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IoT based Anti-Theft Vehicle Security System using Neural Network

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Abstract: Anti-theft vehicle system consist of facial recognition system in addition to conventional manual key ignition to avoid the theft of the vehicle. The camera is fixed in front of bike. The image captured is processed Using neural network. Every time when the key is inserted to the vehicle the camera is activated automatically and checks the registered face. The vehicle will not start if it is not a registered face as well the camera will capture and sends the intruder's image through internet.

Keywords: Image processing

I. INTRODUCTION

In the modern era, thieves comes with a new technique that they targeting vehicles like bikes and scooters. Two-wheeler thefts comprise nearly 88% of total number of automobile thefts in many cities. According to police records, vehicle thefts have gone up in the past year. Percentage shows that people are more insecure about their vehicles than any other things that is being stolen. In the record of 2013 there are 2,085 motorcycles and scooters were stolen, and the number rose to 2,850. Thieves are excellent in planning and stolen the vehicles people should be aware of the theft, they should take some safety measures in protecting their vehicles from others.

Thieves re using a new technique to stole the vehicle which we cannot able to identify. If any one person understands what technique they are using then this can be easily prevented by making a new advanced method. In the recent survey, it shows that vehicle theft percentage has been rapidly increased from a lower to a higher level. Even the police are finding to track them and they are taking immediate measures to prevent the theft cases but they were at the very low level while comparing to the thefts done.

After a several research report says that, the stolen vehicle cannot be found easily because they are dismantling the vehicle and then sells each and every part individually to different shops in black areas that are not popularly known. They stole it mainly in the parking areas where people are not more and they do not simply stole the bikes before doing it they used to checks the condition of bike if its part are in the good condition, if its working or not.

II. LITERATURE SURVEY

K. A. Mamun, Z. Ashraf, " Anti-theft vehicle security system with preventive action", Nowadays rate of vehicle theft is very high all through the world and the situation are even worse in developing country. Therefore, protection of vehicles with an intelligent, reliable, effective and economical system is very important. The existing technologies for vehicle security have a number of limitations including high false alarm rate, easy deactivation and high cost. In this research an Anti-Theft Vehicle Security System (ATV2S) has been design and implemented utilizing sensor-network system which employ Global Positioning System (GPS) and Global System for mobile communication (GSM) technology to track the vehicle. The cutting edge technology of ATV2S is capable to protect, monitor and track the vehicle even within a minute.

Abu Taher Noman , Samzad Hossain, Shariful Islam, " Design and Implementation of Microcontroller Based Anti-Theft Vehicle Security System using GPS, GSM and RFID." Stealing the vehicle is the major threat to car or vehicle owners. Nowadays, it is increasing day by day. If not recovered soon, stolen vehicle are generally sold, revamped or even burned, if the resale price is considered to be too low. When a vehicle is stolen, it becomes hard to locate and track it, which considerably decreases the chances of recovering it. An Anti-Theft vehicle security has been developed to mitigate this problem. This system consists of a PIC16F876A microcontroller, fingerprint, RFID, GPS-GSM modules and a tilt sensor. The car will be started with RFID or fingerprint or password. If an unauthorized person wants to open the door of the vehicle, it will ask for correct RFID or password or fingerprint. The tilt sensor is used to measure any breaking of windows or doors and movement of the vehicle, a message will be sent to the owner's mobile containing the location of the car via GPS-GSM module. The system gives also an alarm. Furthermore, the connection to the fuel injector of the car is deactivated to prevent the unauthorized start of the vehicle anyhow. This anti-theft security system enhances the chances of recovering the car.

Zhigang Liu, Anqi Zhang, Shaojun Li, " Vehicle anti-theft tracking system based on Internet of things." As the amount of urban vehicle grows rapidly, vehicle theft has become a shared concern for all citizens. However, present anti-theft systems lack the tracking and monitoring function. The vehicle anti-theft tracking system based on Internet of things is designed in this article, which can provide all-round active service for the owners. This system is controlled by an RFID module to switch on and off. When the car is stolen, the vibration sensors and pyro electric infrared sensors mounted inside the vehicle are triggered, and GSM module will send the location information obtained by GPS module to the owner's mobile phone, thus owners can check the position of the vehicle with an android software developed by our team. This system uses android mobile phones as mobile terminal, which is more convenient and flexible than other kinds of like products since the owner can check and track the position of the car immediately with android mobile phone application once the car is stolen.

Debajyoti Mukhopadhyay, Megha Gupta, Tahesin Attar, " An Attempt to Develop an IOT Based Vehicle Security System." As the amount of urban vehicle grows rapidly, vehicle theft has become a shared concern for all citizens. Security and safety have always become a necessity for urban population. However, present anti-theft systems lack the tracking and monitoring function. Internet of things (IOT) has been governing the electronics era with cloud services dominating the ever-increasing electronics product segment. Thus, there is a need to develop a system for providing security to the vehicle from problems like theft and towing using IOT for security of automobiles and passengers. Our system proposes a novel security system based on wireless communication and a low cost Bluetooth module. This paper illustrates a model in which the GSM is used for sending messages. The user can control the engine/ignition and turn it off if needed. The system also employs a password through keypad (with maximum 3 chances) which controls the opening of a safety locker door as well as wearing of a seat belt. If there is a window intruder, the IR module/sensor detects the intruder, or any obstacle and it sends a signal to the micro controller. The controller is connected to a Bluetooth module and to an alarm system. The System transmits an alert signal to the dashboard (which is nothing but a mobile handset) which sends an alert signal to the user's mobile phone. The prototype also provides a solution to the problem like Towing. Thus, the system uses Bluetooth module and controller to control the security system from the user's mobile phone by means of any device with a potential Internet connection.

III. EXISTING SYSTEM

- 1) GPS security device is to alert your mobile phone during attempted vehicle theft
- 2) GPS tracker communicates with your mobile phone (any model) via MMS
- 3) GPS Security System allow you to switching bike off it will blowout during emergency
- 4) Two wheeler Anti-theft security system detects unauthorized movement

A. Drawback

- 1) The current system is power dependency
- 2) GPS signals can be jammed by devices that disturb the signals broadcast by GPS satellites
- 3) Devices can come with a hefty price tag
- 4) There is lack to sends a notification to user

IV. OBJECTIVE OF THE STUDY

The main objective of this paper is to design an application which can be used by all people in their mobile itself. The main idea is to replace the existing method, and gives an additional information through SMS. This will be useful for the user to safely maintain their vehicle from thefts.

A. Abbreviation and Acronyms

- 1) SMS-Short Message Service
- 2) Open CV-Open Source Computer Vision

B. Product Features

This device enable the user to detect the theft by using the SMS. If any person tries to use your vehicle it will detect their face and you will be notified by means of an SMS in your mobile. If they can access the vehicle you have to send an accepting reply to that message and they can access the vehicle.

C. User Characteristics

- 1) There are many needs for this application and this will make their work simple and no need to worry about the vehicle.
- 2) This device will help the user to easily identify the face of the people who tries to use vehicle/
- 3) This application can be accessed without the internet connection anytime and anywhere

D. Constrains

- 1) The languages used in the project is Python
- 2) Python Interpreter is the compiler used here

E. Technologies

- 1) Open CV
- 2) Neural Network

V. PROPOSED METHODOLOGY

This device indicates when an unauthenticated driver/owner tries to theft the two wheeler it sends alert message and asks the permission from the authenticated owner that he/she can start the two wheeler.

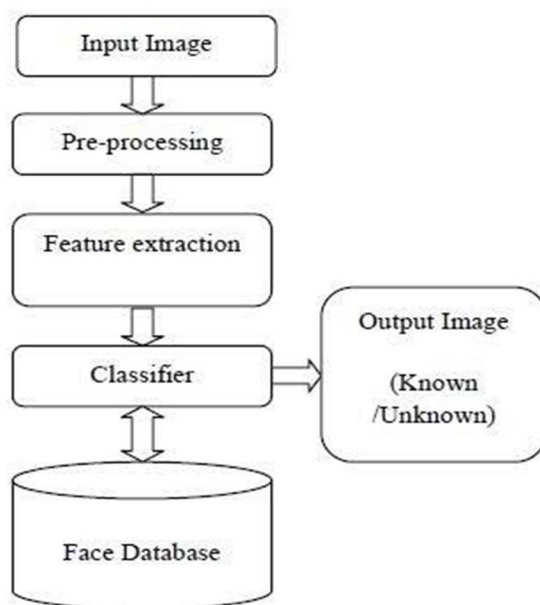


Fig.5(a). Flow chart

A. Input Image

Using Neural network, Performing data set creation by training several number of images from single person who is considered as owner of the vehicle. The authenticated person image will be captured and stored for the further process.

B. Pre-processing

The pre-processing is for actions with images of absorption for both input and output are intensity images. The aim of pre-processing is the image data it suppresses the unwanted misuse or enlarge of some image features other than the database important for further processing.

C. Feature Extraction

Feature extraction a type of dimensionality reduction that efficiently represents interesting parts of an image as a compact feature vector. This approach is useful when image sizes are large, small or medium. The reduced feature representation is required to quickly complete tasks such as image matching and can be restore. Feature detection, feature extraction, and matching are often combined to solve common computer vision problems such as object detection and recognition, content-based image retrieval, face detection and recognition, and texture classification.

D. Classifier

Image classification is the process in vision that will check if it is based on its visual content. For example, it is based on the algorithm that may be designed to tell if an image contains a human figure or not. While detecting an object is related for humans, robust image classification is still a challenge in computer vision applications.

E. Face Database

A facial database is a collection of images or video clips with facial expressions of a range of emotions. Well-annotated media content of facial behavior is essential for training, testing, and validation of algorithms for the development of expression recognition systems. Most of the databases are usually based on the basic emotions theory which assumes the existence of six discrete basic emotions (anger, fear, disgust, surprise, joy, sadness).

In expression databases, the participants are asked to display different basic emotional expressions, while in spontaneous expression database, the expressions are natural. Spontaneous expressions differ from mannerism ones remarkably in terms of intensity, configuration, and duration. The synthesis of some AUs are barely achievable without undergoing the associated emotional state. Therefore, in most cases, the expressions are exaggerated, while the spontaneous ones are subtle and differ in appearance.

F. Output Image

The system will automatically take photos of driver and compares his or her face with database to check whether he is an authenticated driver or not. The authenticated persons can have access to the vehicle. If someone is not an authenticated driver an alarm rings and electrical connections are not activated. And the message sent to the authenticated driver for permission to start the vehicle.

VI. EXPERIMENTAL RESULT

In the experiment, we used a web camera on a laptop computer to experiment with unauthenticated and authenticated persons that registered in the face database. The face detections techniques performed the high precision of the face detection. Subsequently, we performed face detection techniques using the web camera. The camera on laptop detects the person in front of it and send to the database which compares the photo with the registered photos on the database. It processes the images then if the detected face is in the database it will sent the message that the vehicle is started otherwise if the face is not detected in the database it sends the message to the authenticated person. The result of validation with images on the web camera, obtained the accuracy to detect authenticated owner of the vehicle. It processes the images then sent message to the owner. From fig.4(a) the image will detect the person by the web camera and recognize is that the image is authenticated or unauthenticated person. Fig.4(b) if the detected image is authenticated it send vehicle started otherwise it sends vehicle stop message will be received.

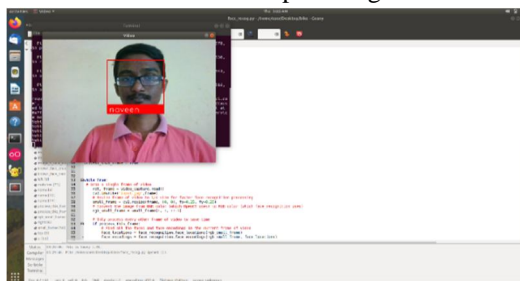


Fig.4(a). Authenticated face detected

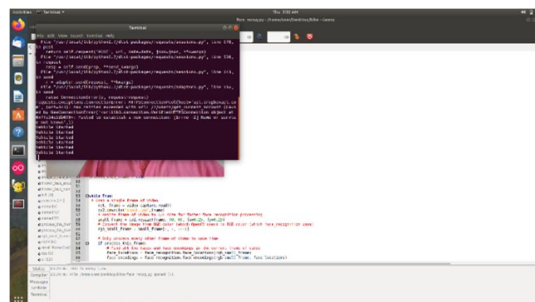


Fig.4(b).Message sent

From our results it shows that if any one tries to steal vehicle it automatically sends message to the owner. If the vehicle is taken by the authenticated person it starts. So due to this experiment they can keep their vehicle safe and also they can receive messages when someone tries to steal their vehicle.

VII. CONCLUSION

The result of this project is anti-theft of two wheelers which can be created to keep the vehicles safe. By using this method of face recognition the authenticated person can only start the vehicle. If other than authenticated person tries to take the vehicle's electrical connections are not activated and it also sends the alert message to the authenticated person with the unauthenticated person image and asks for the permission to start the vehicle so that by using this method we can control the theft of vehicles amount in the world. The project uses various techniques in the field of computer technology using the internet of things.

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