Smart Security System for Two Wheelers

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Abstract *In this modern era there is rapid increase in number of vehicles and so is the number of theft attempts.In automobile field, the security and burglary counteractive action are one of the fundamental regions in current situation. Generally, the GSM, GPS technology are used for security purpose.Using these technologies,we can only track and monitor the vehicle.our project implements for theft prevention in two wheeler using face recognition. Security objectives are accomplished by the GPS and GSM system.We can track, screen and stop the stolen bike too by this framework. The position got by the GPS module, which is send to the Raspberry Pi, which at that point sends the message to the user through the GSM module.The owners will get the image of the robber in mobile phone and mark out the place using GPS.Also, the vehicle can be locked or unlocked by sending a message to the system.*

Keywords: *GSM,GPS,Raspberry Pi,Web camera.*

I . INTRODUCTION
1.1 OBJECTIVE

The 2-wheeler market in India grew 14% in the April to June 2016 quarter, compared to the same period in 2015. Two-wheeler sales last grew in double digits back in the year 2012, so after a long gap of six years, we are again seeing double-digit growth. Thus it also resulted in accelerated accidents and decreased road safety. Another issue is the increasing 2-wheeler thefts. Measurements demonstrate that just a single vehicle is recovered for every five stolen.The present existing security system is merely an alarm system and are still of no match to the well-equipped thieves. It will take only a couple of moments to get through the system. In this manner our project aims at designing a system that prevent vehicle theft and ensure safety of the vehicle. The primary point of this project is to offer a advanced security for 2 wheelers , which comprises of a face recognition system ,a GPS module, a GSM module and a control stage. Biometric and non-biometric methods usually provide such security features. Non-biometric systems fail due to hacked password and encryption of decrypted data, yet it is relatively difficult to make copy of distinctive characteristics. There are many biological and behavioural patterns in human beings that biometrics can leverage to identify them individually. Biometric systems are modern and use techniques like fingerprint recognition, iris recognition and face recognition. Of these face recognition and detection systems are more sophisticated, easy to deploy and people can be identified without their knowledge.Here we have used face recognition technology mainly to capture the image of the robber. The Raspberry Pi based control framework settled inside the vehicle utilizes GPS, GSM and catches picture from the camera on detection of person. Face is detected and recognized using algorithm overcoming the pose and illumination constraints[3]. The recognized image is compared with the authorized image of users in the database. If matched, the system allows operating the vehicle. If not matched, it sends image of the person accessing it and GPS values to the owner.The owner then decides and commands the system to either prevent the access of the vehicle or to allow the person to operate the vehicle.

II. SYSTEM ANALYSIS
2.1 EXISTING SYSTEM

At the present time, the rate of crime is increasing rapidly because it is a kind of evident from the actual fact that thefts became a matter of routine[2].To avoid and prevent the theft of two wheeler vehicles, smart security system is proposed. The current systems simply act as a caution system.the principle disadvantage is that if the owner is far from the vehicle they can't hear the alert sound . Likewise in some different systems we can lock and unlock the vehicle simply like in cars yet here the disadvantage is that the zone scope for locking and unlocking is constrained inside certain separation.

2.2 PROPOSED SYSTEM

This proposed work is an attempt to design an advance vehicle security system that uses Face Detection System (FDS) to detect the face of the driver and compare it with the predefined face. GPS and GSM system to prevent theft and to determine the exact location of vehicle. This system puts into the sleeping mode vehicle handled by the owner or authorized persons , otherwise goes to active mode.When the theft identified, the responsible people send SMS to the Raspberry Pi, then issue the control signals to stop the engine. When the location is detected then user sends this message as 'lock' to lock the engine of the vehicle. This message can be send to

microcontroller through GSM. Then the microcontroller will locks the vehicle engine with the help of relay by applying breaks to it

III . PROJECT DESCRIPTION
3.1 BLOCK DIAGRAM

Our Two wheeler Smart security system shown in Fig.1is Intelligent enough to alert our mobile phone.Here GPS acts as receiver which tracks and locates the vehicle,while GSM acts as transmitter which sends an SMS alert to us during possible vehicle theft.when the face is detected the web camera detects the user's face and send it to the Raspberry Pi , which contains the pre-stored images and compares with it.If the user image is matched with the predefined image it then allow the user to start the vehicle .if not then an mail alert with the unauthorized person's image and an SMS alert is sendGPS technology enables us to track our vehicle location using a mobile phone.GPS tracker will communicate with our mobile phone via SMS as per our wish.Two wheeler security system empowers us to switch off bike ignition during emergency.Bike security system detects unauthorized ignition and movement.GPS Vehicle Tracking system can be installed in all types of vehicle irrespective of model and make.Bike location identification is tracked using the bike GPS Tracker and alerted via SMS.The working is done in the process i.e. the drivers RS232 from GPS and GSM device are connected to drivers (RS232) of the Raspberry Pi.Thus we can control the engines with the help of driver circuit and relays.
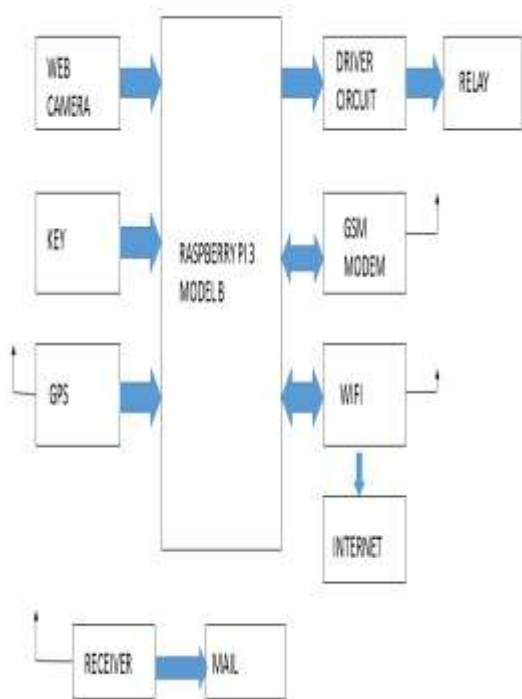

Fig.1.Block Diagram of smart security system for two wheelers

3.2 RASPBERRY PI

The Raspberry Pi is primarily designed to act as a standalone micro-computer. It has on board RAM, CPU, USB and Ethernet ports, standard display output options, and much more. It runs an operatingsystem, and can beused to create software applications from a terminal level, through to high level programming languages such as Python and Scratch. You can do an incredible amount of things on your Raspberry Pi without connecting anything other than power, a keyboard/mouse, and a display.This makes it perfect for learning to program in a variety of languages, as well as interact with a traditional style computer at a deeper level. It's got a lot more power than any Arduino, however everything you do is at a software level, and whilst it might seem like it's a simple step to connect sensors and external circuitry up to the GPIO pins, there are a few different elements in the software that you have to go through in order to use it like a traditional microcontroller.The Raspberry Pi 3 is the third-generation Raspberry Pi. It replaced the Raspberry Pi 2 Model B in February 2016.

- Quad Core 1.2GHz Broadcom BCM2837 64bit CPU
- 1GB RAM
- BCM43438 wireless LAN and Bluetooth Low Energy (BLE) on board
- 40-pin extended GPIO
- 4 USB 2 ports
- 4 Pole stereo output and composite video port
- Full size HDMI
- CSI camera port for connecting a Raspberry Pi camera
- DSI display port for connecting a Raspberry Pi touchscreen display
- Micro SD port for loading your operating system and storing data
- Upgraded switched Micro USB power source up to 2.5A

3.3 WORKING OF A GSM

A GSM modem is a specialized type of modem which accepts a SIM card, and operates over a subscription to a mobile operator, just like a mobile phone. From the mobile operator perspective, a GSM modem looks just like a mobile phone.

- For the purpose of this document, the term GSM modem is used as a generic term to

refer to any modem that supports one or more of the protocols in the GSM evolutionary family, including the 2.5G technologies GPRS and EDGE, as well as the 3G technologies WCDMA, UMTS, HSDPA and HSUPA.A GSM modem exposes an interface that allows applications such as Now SMS to send and receive messages over the modem interface. The mobile operator charges for this message sending and receiving as if it was performed directly on a mobile phone. To perform these tasks, a GSM modem must support an "extended AT command set" for sending/receiving SMS messages, as defined in the ETSI GSM 07.05 and 3GPP TS 27.005 specifications.GSM modems can be a quick and efficient way to get started with SMS, because a special subscription to an SMS service provider is not required. In most parts of the world, GSM modems are a cost effective solution for receiving SMS messages, because the sender is paying for the message delivery.

- A GSM modem can be a dedicated modem device with a serial, USB or Bluetooth connection, such as the Falco Samba 75 used in this document. (Other manufacturers of dedicated GSM modem devices include Waveform, Multitask and iTegno.) To begin, insert a GSM SIM card into the modem and connect it to an available USB port on your computer GSM modem could also be a standard GSM mobile phone with the appropriate cable and software driver to connect to a serial port or USB port on your computer. Any phone that supports the "extended AT command set" for sending/receiving SMS messages, as defined in E

3.4 GLOBAL POSITIONING SYSTEMS

The Global Positioning System (GPS) is a satellite-based navigation system that consists of 24 orbiting satellites, each of which makes two circuits around the Earth every 24 hours. These satellites transmit three bits of information – the satellite's number, its position in space, and the time the information is sent. These signals are picked up by the GPS receiver, which uses this information to calculate the distance between it and the GPS satellites.With signals from three or more satellites, a GPS receiver can triangulate its location on the ground (i.e., longitude and latitude) from the known position of the satellites. With four or more satellites, a GPS receiver can determine a 3D position (i.e., latitude, longitude, and elevation). In addition, a GPS receiver can provide data on your speed and direction of travel. Anyone with a GPS receiver can access the system. Because GPS provides real-time, three-dimensional positioning, navigation, and timing 24 hours a day, 7 days a week, all over the world, it is used in numerous applications, including GIS data collection, surveying, and mapping.

Of all the applications of GPS, vehicle tracking and navigational systems have brought this technology to the day-to-day life of the common man. Today GPS fitted cars; ambulances, fleets and police vehicles are common sights on the roads of developed countries. Known by many names such as Automatic Vehicle Locating System (AVLS), Vehicle Tracking and Information System (VTIS), Mobile Asset Management System (MAMS), these systems offer an effective tool for improving the operational efficiencyand utilization of vehicles.

3.5 WEB CAMERA

Webcam lets us capture our own photos and videos (720p/1080p mode with some cameras), adjust your camera settings, activate motion detection, and use face-tracking with our preferred video-calling software.A webcam can function as a digital camera, snapping still images. In most cases, once a webcam is activated, and the image it is pointed at appears on your computer screen, a picture is taken by hitting a specific key on the keyboard or clicking a button on the screen. Once an images is captured, it is saved to the computer hard drive.So the image sensor is the "electronic eye" of a webcam or a digital camera. It's a semiconductor chip made of millions of tiny, light-sensitive squares arranged in a grid pattern. These squares are called **pixels**. Basic webcams use relatively small sensors with just a few hundred thousand pixels (typically a grid of 640×480. Good digital cameras use sensors with many more pixels; that's why cameras are compared by how many **megapixels** (millions of pixels) they have. A basic webcam has about 0.3 megapixels (300,000, in other words), while a digital camera with 6 megapixels has over 20 times more—probably arranged in a rectangle with three thousand across and two thousand down (3000 x 2000 = 6 million)

V. CIRCUIT DIAGRAM
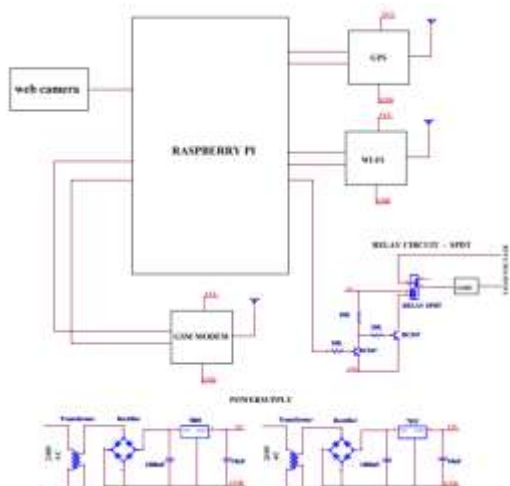
VI. PYTHON SOFTWARE
6.1 PYTHON

Python is a general-purpose interpreted, interactive, object-oriented, and high-level programming language. It was created by Guido van Rossum during 1985-1990.Like Perl, Python source code is also available under the GNU General Public Licence (GPL).This tutorial gives enough understanding on Python programming language.

6.2 FEATURES
- Simple to use.
- Easy to learn
- Free and open source
- High level language
- Portable
- Interpreted
- Object oriented
- Extensive libraries
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6.3 EXECUTION
Example Python Program
#!/usr/bin/python
print "Hello,Python!"

VII. MERITS AND DEMERITS

7.1 MERITS
- Prevent your bike from being stolen.
- Smart alert for system protection.
- Lower rates for manufacturing system.
- Small size and light weight.

7.2 DEMERITS
- If person is wearing mask on face, so received image can not clarify the identity of that person.

7.3 FUTURE SCOPE
- Presently only SMS feature is available, we can include the Call feature for ease of operation.
- Using android application we can also stop the engine.
- Microphone could be interfaced to the GSM/GPS module so that during theft activity voice call could be established with the owner.

VIII. CONCLUSION

In this paper, an embedded security device related to face recognition is presented. The system can be utilized to decrease the expanded vehicle robbery and enables the proprietor to distinguish the unauthorized persons,in this way having the vehicle under his/her control. The outcomes got through the face acknowledgment demonstrates that it can be relied upon to guarantee security of vehicle. The system is also reliable to be used in other authorization applications involving robotics, border management, banking security involving ATMs etc.This paper will help to reduce the complexity and improve security, also smarter than traditional one's.

IX. REFERENCE

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