

Android based Vehicle Tracking, Management And Diagnostic System

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Abstract: In this paper, we have worked for enhancing security for vehicles , advanced vehicle tracking, management and diagnostic system based on Arduino circuit board and sensors. An android application is designed and implemented for monitoring all these parameters. In this report, we are tracking vehicle location using GPS , we are using anti-theft sensor for vehicle safety. We also included vehicle maintenance indicator on Smartphone application. We have also worked on cashless payment for repairing damage parts of vehicle for promoting digital India initiative.

Keywords: WSN, GPS, Vehicle tracking, Android , Database

I. Introduction

Vehicle management, tracking is a technology that is used to ascertain the whereabouts of a vehicle using technologies like Global Positioning Systems (GPS) and sensors operating through satellites and web-servers. Various parameters like geographical coordinates, distance, mileage, etc. can be obtained and then viewed on a digital map using software. Monitoring and managing mobile assets are a core need of companies dealing with transportation services, and a feature which private vehicle owners would relish. Extending the application of such a system to anti-theft and cashless hassle free payment usage was the primary objective of the our system design. The design aimed at implementing a vehicle tracking system which can help a user to track the vehicle and provide anti-theft services. It uses a smart phone to communicate with the system, which uses GPS technologies to provide the desired services. The work also aimed to develop an interactive Graphical User Interface (GUI) for the smart phone application.

Section II gives a brief summary about the work been carried out in designing vehicle tracking systems. Section III describes the block diagram and flowchart of the system designed. Section IV describes the hardware modules used in system development. Section V presents the results of vehicle tracking system. Section VI explains the various applications of this prototype and highlights its scope in different spheres.

II. Literature Survey

Wei Yuan in paper ,“Automatic Tracking System of Vehicles Based on GPS and GSM,” Shanxi Electronic Technology , have discussed the design of a system which gives location co-ordinates of the vehicle at regular intervals of time and this information is stored in a database, using a smart phone app. The coordinates are then used in the Google maps API to get exact location of vehicle [1].

In the paper “Real Time Vehicle Monitoring and Tracking System based on Embedded Linux Board and Android Application” Prashant A. Shinde , Prof. Mr.Y.B. Mane, Pandurang H. Tarange , proposed a Real Time Vehicle Monitoring and Tracking System which acquires the vehicle’s location, Storing and updating the real time database of the vehicle like its Speed, Time, Location, and Date which is useful in case of vehicle theft detection. This transmitted information is then displayed on a smart phone application, along with the location on a map.[2]

Ashraf Tahat, Ahmad Said, Fouad Jaouni, Waleed Qadamani in their paper titled “Android-Based Universal Vehicle Diagnostic and Tracking System” describes a low-cost means of monitoring a vehicle’s performance and tracking by communicating the obtained data to a mobile device via Bluetooth. Then the results can be viewed by the user to monitor fuel consumption and other vital vehicle electromechanical parameters. Data can also be sent to the vehicle’s maintenance department which may be used to detect and

predict faults in the vehicle. This is done by collecting live readings from the engine control unit (ECU) utilizing the vehicle's built in on-board diagnostics system (OBD) [3].

III. System Block Diagram

The system architecture consists of arduino kit with Bluetooth, web server and on client side android application. Arduino kit consists of various sensors integrated in it. And web server stores the information of client and vehicle details on database.

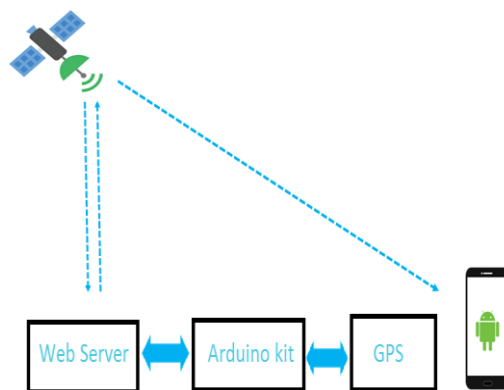


Fig.1. System Architecture

In Fig.1. it consists of various blocks such web server ,which fetches the user information through android application and stores the fetched information in the database. Second block is Arduino kit , this is the hardware unit. Third block is GPS, which is used to track vehicle current location. The proposed system working can be explained with the help of the following cases:

Scenario I:

In this scenario, if user wants to check the current location of the vehicle .He can use the android application for tracking the location of vehicle. The location can be viewed on the google map.

Scenario II:

In Scenario, if vehicle is moved from the parked location then vibration sensor alerts the user .And user comes to know that someone is accessing the vehicle.

Scenario III:

In this Scenario, vehicle performance is measured on the basis of various readings obtained through the Hardware Unit.

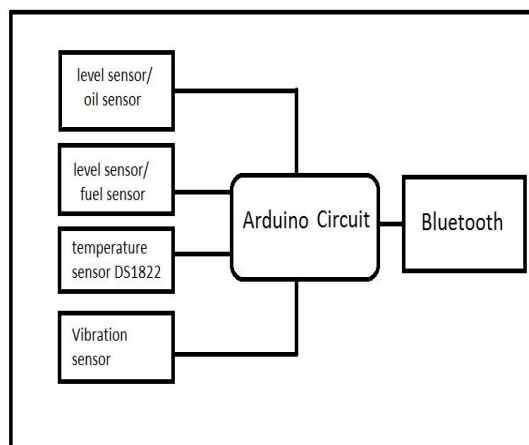


Fig.2..Block diagram of Arduino Kit

In Fig.2. this is the main hardware unit which consists of various module and sensors such as level sensor, temperature sensor, vibration sensor.

How the purposed system is different?

- You can keep track of your vehicle from anywhere, anytime.
- You can know when your vehicle needs servicing and diagnosis.
- Anti-theft alarm type system can be used.
- You can manage your vehicle by your own(like fuel entries,service charge payment etc)
- All these operations you can perform through your ANDROID Smartphone interface.

IV. System Development

Several hardware components were used for accomplishing the task of building an efficient and a foolproof in-vehicle tracking device.

The following modules were used for the system development.

- 1) *Arduino UNO R3 –Microcontroller Development board*
- 2) *Temperature sensor*
- 3) *Vibration Sensor*
- 4) *GPS*

A. Arduino UNO R3

The development board consists of Atmega328P microcontroller, which is an 8-bit RISC based AVR made by Atmel and it is optimized for low power applications.It has a 32KB flash memory to store Arduino programs and has a default baud rate of 9600bps that can be varied up to 115200 bps. Arduino Integrated Development Environment (IDE) is a cross platform and is used to write programs and upload them onto the Arduino board. This IDE comes with standard libraries with predefined functions that help in easy programming.

B. Temperature Sensor

Temperature sensor is used to measure the temperature of the engine.It alerts the user when temperature is rised and cross normal temperature.

C. Vibration Sensor

Vibration Sensor assures the safety of the vehicle .It alerts the user when someone is trying to move users vehicle from parked location.

D. GPS

Due to high cost factor of this sensor , we have implemented this prototype using android mobile's built in GPS.

V. Result and Discussions

Expected result should show the location of vehicle , detect unauthorized access to vehicle ,should able to show the performance of vehicle.

VI. Applications

The vehicle tracking system is becoming very popular invarious fields. It has innumerous applications and benefits such as:

- Tracking parking location of vehicle
- Anti-Theft Systems and Stolen Vehicle Recovery
- Travelling agencies
- Transportation systems.

CONCLUSION

The current work helps in managing and monitoring the vehicles. It is an attempt to expand its use to individual vehicle owners. The aim of this work was to enable the user to have safety measures for theft control and the user can manage their vehicle, user know what cost is exactly needed to repair a certain part of vehicle. Owner of the vehicle knows exact location of driver where he last time added fuel in the vehicle. We have also conclude the exact time for maintenance of vehicle.

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