Advanced Vehicle Tracking system using GSM/GPRS and GPS

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Abstract—Vehicle Tracker is a Universal Anti-Larceny System for all kinds of motorcycles. The gadget is inserted inside a vehicle whose position is to be resolved and followed continuously. The composed device works utilizing Global Positioning System (GPS) and Global system for mobile communication/General Packet Radio Service (GSM/GPRS) technology that is the most widely recognized courses for vehicle tracking system. GPS and high sensitivity antenna are used for effective and precise location tracking of motorcycle through mobile application. Accelerometer sensor will alert the user of a possible larceny by detecting the slightest transition of the motorcycle. Immobilizer relay to remotely enable/incapacitate motorcycle ignition. Ignition switch status monitoring is utilized to detect key insertion. Fuel level sensor used to detect fuel larceny and to determine the information about fuel level in automobile tank.

Keywords—Accelerometer Sensor, Anti-Larceny, GPS, GSM/GPRS, Mobile Application, Immobilizer relay.

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I. INTRODUCTION

The security of personal and public conveyances is a chief issue and so having GPS automobile tracking machine to your conveyance to ascertain its protection when you are touring. This conveyance monitoring system may be applied within the personal conveyances or may be observed in customer's conveyances as a larceny aversion and retrieval device. Police officers can comply with the sign transmitted with the aid of the tracking device to find a vehicle that's glommed. This machine can be set up for the four wheelers but in India in which majority of the human beings making use of wheelers bikes, the maximum frugal supply of an anti-larceny is the automobile tracking gadget. Fleet operators usually use conveyance monitoring systems for fleet management features which includes routing, dispatch, on-board facts and protection.

Vehicle robbery is the principle situation for the behavior of this task, is one in every of the largest crimes that's hard to remove. The ultra-modern trend of automobile robbery entails the vehicle being taken away, and also alarm signal capturing where the alarm disabler signal can be traced by thief using a tool to seize the signal and use it to disable the alarm. There are numerous options to prevent the auto theft, common vehicle alarm machine which nearly all vehicles have the system established, and additionally GPS [1] in which the positions of the vehicles are traced.

Vehicle tracking systems can avail to lessen walking charges via concretely targeting people who pace and waste gas. This device moreover applied in tracking the distribution time and for more secure conveyance renting. Vehicle tracking is a strongly intellective conveyance device and an automated machine.

A tracking gadget for motorcycle makes use of GPS for tracking, a good way to determine unique location of the vehicle. Tracker uses monitoring server for storing area statistics. This tracker presents utilizer interface like web and android utility [2]. This has moreover fuel stage monitoring by providing fuel level sensor. EEPROM [3] stores precedent GPS data locations in memory and updates to server. A secondary contact is provided in the android application if the user phone is unavailable to receive the message.

II. EXISTING SYSTEM

Jignesh B Jadav, Dr.K.H.Wandra, Mr.Rohit Dabhi as in [4] proposed system has the control and communication between

the user and device are achieved through a short message services (SMS) protocol available in the mobile phone.

SeokJu Lee, Girma Tewolde, Jaerock Kwon as in [5] proposed system can get only the location of the conveyance, this project provides ignition switch and immobilizer relay which can immediately seize the engine ignition just by sending a message from android application. In addition, it also provides fuel security.

III. BLOCK DIAGRAM

The proposed methodology adopted in the present project work is depicted in the Fig. 1 shown below with various blocks as follows.
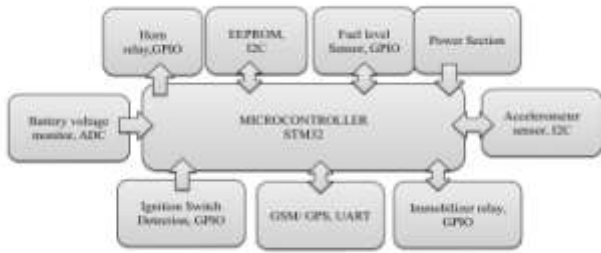
448

Fig. 1 Block diagram of the Vehicle Tracking System using GSM & GPS.

IV. METHODOLOGY

The microcontroller STM32 [6] is interfaced with the GSM [7] and GPS through the Universal asynchronous receiver/transmitter (UARTs) [8]. The fuel level sensor used to attain dependable statistics about contemporary fuel quantity in automobile tank and to outline the vehicle fueling volume.

It will determine fuel theft from the tank and also performs the far flung tank monitoring. Accelerometer sensor MMA8653FC [9] is interfaced to the controller through Inter-Integrated Circuit I^2C[10] for real time orientation detection of the vehicle. Ignition switch detection will detect key insertion by an unauthorized person who accesses the conveyance and the conveyance ignition will be automatically ceased by utilizing immobilizer relay. EEPROM will be provided which is connected to the controller through I^2C to store the locations of vehicle. AT commands are used to control the GSM and GPS module.

V. IMPLEMENTATION DETAILS

The GPS location of the conveyance is perpetually tracked by the satellite and data is sent from GSM to server. Fig. 2 shows the consummate picture of vehicle tracking system. Authorized user can get location of data in the mobile application from the server. Accelerometer sensor is utilized to detect the displacement of the conveyance, and if any intrusion in x, y, or z axis and immediately alerting message will be sent from microcontroller to user's mobile.

Fig. 2 Vehicle Tracking System using GSM & GPS.

Fuel level sensor is provided in the system to detect if fuel theft transpires. Conclusively, the result is obtained and will be presented in the final stage, which concludes the efficacy of proposed methodology developed.

The device operates in two modes: Active and Passive modes.

In both modes location will be updated to the server. All commands can be processed in the active mode. None of the commands are worked in passive mode.

In the android application, five options are provided to the user: Arm Device, Disarm Device, Blow Horn, and Immobilize

and locate. The web application is also provided with the same options. So at whatever point these choices are squeezed, the comparing work is finished by the controller.

A. Inward Communication

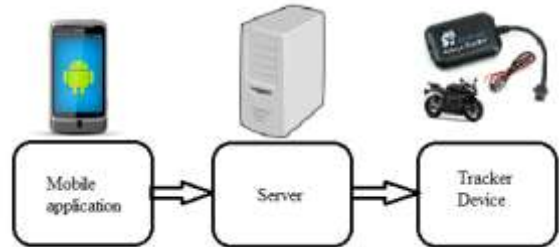Communication from mobile to device is as shown in the below diagram Fig. 3

Fig. 3 Communication from mobile to device.

Mobile sends a command to the device which is fine-tuned in the conveyance. This signal is first sent to the Server and in turn server transfers the signal to the device. For example, if your conveyance is hoisted by an unauthorized person, device should honk once and should send signal to server. Server sends alarm to device every couple of minutes. Server additionally sends alert message to sanctioned mobile every couple of minutes. If "Immobilize" command is sent to device from the android application by the user from his mobile, it will be first received by the server. Server sends "Immobilize" command to the device. Device will turn off the engine.

B. Outward Communication

Communication from device to mobile is as shown in the below diagram Fig. 4
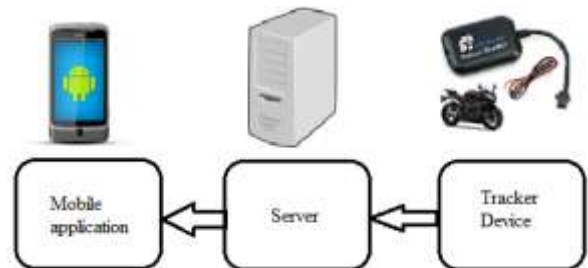

Fig. 4 : Communication from Device to mobile.

The device fixed in the vehicle sends its replication to the server and server sends this signal to the user's mobile phone.

The device should update its location to the server and server updates it to the mobile for every short period of time.

C. STM32 microcontroller

The STM32 predicated on 32-bit ARM processor core is utilized as to control the tracking system. All the external peripheral devices are connected and are controlled by the microcontroller. Device is programmed using Keil development tool and embedded c programming language. Finally the programmed code is compiled and stored in the controller's memory.

D. AT commands

AT commands [11] are used to control and communicate with the GSM and GPS modules.

449

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E. Flowchart

As shown in the Fig. 5.1 and Fig. 5.2 depict Implementation for vehicle in Parked Condition. There are two modes in the process: Arm mode and Disarm mode. If the "Arm" command is received from the android application to the device through the server. Every short period of time, the device should send the GPS location. All the commands are kept active in this mode. If "Immobilize" command is received from the mobile then ignition of the engine is made off and every short period of time horn is blown in the device. If the "Disarm" command is received from the android application to the device through the server. For every short period of time, the device should send the GPS location and no other commands will work.
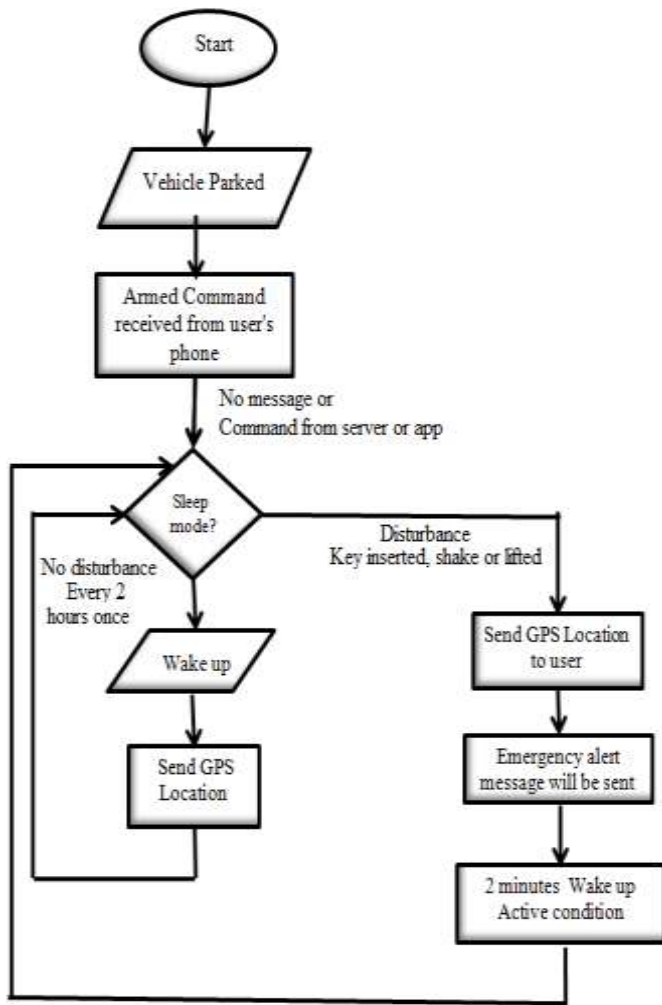

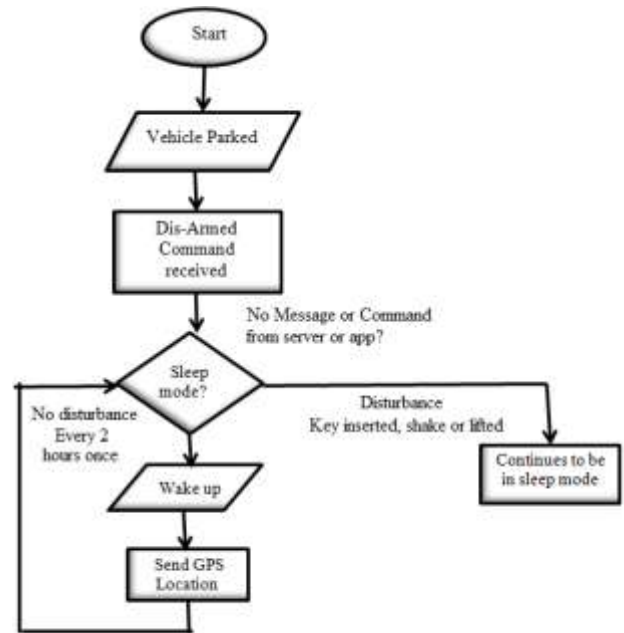Fig. 5.1 Flowchart of Implementation for vehicle in Parked Condition(Arm Mode)

Fig. 5.2 Flowchart of Implementation for vehicle in Parked Condition(Disarm mode)

The Fig. 6 describes the Implementation for vehicle in Parked Condition for immobilize mode. When immobilize mode is selected, the engine ignition will be switched off. The buzzer keeps on honking. The emergency alert message will be immediately sent to authorized person. The Fig. 6 describes the Implementation for vehicle in Running Condition. If Arm command is selected, the device keeps on sending its location. If Disarm mode is selected no GPS data will be tracked.
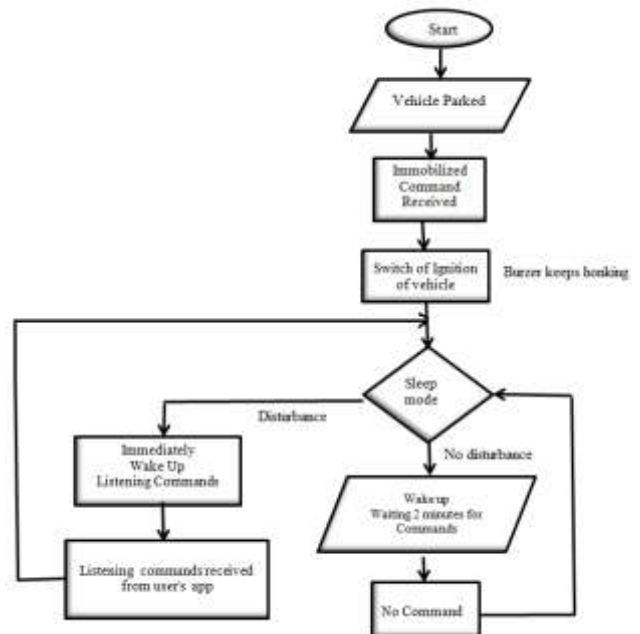

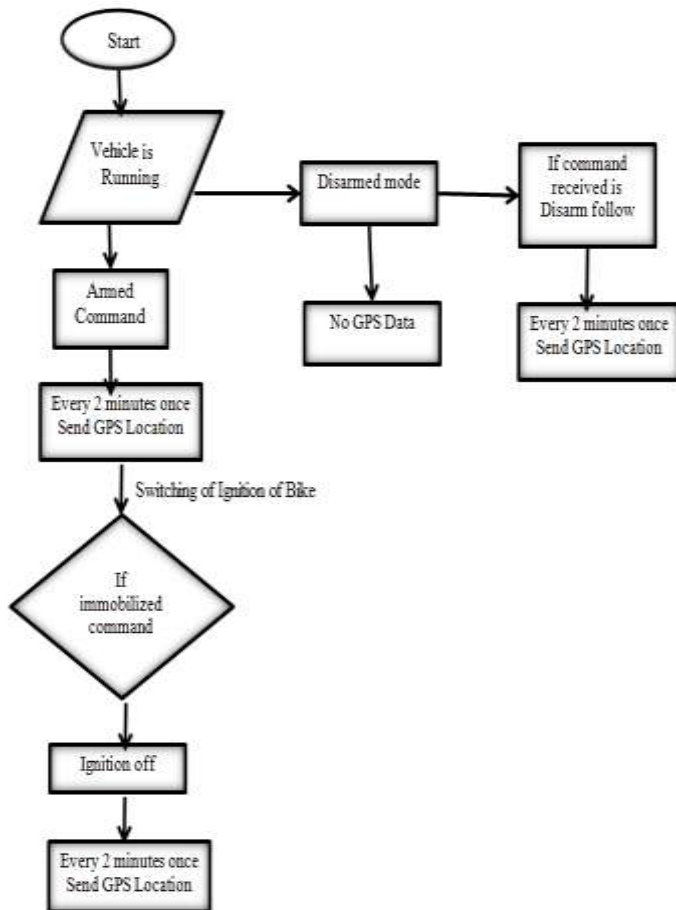Fig.6 Flowchart of Implementation for vehicle in Parked Condition Immobilzed mode)

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Fig. 7 Flowchart of Implementation for vehicle in Running Condition

VI. RESULT

The server receives the messages from tracking device and sends to user's android application as a vigilant message. Location of the conveyance is facilely tracked for the given stipulated time. User can lock the ignition switch by sending a message to device. The message which is sent by device to user's phone is shown in Fig. 8. Vehicle's fuel level can withal be received as message from device.

The device location can be tracked often as mentioned in Fig. 8 which can be seen using the android application.

VII. CONCLUSION

In this paper we have proposed bestseller method of conveyance tracking systems utilizing GPS and GSM used to track the larceny conveyance by utilizing GPS and GSM/GPRS technology.
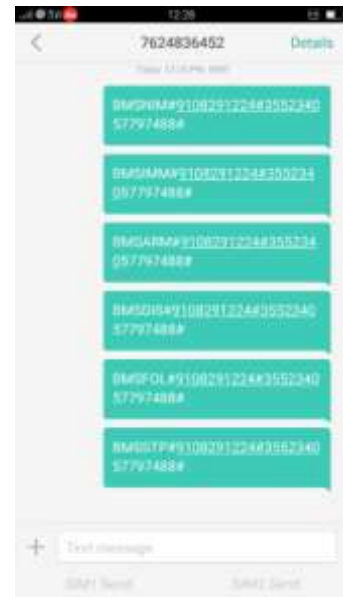

Fig. 8 Messages from Mobile to device.

The message can be received through SMS or Internet DATA packs recharged in GSM SIM card installed in the device. Fuel monitoring is updated and if larceny transpires immediate message is sent to the android application installed in the authorized person's mobile phone.

This system can be put into the sleeping mode conveyance handled by the owner or sanctioned persons. Otherwise goes to active mode.

The mode of operations can be transmuted by persons remotely. When the larceny identified, the responsible person will send SMS to the device, then issue the control signals to seize the engine motor. After that the conveyance engine is locked. In this method, facilely track the vehicle's place. The location information is updated to the server frequently

Fig. 9 Device location in the android application.

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REFERENCES

[1] Mashood Mukhtar, "GPS based Advanced Vehicle Tracking and Vehicle Control System", I.J. Intelligent Systems and Applications, 2015, 03, 1-12 Published Online February 2015 in MECS (http://www.mecs-press.org/)

[2] Rohitaksha K , Madhu C G , Nalini B G ,Nirupama C V, "Android Application for Vehicle Theft Prevention and Tracking System", International Journal of Computer Science and Information Technologies, Vol. 5 (3) , 2014, 3754-3758

[3] www.digikey.com/en/ptm/m/microchip-technology/ic-serial-eeprom

[4] Jignesh B Jadav, Dr.K.H.Wandra, Mr.Rohit Dabhi, "Innovative Automobile Security System Using Various Security Modules" ,International Journal on Recent and Innovation Trends in Computing and Communication ISSN: 2321-8169 Volume: 3 Issue: 2 583 – 586

[5] SeokJu Lee, Girma Tewolde, Jaerock Kwon"Design & "Implementation of Vehicle Tracking System using GPS/GSM/GPRS Technology and Smartphone Application"IEEE World Forum On Internet Of things(WF-IoT) March 2014-Seoul.

[6] www2.keil.com/stmicroelectronics-stm32, www.st.com/en/microcontrollers/stm32-32-bit-arm-cortex-mcus.html

[7] http://www.radio-electronics.com/info/cellulartelecomms/gsm_technical/gsm_introduction.php

[8] http://www.ti.com/lit/ug/sprugp1/sprugp1.pdf

[9] DESerrano,"Design and Analysis of MEMS Accelerometers", Journal of Microelectromechanical. Systems

[10] www.esacademy.com/en/library/technical-articles-and.../i2c.../i2c-bus-protocol.html

[11] https://www.u-blox.com/sites/default/files/u-blox-ATCommands_Manual_(UBX-13002752).pdf

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