IoT-Based Vehicle Tracking and Monitoring using Raspberry Pi

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Abstract. The inspection of the powered vehicle and the following mechanisms is given and checked as an embedded board and the Android software for the tracking of school vehicles from every area A to area B. The system suggested would allow a significant use of creativity in the area of the smart phone android smart phone programme. The proposed framework utilizes the internet of things (IoT) and GPS, where IoT sends information to any guardian or owner regarding the vehicle status and GPS sends the current area of the vehicle.

Keywords: GPS, Raspberry pi processor, IoT, Smoke sensor, LM35 and buzzer.

1. Introduction

We watch the driving deficiency and theft of vehicles causing social issues such as maladies and many other hazards [1]. Each day, we see or read such exercises in the open and private segments which raise the question of our well-being and security. Continuous tracking, follow-up and updating of the vehicle's database on special occasions are therefore required [2]. The human assistance in giving the database of the followed vehicle is to some extent challenging in urban environments [3]. Under the proposed arrangement, the car, that accommodates the school transport, its proprietors, and the child protection system and also includes the exact landing time in particular area or exits, will be tracked and monitored fully informatics. Moreover, by using precise time, children you may invest more time on focus, rehabilitation or relaxation instead of waiting tightly for late trips [4]. The expenditure of fewer resources for transport increases the time control of understudy both in a friendly and viable way. The Platform offers easy follow-up agreements with Embedded Linux Board [8] and [9], with a clear end target of minimising labour and saving cash. The suggested background is based on vehicle numbers (single ID), area and speed storage data from the ARM7 database [5]. The frame also provides the wellness aspect with the help of a temperature sensor and a gas spillage sensor. Following this the ready alert will be sent to the driver and the car owner, so the temperature inside the car is raised due to some excuse or The MySQL Network Manager has been used for car follow-up using GPS and network management [6] and [7]. Spill of the LPG gas in automobiles. The Module GSM / GPRS migrates the modified vehicle database to the web server and client [10]. Observation and overhaul of the database indicates the constant field of the Smartphone car. On demand, customers may screen a moving vehicle through the mobile device and adapt for calculating the separation and time to attach to the base for a specific target [11].

2. Proposed Framework

The plan would place the vehicle in which its location on the website is set and continually monitored. In the proposed system shown in Figure 1, a review is conducted between the existing route and the
manner in which the raspberry pi processor is registered [14]. In this sense the successful determination of within the frame of raspberry pi taken from the android PDA of the vehicle proprietor using the android framework is given. It means deciding the route from field A to B from the Android application of the vehicle owner that provides more convenience and guarantees travel to the traveller [12]. The driver then drives the car on the default way of the vehicle owner. If the driver pushes the car, the ready message shall be sent on the wrong route to the portable owner of the car from the suggested system. If the speed of the car goes above the fixed speed estimate, the alert would be transmitted from the system to the multi-faceted proprietor [15]. The system suggested also tackled the well-being of the explorers by the use of the MQ6 LPG Gas Sensor and the LM35 temperature sensor.

Figure 1: Proposed device block diagram

3. Hardware Description

3.1. LCD
LCD is the technology for the blocking of light in liquid crystal displays. In specific, it is composed of two polarised glass pieces containing within them a liquid crystal substance. The light that travels through the first substratum produces a backlight. LCD display shown in Figure 2, used for the intent of viewing [13].

Figure 2: LCD display

3.2. Buzzer
Popular uses, including alarms, timers, & beepers, include authentication of alarms, timer & user input as a simple touch or keystroke. Model of a buzzer is shown in Figure 3.

Figure 3: Buzzer

3.3. Raspberry Pi
It's an insane mini-computer that's 5.5 cm wide & 9 cm long. As shown in architecture diagram depicted in the Figure 4 and Table 1, it comprises a system on Chip (SoC) element represent a unique
core CPU with a precision floating-point processing CPU, GPU & RAM with a capacity of 512 MB (SD-RAM). In comparison, less energy is consumed, which is just about 5-7 watts. Figure 5 demonstrates the picture of the Raspberry Pi. It has various layers of memory space, with a 32KB size for the first level & a 128KB size for the latter. These are used to maintain recent programmes & ALU is used for commands to be executed [12].

![Architecture diagram of raspberry pi](image)

**Figure 4:** Architecture diagram of raspberry pi

| Table 1: Detailed description of Raspberry pi |
|----------------------------------------------|
| **Chip** | **Broadcom BCM2835 SoC** |
| Architecture | ARM 11 |
| CPU | 700 MHz Low power ARM1176JZFS |
| RAM | 512 MB (SD-RAM) |
| OS | Linux |
| Dimensions | $85.6 \times 53.97 \times 16$mm |
| Power | Micro socket, 5 V, 1.2 A |

It's a really tiny computer as pictured in Figure 5. It is composed of both software & hardware development tools. The associated mouse & keyboard need a Memory card & a power source. Consequently, a monitor also operates for operating OS such as Mac & Windows.

![Picture of a Raspberry Pi](image)

**Figure 5:** Picture of a Raspberry Pi

4. **Experimental Analysis**

From the proposed work the hardware setup is projected and can be viewed from the Figure 6. The whole module from the Figure 6 consists of smoke sensor, GPS and a controller and power module to turn on the system. And Figure 7 gives message about the temperature and carbon dioxide from the GPS location.
Figure 6: Hardware set up of proposed system

![Hardware setup](image1)

Figure 7: Text message to the mobile

![Text message](image2)

Here we used LCD display to view the temperature and rpm of the car as shown in Figure 8. The controller will automatically send the GPS location to the main unit. The live link of the concerned location can be notified to the persons. The vehicle tracking location can be viewed by Google maps as in Figure 9.

![Parameters display](image3)

Figure 8: Parameters display on LCD screen

![Vehicle tracking](image4)

Figure 9: Vehicle tracking location on Google maps

The Figure 10 represents vehicle moving path including with temperature and gas accumulation. We can lively monitor the temperature and GPS location. The SMS can be send to the concerned mobile via GSM module.
5. Conclusion

Subsequently, the proposed system made good use of smart phone technologies by supplying the explorer with well-being and a safe trip using the wrong part. The suggested system assumes an imperative aspect that will be eventually pursued and tracked by updating constant vehicle data on the server side after any time span with a clear final aim for managed vehicles. At some moment in time where the driver pushes the car in the wrong direction or where the suffering exists, this suggested system provides the ebb and flow region of the car, speed and flexibility to the vehicle owners. This ensures that these benefits will be expected to track the car as early as possible. The well-being device of Understudy also has temperature and LPG gas spillage controls to be used. In these unique situations, the suggested system also includes portable understudy guardians so that guardians can also care about the protection and wellbeing of their youth, in line with understudies’ well-being concern.

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