A Novel IoT based Approach to Report, Monitor and Secure Vehicles

Rohit Arvind Deshmukh, Mrs. Nilima Warade

Abstract*: In India transportation is a booming field where the count of vehicles is increasing day by day. Vehicle and its parameters tracking is essential nowadays. Internet of Things (IoT) has attracted much attention in the internetworking of physical devices, vehicles and other device embedded with the electronics, software, sensors, network connectivity, GPS and GSM that enable to get the data of those objects. In this paper, we proposed a Novel IoT based approach that the person will be able to do Vehicle Monitoring of various parameters such as Fuel, live location, Temperature, Ignition state, over speeding, etc. without any physical touch through Web server/ Application. The user can view the past reports anytime. The technology used in this is open source controller and GPS/GSM/GPRS systems.

***Keywords*: Internet of Things (IoT), GPS, GSM, Vehicle Monitoring**

I. INTRODUCTION

In 1957, Easton invented the Mini-track Tracking system to determine the vanguard satellite's orbit. Vehicle tracking system is the combination of Automatic vehicle location in individual vehicles and software which collects the ample picture for vehicle location. GPS and GLONASS technology are modern vehicle tracking systems also other automatic vehicle location technology can be used for tracking. Currently GPS is one of the technology that is being used in a huge number of applications today. The fields of application for IoT technologies are lot in numbers. IoT solutions are progressively spreading to virtually all areas day by day. IoT has made an impact in the application such as vehicle tracking system and all its parameters monitoring. Most common applications is tracking of your vehicle and keeps regular monitoring on them. Tracking system helps us to inform you the location and route travelled by our vehicle, and the information can be detected from any other remote location. Web application is also included which provides you exact location of target vehicle. This system allows us to track target vehicle in any meteorological conditions. GPS and GSM technologies are being used in this method. A vehicle parameters monitoring in any situation is the answer to the number of queries user has in his mind. Assume if the user forgets the location of parking of his vehicle in a mall or any other place else say the vehicle is lost or whether to check the driver has kept the vehicle ignition on/off.

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This paper discuss about the simplest solutions that IoT offers to the questions. GPS module is use by vehicle tracking system to get geographic co-ordinates at fixed time intervals. The GSM/GPRS module is used to communicate and brings up-to-date vehicle location to a database.

Currently almost all the public are having their own vehicle, some owners make available their private vehicles to the public use by taking drivers on monthly basis but the drivers drives the vehicle harshly irresponsibly and steal the petrol. We can track such vehicles at every step and gives the report to the owner. On the basis of these reports owner can take business decisions. These days safety for public vehicles is a most important concern. Vehicle tracking system is installed in the vehicle, to track and report the place and locking engine motor. The location of the vehicle is identified using Global Positioning system (GPS). These systems continuously monitor a moving Vehicle and report the status of vehicle. There is lot of enhancement in the GPS technology so nowadays, companies are coming up with phones and other modern gadgets which compatible with it. Integration of several security systems is done on some vehicle tracking systems, for example by sending an automatic alert to a phone or email if an alarm is triggered or the vehicle is moved without authorization, or when it leaves or enters a geo-fence (a hypothetical circular area).1)In this system we have propose to detect several things associated to vehicle Alerts should be sent after any problem happens with vehicle such as:, Engine ON/OFF, Over Speeding, Location Changed alert, Stolen Vehicle details to Police station, Kilometer traveled, Battery Notifications, Longitude and Latitude etc.2) Vehicle tracking systems are also popular in vehicles for a theft prevention, monitoring and retrieval device. Police can easily find the vehicle by simply following stolen vehicle can be easily find out by Police by simply following the signal emitted by the tracking system and locate the vehicle. The Panic button is included for the traveler if any of the security problem arises.

II. LITERATURE REVIEW

According to the Survey done, there is lot of enhancement in Vehicle tracking and monitoring systems at different levels. Hence in this situation the monitoring of live vehicle parameters, Past Reports and Security to the vehicle is provided using an IoT. In every paper all the parameters are not monitored, past reports are also not available as they have proposed different ideas in their view.

In 2017, N. Upendra Yadav and Prof. Kamalakannan proposed a system that informs location of vehicle, accident if any happens it gets inform to family members. Accelerometer is used to detect the reason of accidents. GSM &GPS module are used for communication and Arduino Uno microcontroller is used [1].

In 2017, Thishone P. and Samson Isaac. J proposed a system for development of portable road vehicle and its speed measurement. Here for detecting ultrasonic sensor is used as transmitter and receiver. The controller used is ATmega128 microcontroller. ZigBee module is used to transfer the information to control section. Thus, if any wrong thing done by someone while driving can be informed [2].

In 2018, Dr. L. Jubair Ahamed proposed a system for vehicle parameters monitoring which uses CC3200 single chip wireless MCU. The GPS and GSM same here is used for communication [3].

In 2016, Shulong Wang, Yibin Hou, Fang Goo and Xinrong Ji proposed a system which uses FPGA and SoC technology. Here IEEE 1451.2 standard is adopted for monitoring vehicle parameters [4].

In 2017, Safa Abdelmenem Yosif, Murtada, Mohamed proposed a system for Bus tracking and fuel monitoring. In this ATmega2560 microcontroller, Arduino, GPS, GSM, fuel sensor and speed sensor is fixed in the bus. The sensor measure the data and send to the controller. Then the collected data using GSM is send to the server [5].

In 2017, A.Anusha and Syed Musthak Ahmed proposed a system that monitor driver conditions, temperature, abnormalities in driver. LPC2148 microcontroller, temperature, alcohol detection, eye blink sensors are used for the safety of driving using IoT [6]. In 2017, Swapnali Kumbhar and Sunita Shinde proposed a same system by using GPS and GSM. Additionally in this the LCD display is attached in vehicle to make the driver alert for the future actions. Example Keep the safe distance, Temperature, etc. [8].

In 2017, Neha Mangla, Siranda G, Aishwarya Kashyap and Vinutha proposed a system same GPS and GSM system using Arduino controller. In this user can see the data in Android application [9]

In 2013, M.A. Al Rashed, Ousmane Ouman and Damanjit Singh proposed a system for a GPS based tracking and its speed. In this it provides real time text alert for speed and location through text messaging [10].

III. METHODOLOGY

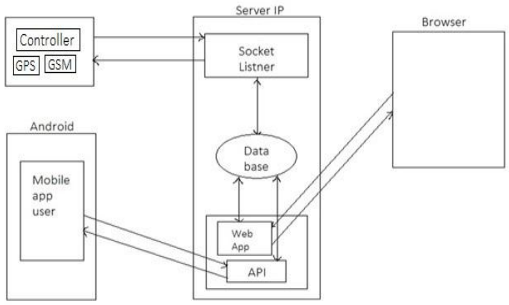

Fig. 1 Block Diagram of Implementation process

A. Implementation of Software System

In the Software system, initially the data gathered in the hardware system is send to the Server. In server system there is a Socket listener which stores the raw data in log files which will get the input data from the data collected in the hardware. The multiple log files are send to Parser. Parser converts the information from HEX to ASCII format and dumps the data into database. Database is used to store all data and interpret the data on the user dependent actions as on the Mobile application or Web browser. Here Google Map is used for displaying the exact vehicle location.

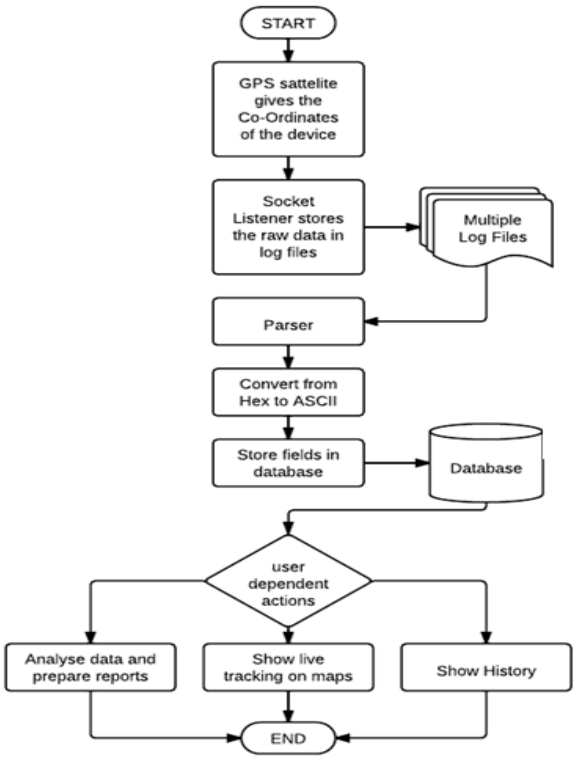

Fig.2 Flowchart of Software System

B. Implementation of Hardware System

A Hardware system is made up of microcontroller, GPS and GSM module. The parameters which are to be monitored are calibrated with the system. The vehicle location co-ordinates are being send using the GPS module which are provided to the controller. Transfer of data to the server is done with the help of GSM/GPRS technology. Neoway N10 module is used for GSM/GPRS. As it has 10 bit ADC analog test input and its voltages ranges from 0V to 2.8V. The Jupiter Telit SL869-V2S module is used for GPS. It has default 1Hz up to 10Hz navigation and supply voltage lies between 3V to 3.6V. The vehicle parameters monitor such as live vehicle location, Fuel level, Geo fencing, Ignition on/off, Speed, Over-speeding, Engine Work Time, Bold Stop, etc. The data of this parameters is send and stored in the database on theweb server

IV. RESULT

In this framework the hardware is attached to the vehicles and the results are performed considering all the parameters which are to be monitored.

Initially after browsing the address in the web browser the login page will get displayed as shown in figure 3 and the dashboard page is shown in figure 4

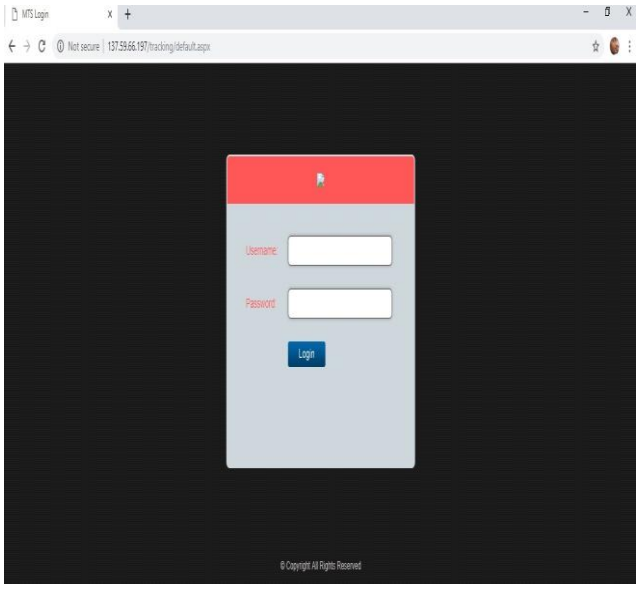

Fig.3 Login page

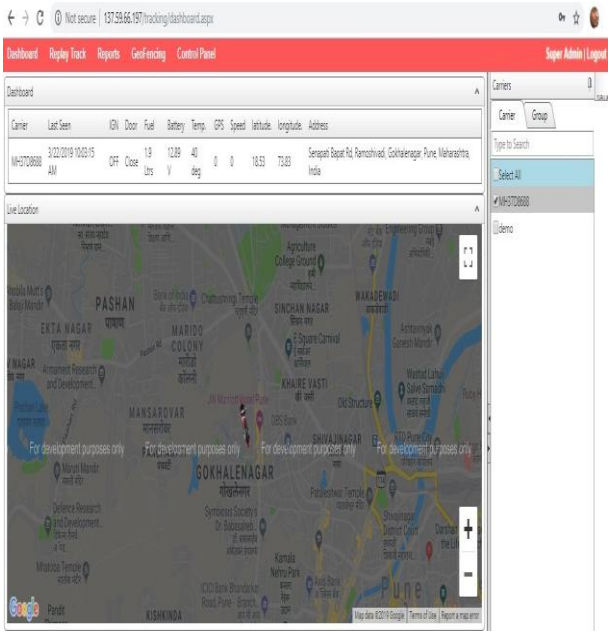

Fig.4 Dashboard Page

In the Replay tracking the history can be viewed by the user anytime from anywhere it will show the live results with respect to Fuel level, Speed, Distance travelled and live location as shown in Figure 5

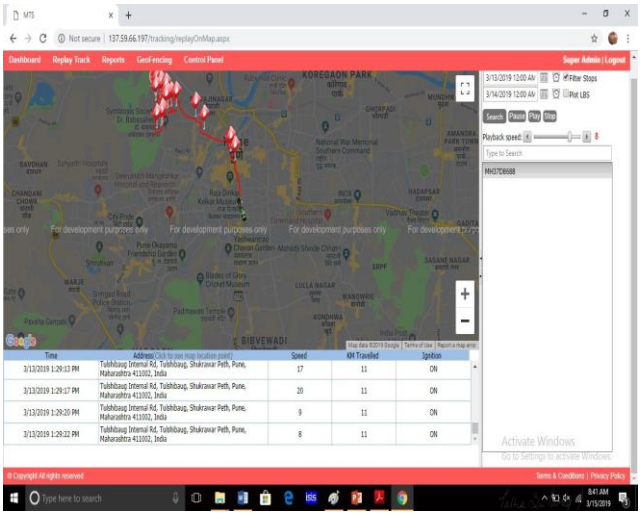

Fig.5 Parameters Monitoring

To secure the vehicles from anti-theft the reports of all the parameters can be evaluated such as Distance travelled in kilometers, Over-speeding, Bold Stop, Idle Time, etc. as shown in figure 6

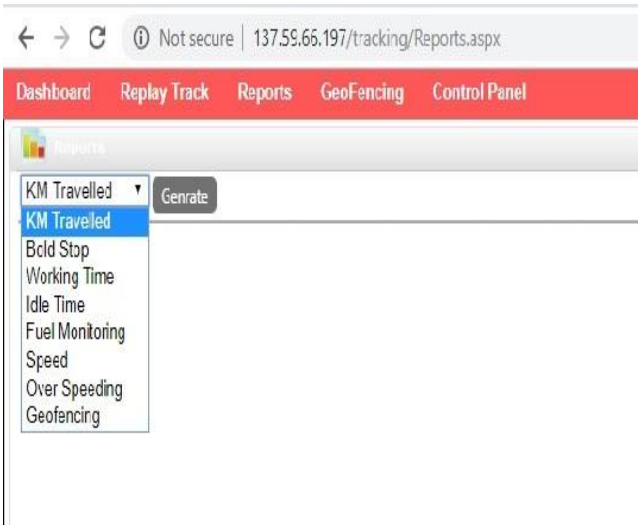

Fig.6 Report Generator Page

V. CONCLUSION

In this we have designed and developed a novel IoT based approach which will be helpful in the commercial vehicles so the owner can get all the live records as well as the past records how the driver drives, Fuel history and theft monitoring. It will be also helpful to the parents because after giving vehicle to their children they can track all their activities. Making the full use of technologies, the system has provided us with powerful processing speed, admirable compatibility and making the hardware to compact size design with cost effective measures. The future scope in this will be making fully loaded Smart vehicle and adding the more parameters such as accident reporting and alarm for vehicle maintenance.

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