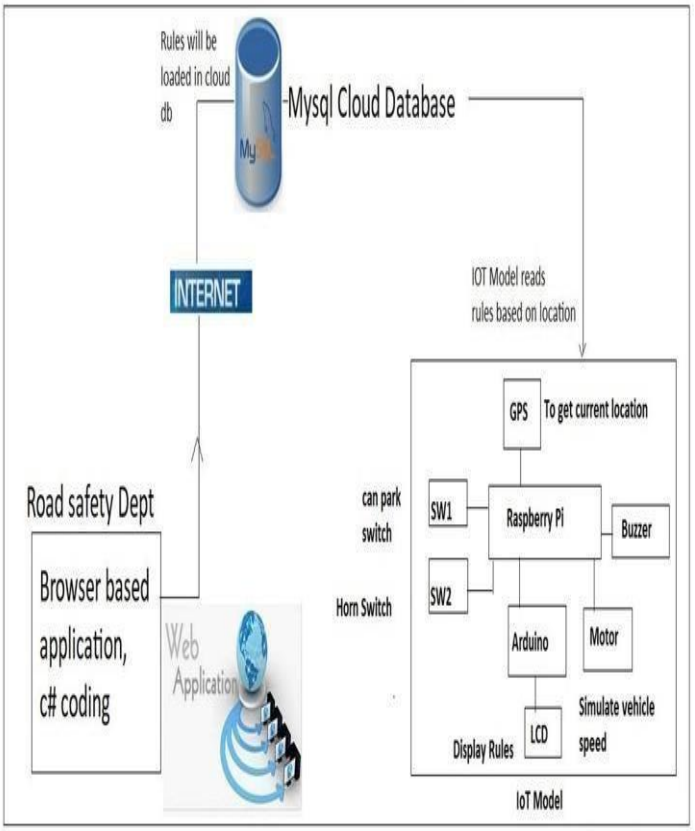

Fig-1: Architecture Diagram

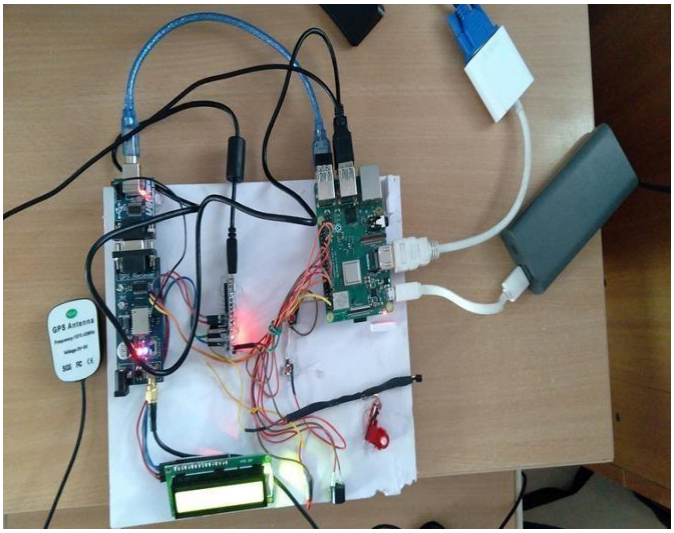

Fig-2: Hardware Prototype

3. CONCLUSION

Identifying the parking zone to avoid traffic jams & traffic rule violations or vehicle damages due to towing. The system has a speed controller module which controls the speed in restricted areas (E.g., Speed limit-50kmph) thus preventing accidents. The system can identify NO HORN ZONE, which disables the horn of the vehicle when it enters the NO HORN area. The system can identify and notify the driver about the nearest HUMP, which can prevent accidents especially during night time. We see that, this system adds a value to the urban lifestyle, thereby being one of the reasons for the evolvement of Smart Cities & safe travel.

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