

Intelligent Vehicle Driver Monitoring And vehicle Diagnostic System Using Android And Cloud

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Abstract - The usage of vehicles all over the world has increased during the last decade. This rapid increase of vehicles has led to many issues for a range of people and organizations where most of these issues are common in some parties. These parties can be insurance companies, school transport system, drivers. So we are trying to implement such a system that will make a comfort zone related to driving. We are representing a cloud-based vehicular data diagnostics and driver behavior monitoring. Our system consists of an On Board Diagnostics (OBD) port through a dongle and an Android app running on a smart phone and a cloud which tracks an anomalous event on a smart phone to notify unsafe events. A smart phone can alert about seat belt, driver drowsiness, and check whether the driver is drunk or not. Information collected by sensors is saved on a cloud server and which is easy to access from anywhere. Any error in the system is identified and notified to the Android app using Bluetooth connectivity, and this data is getting stored on a cloud server. Saved data can be accessed by an admin user to keep track of the vehicle's condition.

Keywords- Hardware kit, Sensors, Android app, Database, Security, Cloud, Server, GPS.

1. INTRODUCTION

From the last two decades, huge growth of vehicles has been taking place in daily routines. Approximately 30,000 new cars are being registered each year and the number keeps increasing now. Traffic management is a major issue for this growth. If we are trying to build a smart city, we must find a solution for that. The additional problem is that reckless driving results in hazardous effects on human lives. This may lead to an unfortunate death.

For a solution to this, we are representing a cloud-based vehicular data acquisition and analytic system for real-time vehicle monitoring and driver behavior monitoring.

Our system consists of a hardware kit which senses the data through sensors and sends it to an Android app which is running on a smart phone and a cloud. We track an anomalous event on a smart phone to notify unsafe events. A smart phone can alert about seat belt, driver drowsiness, fuel level, gas detection, accident detection, temperature

and check whether the driver is drunk or not. Information collected by sensors is saved on a cloud server and which is easy to access from anywhere. Any error in the system is identified and notified to the Android app using Bluetooth connectivity, and this data is getting stored on a cloud server. Saved data can be accessed by an admin user to keep track of the vehicle's condition.

2. LITERATURE SURVEY

1. The paper works for cloud-based vehicular data. From the last two decades, huge growth of vehicles has been taking place in daily routines. Approximately 30,000 new cars are being registered each year and the number keeps increasing now. Traffic management is a major issue for this growth. If we are trying to build a smart city, we must find a solution for that. The additional problem is that reckless driving results in hazardous effects on human lives. This may lead to an unfortunate death.

Their system consists of an OBD that stands for On Board Diagnostics, port to Bluetooth, a mobile app running on a smart phone, and a cloud backend. They are using a Complex Event Processor (CEP) at both the smart phone and backend to detect and alert unsafe conditions. For example, CEP engine at the smart phone can notify if coolant temperature gets high. CEP also provides a trip log and then filters out what messages to be sent to the backend system, by saving the bandwidth and power. [1]

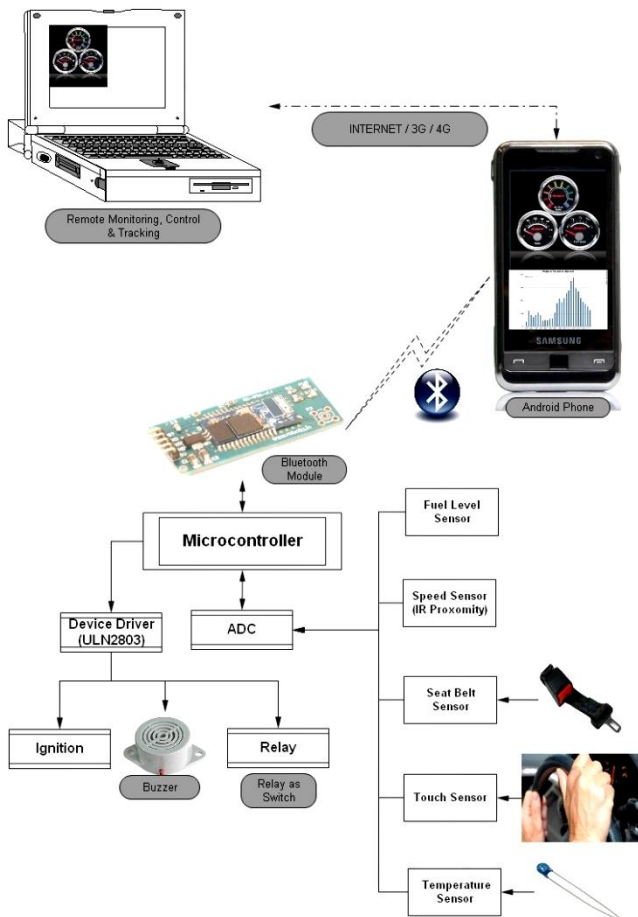
2. This paper provides a solution for the speed limit alerts, the crashes, and detection of vehicles. For giving alerts about fast driving in areas like zone-wise, hills area, highways, signboards are placed. But there is a chance that a driver may get disturbed and an accident occur. So they are alerting the driver's speed limit at zones and to detect crashes automatically is done by using MEMS, RF, GPS, GSM technology. [2]

3) Driving while drowsy is a major cause behind road accidents. Hence the use of such systems that monitor a driver's measure of vigilance and notify the driver in case of drowsiness that can be significant in the prevention of accidents. This paper gives a new approach towards

detection of driver's drowsiness by yawning measurement . This involves several steps including detection and tracking of driver's face, recognize and tracking of the mouth contour area. It can detect the yawning state as a sign of driver's drowsiness.[3]

3. System Overview

3.1 System Architecture



In our system we are going to use a hardware chip, android app, cloud server and administrators application.

1. Hardware chip:

It has all sensors (temperature, IR, alcohol, gas, seat belt, touch, level, machine switch), Bluetooth controller, micro controller, ADC, sensor controller, device driver. All sensors collect the information from environment and send it to the android app by using Bluetooth control. Micro controller process the collected data by using ADC.

2. Android application

We are developing an android application which is going to use by driver. All sensed information from the hardware kit is getting collected by app. By using the internet

connectivity(3G/4G/wifi) this data is going to share with server. In case any miss-happen that will get notify by android app.

3. Cloud server:

We are using cloud for data storing purpose. It is accessible from anywhere and data is also reliable. All data on server can be access by admin from anywhere anytime.

4. Administrator application

This application helps admin to view the data at real time sense by hardware chip. If any suspicious event occur that will also get notify to admin. We are providing transparency between vehicle and admin.

3.2 HARDWARE

Sensors:-

Sensor is devices which detects the present condition of vehicle. These are placed on the hardware kit. The Bluetooth is used to send this data to the android app of the driver.

List of Sensors:-

- Temperature - Thermistor with 10K internal Resistor
- IR (Drowsiness) - IR Sensor (RX + TX)
- Alcohol - MQ3
- Accident - Push Button
- SB - Push to on Push to OFF Switch
- Touch - Using TTP223 IC
- Level - Potentiometer
- Gas - MQ6

1)Gas Sensor:- Thermistor

The resistance of thermistor is varies significantly with temperature, more than standard registers. The word thermistor is portmanteau of thermal and resistor. Thermistors are mostly used as inrush current limitation, temperature sensors, and self-regulating heating elements.

2)IR Sensor:

IR sensor is the most fundamental type of sensor available in the market. The basic technique of this is simple. There is an emitter which emits infrared (IR) rays which are detected by a detector of IR. This mechanism is used to make proximity sensor (to check if something disturbs the path or not, etc), contrast sensors (used to find contrast difference between black and white, like in line follower robots), etc.

3) Gas Sensor:- MQ 3

MQ3 is used for High sensitivity to alcohol and small sensitivity to Benzine .It gives fast response and high sensitivity. Stable and long life .It consist of Simple drive circuit MQ 3 are suitable for alcohol checker, Breathalyzer.

4) Pushdown Button:-

are mechanical switches used to activate the switch. The activation method is in the form of plunger that is pushed to open or close the switch. There are several switching mechanism. Poles and throws are used for configuration of push buttons.

The number of switch contact sets used is known as poles and the number of conducting positions as single or double ,is referred to as throw. The mechanisms are as first is Single pole single throw ,second is Single pole double throw ,third is Double pole single throw, and double pole double throw

3.3 SOFTWARE

I) Embedded C

Embedded C is a set of extensions for the C Programming language. Embedded C programming requires nonstandard extensions to the C language tends to support features such as fixed-point arithmetic, multiple distinct memory banks , basic I/O operations. It is small and simpler to learn, understand,, for programming and debug.

Compared to assembly language, C code written is reliable and scalable, portable between different platforms. C compilers are available almost for all embedded devices in use today for users. C has advantage of independence with processes and is not specific to any particular microprocessor or any other system.

Following section comprises of the technologies and concepts being used for the project development.

II) Language:

These three tools are combined to make the Dashboard and for analysis.

A . HTML (Hypertext Markup Language)- It's the crux of the webpage on which it's structure is built.

B. CSS - It is a style sheet language written in a markup language and helps in enhancing the design of the web page.

C. JavaScript - It is a high level, dynamic, interpreted programming language and helps in processing and analytics.

D. J2SE :- Its stands for Java 2 Standard Edition. Java would be the required as language for development of the system. JDK is development kit used to compile java programs.

E. embedded c – It is a extension to C language used to write program for embedded systems.

III) API'S:

a. Robot API - Keyboard / Mouse Emulation. There may be a need for keyboard / mouse emulation required in the project, so we can use Robot API. This Robot API is used to create real time keyboard and mouse events as if given to OS directly from actual keyboard or mouse.

b. Alchemy API - Helps in data pre processing. It performs tokenization, stemming and extracts the nouns from the sentence.

c. Stanford NLP - The nouns extracted from Alchemy API are passed to the Stanford NLP which is an open source NLP library that helps in named entity ex-traction

4. Future scope

A. Our system can be enlarged by providing platform independent android applications.

B. If somebody steals our vehicle then we can easily find our vehicle around the globe by keeping vehicle positioning using GPS.

5. Conclusion

A. Vehicle diagnosis and monitoring system is used for improving overall productivity which offer better return on your investments.

B. For handling larger jobs loads within time root planning is important both for personal as well as business purpose.

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