Anti-Theft Detection System For Automobiles

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Abstract: Communication mainly is the transfer of whatever thing or exchanging of data, so that the Internet of things is nothing but the transferring or exchanging of anything with several other things. The using of internet authorized system or devices roughly calculated as that by 2020 there will be nearly about billions. The purpose of the paper is to define a safekeeping alert device spending little work force with Internet of things, which help to observe and alerts when gestures or motion is detected and notifies the owner through mail if there is a security breach along with the burglar's image. A credit card size Raspberry Pi with a advantage of Python software knobs the image processing, control algorithms used for the attentiveness then shows taken images to concern persons email by the use of Wi- Fi module. The system uses the pi camera for the capturing of images. Door lock, Steer lock and kill switch are the three levels of security provided by the system.
Keywords:—Pi camera, Wi-Fi module, Raspberry Pi,Internet of things.

I. INTRODUCTION

Vehicular theft constitutes a high percentage of reported criminal acts. The number of automobiles involved in travelling each grows drastically high and it becomes impossible to identify the stolen vehicle. If the stolen crosses the national border then the probability of capturing the vehicle is quiet low. Some vehicles are even stolen from attended garages and parking lots and thieves ingenuity has overcome the most complex and safest mechanical locking devices. There was steady increase in the number of stolen vehicle and the searches carried out as reported by INTERPOL. The best solution for this is by using IoT. The Internet of Things (IoT) is communications network which built on an "always-on" the Internet. IoT can be well thought out as a grid of corporeal things, which can be log on thru the Internet. Raspberry Pi, a credit card size low-price reasonably priced computer. Raspberry pi platform is being used widely from the past few years.

A solution to this vehicular theft is making an image recording devices that would record such image when it is needed. The pi camera will record image when intruder has entered the vehicle, in this case the pi camera starts when the PIR sensor detects the motion. The system checks for the authenticated face in the database as soon as the face is detected if the match is found it provides access to the vehicle if not it alerts the owner, which shows that intruder has entered the vehicle. The notification of this sent as an email .The email could be completed with the attachment and text including warning of burglar who is captured as such motion activity in the vehicle. Therefore, the monitoring system is implemented and connected to the server. By using Raspberry pi we can hoard captured pictures. In addition, the system uses the Arduino Board interfaced with the Pi board which houses the GPS module, Wi-Fi module and sensors. An android application is built such that the vehicle is controlled remotely. Through which the location of the vehicle is seen, notifies the user when the door lock is broken and provides a remote steer lock. It also provides us with the kill switch, which will off the engine when the intruder alert will be sent through mail with necessary information.

The organization of the paper is listed below section II describes the proposed work, section III describes the system architecture, section IV describes the related work, section V discusses the experimental results. At last the section VI concludes the paper.

II. PROPOSED WORK

The Anti-theft detection system for automobiles propose a more secure and reliable system for the users .In which the system provides a three level security for the automobile which are listed in the following .The first level being the door lock when there is the situation of the door lock being broken or opened without the user's watch then the user will be notified through the android app notification. The second security level being the steer lock so to be happened if the user sees the app notification a remote steer lock will be given in the app so to which the automobiles steering will be locked.

With both these security levels being breached by the intruder somehow and even though user has not seen the notifications then the third security level play the major role. The intruders face is detected from the pi camera which gets on as soon as the PIR sensor in the automobile senses the motion and sees for the face of the authenticated user so as to not found it sends a alert message to the user through mail with the intruder's the intruder's image being attached which will be helpful in catching the intruder. As soon as the user gets the mail notification, he can execute the kill switch, which results in the power off the engine. The system provides a cost effective way for the user to secure the vehicles in which the entire system is a single board setup installed in the automobile apart from which the user only need to have a android phone with the application installed in it.
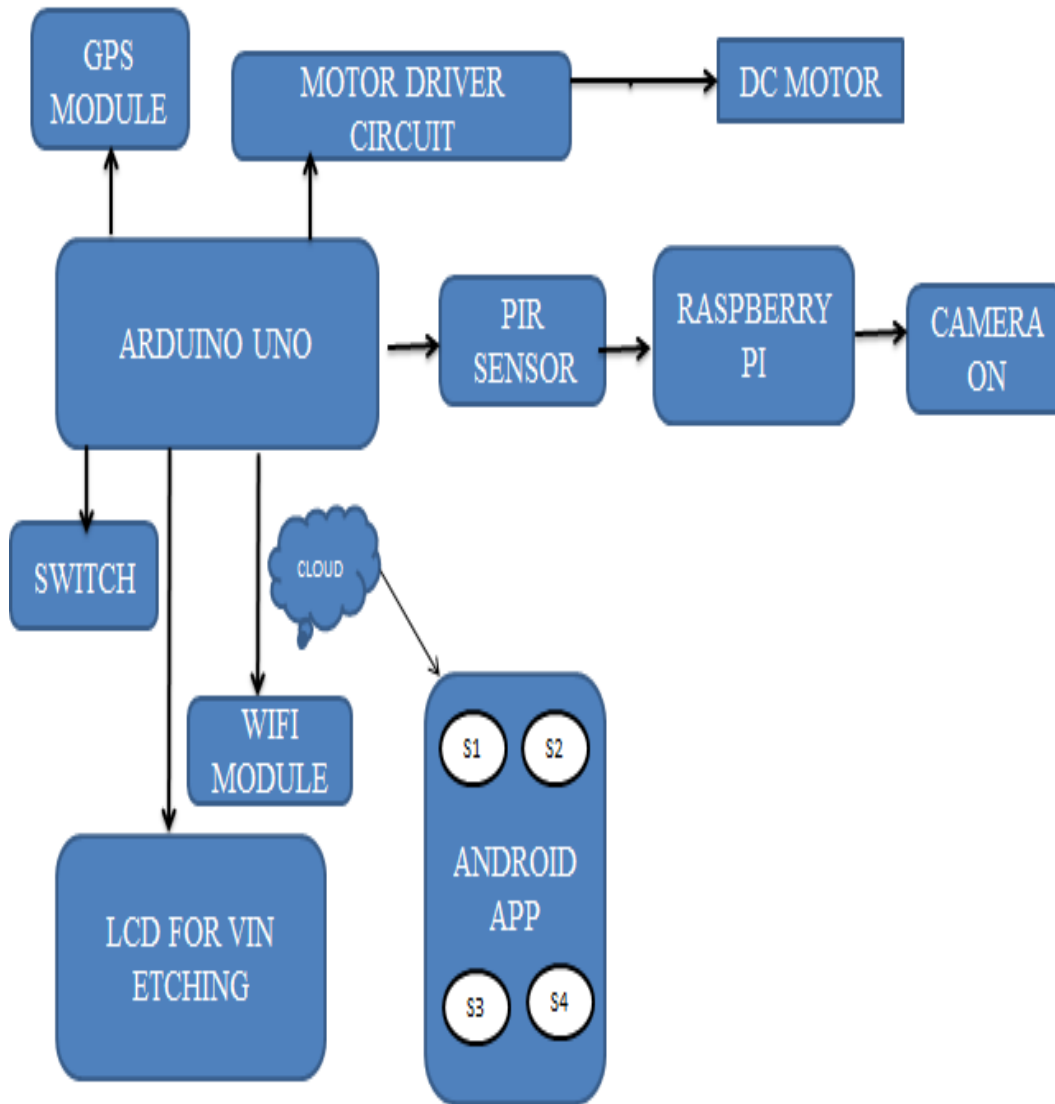
III. SYSTEM ARCHITECTURE
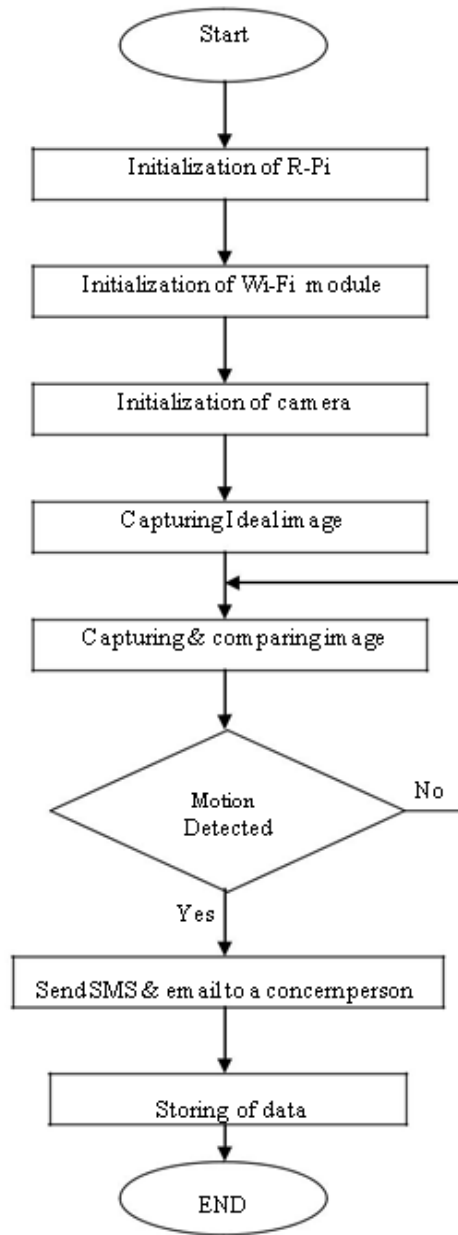

Fig 1: System Architecture

Fig 2: Motion Detection Flow Chart.

In the existing method the Raspberry Pi is connected to web camera to detect and capture the snapshots, videos of the motion when detected and the RJ45 LAN cable . Raspberry Pi executes the processing of all the data and after the data are analyzed then instant email notifications with attached snapshots to user.

Raspberry Pi: A computer which is credit card sized is the Raspberry Pi, in which any HDMI input gadget is able to plug as well as for an operation, a keyboard is required for a procedure. When that one is prepared then the HDMI as well as control panel are similarly not necessarily needed meant for that one operation as you can then operate it by other means. The main technical specifications of the latest model of Raspberry Pi also known as Model B have the following features:

SD Card Slot is used to install OS/booting/long term storage. The total memory SD card is about 8GB.

Micro USB Power Port provides 700mA at 5A.

RCA Video Out is connected to display if HDMI output. It is mainly used to carry audio and video signals. They are otherwise called as A/V jacks.

Audio out Digital audio is obtained if HDMI is used to obtain stereo audio.

Ethernet Port is used to connect to the Internet. It similarly plays significant role in updating, and getting new software easier.

HDMI OUT (High Definition Multimedia Interface) is used with HDTVs as well as monitors with HDMI input.

GPIO 40 pin interface allows us to control and interact with real world.

The Raspberry Pi runs Linux form operating systems as well as there is a master version of Linux based kernel well known as Raspbian which can run nearly all programs which are Linux compatible. Raspbian is a free operating system based on Debian optimized for Raspberry Pi hardware. An operating system is the set of basic programs and utilizes that make raspberry pi run. The Raspberry pi is a significantly extra powerful device but that power arises with some responsibilities that won't requirements for Arduino devices. For that reason in this project, we have made a use of 'python' script for motion detection.

PYTHON: Python is a high-level, interpreted, interactive as well as object -oriented scripting language. Python was designed to be highly understandable which uses English keywords frequently where as other languages usage punctuation and it has rarer syntactical constructions than other languages.

Python is interpreted: It is administered at runtime by the interpreter also you do not need to compile your program before executing it. This is analogous to PERL and PHP.

Python is Interactive: This means that you can actually stand at a Python prompt as wasinteract with the interpreter directly to write your programs.

Python is Object-Oriented: This means that Python provisions Object-Oriented style otherwise technique of programming that compresses code within objects.Python is an impressive language for the learner programmers plus supports the development of a wide range of applications from simple text processing to WWW browsers to games.

Arduino: It is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button. It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started. The Uno differs from all preceding boards in that it does not use the FTDI USB-to-serial driver chip. Instead, it features the Atmega16U2 (Atmega8U2 up to version R2) programmed as a USB-to-serial converter.

The board has following new features:

Added SDA and SCL pins that are near to the AREF pins.

The two other new pins placed near to the RESET pin.

The IOREF that allow the shields to adapt to the voltage provided from the board. In future, shields will be compatible both with the board that uses the AVR, which operate with 5V and with the Arduino Duo that operate with 3.3V. The second one is a not connected pin, which is reserved for future purposes.

Stronger RESET circuit.

Atmega 16U2 replace the 8U2.

ThingSpeak: It is an open source Internet of Things (IoT) application and API to store and retrieve data from things using the HTTP protocol over the Internet or via a Local Area Network. ThingSpeak enables the creation of sensor logging applications, location tracking applications, and a social network of things with status updates".All the 8 Fields provided by the thing speak have been used in our system such as the latitude, longitude,door sensor values and face detection values .

The fields that we have used are represented with the graphs which defines values against the dates.

IV. RELATED WORK

Vehicle tracking systems are widely used throughout the world in different sectors such as smart traffic management system, vehicle location tracking systems, Anti-theft vehicle tracking systems, parking management systems, fleet management, and in the field of Intelligent Transportation Systems (ITS) or Smart transportation systems.

4.1. Bus Tracking System:

A fixed route, simple bus tracking system has been proposed by Lauin. The system used a smartphone application and LED display panel for displaying the location after a specific time interval. The system is very useful for college/university students who attend classes in big campuses. As a result, they (students) can spend more time in studying, sleeping or relaxing rather than wasting time through waiting for a bus. Nowadays, almost all the European countries are using similar type of tracking system for public transportation.

4.2. Anti-Theft Tracking System based on GSM/GPRS:

Unauthorized access of any valuable devices/properties can be prevented by using Anti-Theft Tracking System. Ramadan and Al -Kheder in presented a prototype design of a vehicle tracking and anti-theft system for protecting a vehicle from any intruder by using GPRS/GSM technology. The system used Kalman filter for minimizing the positional (GPS coordinates) errors, due to week GPS signal. An abstract idea for controlling the vehicle's ignition also proposed there without proper implementation details. A notebook with Google Earth is used for monitoring the vehicle's location and its status. A Google maps based Smartphone application would be another alternative to replace the task that the notebook performs.

Fig 3: Architectural view of the Tracking and Anti-Theft System.

4.3. Vehicle tracking system Application.

A mobile phone application has been developed and deployed on an Android Phone whose responsibility is to track the GPS location and send it to a remote location. The safe of vehicles is extremely essential for public vehicles. Vehicle tracking and locking system installed in the vehicle, to track the place. In this system client just send one message to the vehicle and the vehicle mobile will send you the current location of your vehicle in the form of web link and user has to click on a link and that link goes to Google map and will show the current location of your vehicle. At the same time, Mobile Providers are also providing the variety of services to users. In attempt to expand on this, we propose a GPS based vehicle-tracking system for an organization to help to find addresses of their vehicles and locate their positions on mobile devices. The proposed technology allows organizations to track real-time information about their organizational vehicle during travel. Today for local transport most people use Bus as a medium. Android application, which provides the exact location of all organizational vehicles. During vehicle motion its location update can be continuously reported to a server using GPRS service.

V. EXPERIMENTAL RESULTS

The project as well as application of the proposed keen security observation arrangement with IoT approach by means of the Raspberry-Pi done successfully. Tested fully developed system to demonstrate its feasibility and effectiveness. The monitoring system contains the hardware as well as software operations. The hardware implementation carried out the Raspberry Pi, and the software implementation carried out the software program that is programmed in the Raspberry Pi and the concern person's computer, in order the devices were capable to communicate each other. The screenshots of the smart security surveillance system developed has been presented.

The experimental results containing of the snapshots of the alert mail, snapshots of the application and that of the graphs of the fields used in thingspeak to with the sensor values so the android application can pick up the data from the fields. We have aslo shown the comparison table with our proposed system with the existing systems with the various features and parameters considered in the way.
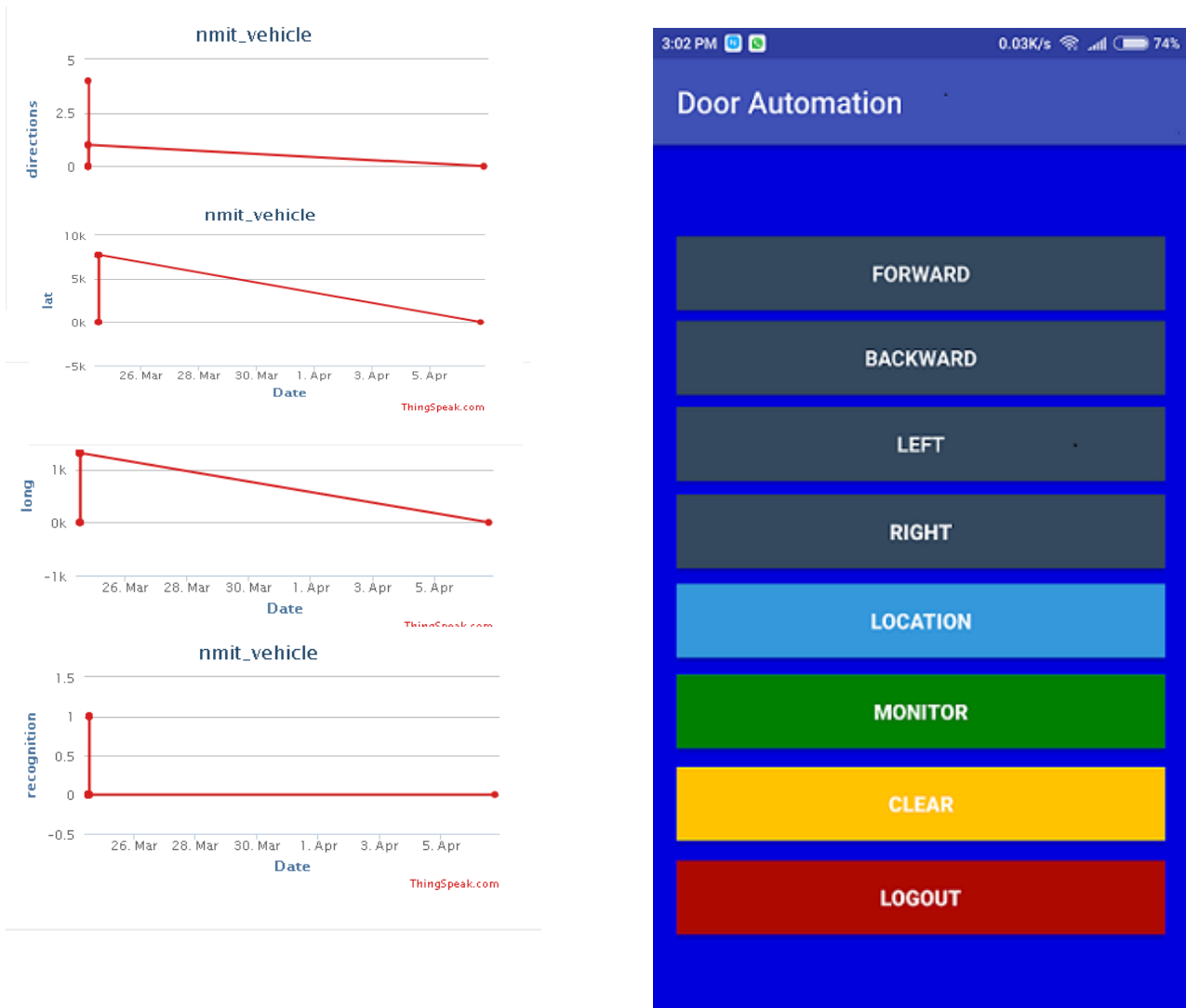
Fig 4: Graphs of various sensor values as fields in thingspeak versus the date

Fig 5: Intruder alert notification to the owner's mail
Fig 6: Snapshot of the Tracking and Monitoring Application
Fig 6: Snapshot of the tracking and monitoring application

Table 1: Proposed & Existing System comparison

	Proposed System	Existing System
Tracking/Monitoring	YES	YES
Engine Power Control	YES	NO
Driver Authentication	YES	YES
Location Logging	YES	YES
Intruder Clue	YES	NO
Cost Effective	YES	NO

VI. CONCLUSION AND FUTURE SCOPE

This project is used to minimize the theft rate. The GPS technology is used to track the location and Wi-Fi module is used send the notification of the car door security breach and the face detection through the application. The email information is also about the security breach contains image of the burglar. This system plays a major role in theft tracking as it provides the major lead on the burglar apart from notifying the owner initially and helps to pull of the kill switch and steer lock.

The monitoring system using the Raspberry Pi as well as the webcam had been completed and tested. Not only the Raspberry Pi applied as a server but also the webcam applied as a motion detection sensor. The capturing and sending notification would be done if there was a motion. The result of the testing illustrates that the monitoring system works well. As the future scope this system can be extended further by adding additional infrared emitting system to detect the people face if they wore the mask on his/her face. By adding this additional system we can easily identify the person even though the person covered his/her face.

Apart from this we can interface sensors like Gas sensors, Smoke sensors, and Fire sensors to give alerts respectively. Additional use of security system is a keen control device, which is thermostat, whichever could be disciplined through a cyberspace. The thermostat or control device could be control the warming arrangement within the house also regulate that one towards the wanted climate. We are going to make available a wireless relay connection also wireless sensor, which can be movable as well as, can be operated and which can be used in company and appoints for Security to the whole building with one single system.

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