International Journal of Scientific Engineering and Science
Volume 1, Issue 8, pp. 78-80, 2017. ISSN (Online): 2456-7361

Car Identification and Theft Control Using Raspberry-Pi and IoT

D. Jeevanand[1], M. Kasiselvanathan[2]
[1, 2]Assistant Professor, Department of Electronics and Communication Engineering, Sri Ramakrishna Engineering College, Coimbatore-22, Tamilnadu, India
Email address: [2]kasiselvanathan[AT]gmail.com

Abstract**—** *There has been a rapid increase in the number of cars on road with crime rates of cars theft are certainly alarming. Due to the costly nature of the cars, secured protection is needed. This paper deals to prevent the cars from unauthorized access and to track the cars using Raspberry Pi3 and GPS module. This system uses an embedded chip that has an inductive proximity sensor, which senses the key insertion and sends an alert email to the owner and as well as Cloud. Then the owner can send the image stored in the cloud to the nearest police station. An android application is installed in the owner's mobile to access the car and get information from the cloud.*

Keywords**—** *GPS module, Cloud, Proximity sensor, Finger print sensor, Raspberry Pi.*

I. INTRODUCTION

Tremendous progress in the automobile industry increases the number of cars across the world over the years. In India, the automobile count stands at an astonishing level around 100illion at present and it is getting multiplied in geometric progression. USA has one of the largest vehicle populations, where the number of motorcars outnumbers the number of licensed drivers. Statistics shows that, in the capital city of India (Delhi) alone car is stolen for every 36 minutes, that sums up to around 40 per day.

Lots of security systems had been devised for the protection of car from being stolen, but yet the crime rates had never been lowered. It is sometimes impossible to track the stolen cars because of the revamping of car's exterior. So, only a small percentage of the thefts are recovered. Since cars are of very costly, the owners are forced to spend a huge amount of money on insurance and other policies. A simple and economical security system for cars has been outlined in this paper which provides reasonable and effective protection of cars from theft.

II. BLOCK DIAGRAM

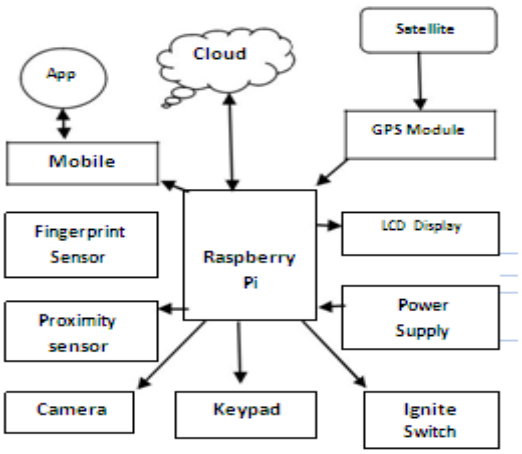

Fig.1. Block diagram.

Figure 1 shows the block diagram of the entire system. This system makes use of an embedded chip that has an inductive proximity sensor, which senses the key insertion and sends an alert email to the owner and as well as Cloud. This is followed by the system present in the vehicle asking the user to enter a unique password. If the user failed to enter the correct password in three trails then an alert message is sent to the owner's email along with geographical location of the car being tracked by the GPS module. The next level is to start ignition after finger print verification is done. If it does not match with the database, the system disables the ignition and the image of the unauthorized person is captured and sent to the cloud and email. If the unauthorized person is completely unknown to the owner, then owner can send the image stored in the cloud to the nearest police station. An android application is installed in the owner's mobile to access the car and get information from the cloud.

III. INTERFACING OF GPS MODULE WITH RASPBERRY PI

The GPS module is equipped with the USB port for interfacing, but if it does not have the USB port, then it is probably serial. The voltage level of the serial interface has to be found out. It can be RS232, TTL or 3.3V. After the voltage level is known, the module can be interfaced with the Raspberry Pi by using a USB-Serial Adapter (RS232 or 5V or 3.3V). The connections should be,

- Connect JP1 GND pin of the GPS module to the GND on the Pi GPIO.
- Connect power supply of 5V from the Pi GPIO to the JP1 (+5V) on the module.
- Connect TxD from the Pi GPIO14 TxD to the module JP4 Tx.
- Connect RxD from the Pi GPIO15 RxD to the module JP4 Rx.

IV. MINUTIAE BASED MATCHING TECHNIQUE

The major minutiae features of the fingerprint ridges are ridge ending, bifurcation and short ridge.

- Ridge ending is the point at which a ridge terminates.

- Bifurcations are points at which a single ridge gets split into 2 ridges.
- Short Ridges are ridges that are significantly shorter in size than the average ridge length on the fingerprint.

Minutiae and patterns are most vital, because no 2 fingers have been shown to be identical. The figure 2 and figure 3 show the Ridge ending and Bifurcation respectively.

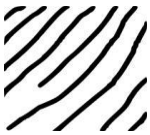

Fig. 2. Ridge ending.

Fig. 3. Bifurcation.

Finger-print sensor is interfaced with the Raspberry Pi as shown in figure 4.

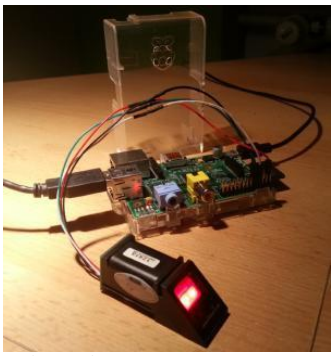

Fig. 4. Interfacing finger print sensor and raspberry Pi.

V. RASPBERRY PI-POWERED CLOUD SERVICE SET-UP

One of the best open-source software that helps in creating our own private and protected cloud-sharing services is Own cloud. To provide added security, own cloud can encrypt our files. Variety of file formats can be handled by adding a number of other apps. Using web browser or desktop client on Windows, Mac and Linux as well as mobile clients for Android and iOS devices, files can be synchronized on own cloud with other online cloud storage services.

A. Lay the Platform

Set up the Own cloud server on top of the Raspbian distribution for the Raspberry Pi. USB portable disk is needed for storing the data, but it is best to use self-powered disk that does not draw power from the Raspberry Pi. Raspberry Pi should have a static IP address before setting up the server. It is done by tie-up an IP address to Raspberry pi's unique MAC address in router admin page.

B. Install Own Cloud

Raspbian is based on Debian OS, so packages can be pulled from Own cloud"s Debian repository. Fire up a terminal and add the own cloud repositories. After refreshing the repositories, install the own cloud server and all its required dependencies. This sets up the MySQL database and the user is asked to set up a root password. Apache web server is configured in order to talk to the own cloud installation. Enable the Apache module and restart it. Tweak the PHP file configuration, if the files to be uploaded are greater than 2Mb in size. To open the PHP configuration file and change the value from 2MB to 1024MB or 2GB. For larger installations, install the APC PHP accelerator to make own clod installation snappier.

C. Mount the Drive

After the server is configured and set up, prepare the storage medium. Plug the USB disk into the Raspberry Pi and enter "sudo blkid" in a terminal. After mounting, make a note of corresponding UUID and create a directory to mount the drive. Once the drive is mounted correctly, edit the file to make sure it is automatically mounted.

D. Configure the Cloud

Launch a web browser and navigate to the own cloud installation, because this is a brand new installation, hence a new user account for the own cloud administrator should be created. Next step is to make our own cloud to use the MySQL database and store files under the mounted USB drive. Then connection details of the database server are entered with the host name "localhost" and "root" as the username. The password has to be configured when the database was pulled in along the own cloud. Now, setup is over and can log into our cloud server as the administrator using the credentials.

E. Change Settings

Once logged on to the own cloud server, click the pull-down menu next to username and click personal. Changes such as login password and display can be done. Profile picture can be configured so as to be notified about certain actions. For multi-users, add users and organize them into different groups, and can also restrict their storage space and can even share admin responsibilities with other users.

VI. RESULTS AND DISCUSSION

The functioning of the Inductive proximity sensor and finger print sensor are checked and their reflex actions are traced and are stored in the cloud. A total of about 5 finger prints are taken and stored in our database. With reference to these, further stamping of finger prints are checked, if it matches with the database the ignition of engine is enabled else it will be disabled. The image of the unauthorized user is taken and sent to the cloud and as well as email. The owner can send the image to the nearest police station, if he finds guilty with the unauthorized person. The figure 5 and figure 6 show the alert mail from the system to owner and image stored in the cloud respectively.

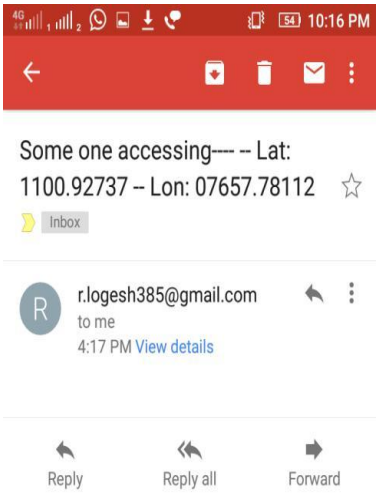

Fig. 7. Alert mail from system to owner.

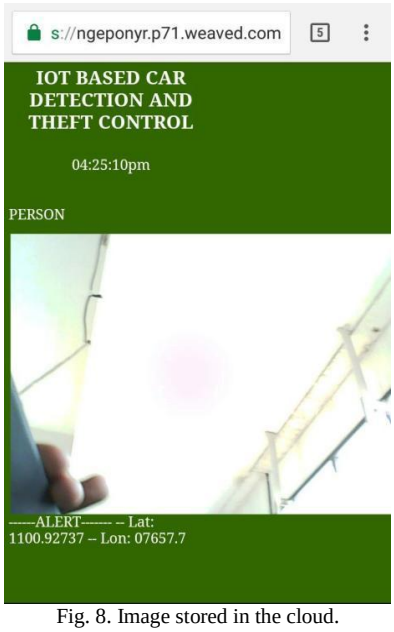

Fig. 8. Image stored in the cloud.

VII. CONCLUSION

The proposed system has made a good use of the Internet of Things (IoT) and cloud computing for providing better security system for the cars from being stolen. An Android application is created in mobiles to have a control over the security system as well as communicating with the cloud.

REFERENCES

[1] K. Mukurghee, "Anti-Theft vehicle tracking and immobilization system," *International Conference on Power, Control and Embedded Systems (ICPCES)*, 2014.

[2] V. K. Sehgal, M. Singhal, B. Mangla, S. Singh, and S. Kulshrestha, "An embedded interface for GSM based car security system," *IEEE Conference, Fourth International Conference on Computational Intelligence, Communication Systems and Networks (CICSyN)*, pp. 9-13, 2012.

[3] R. K. Moloo and V. K. Digumber, "Low-cost mobile GPS tracking solution," *International Conference on Business Computing and Global Information (BCGIN)*, , pp. 516-519, 2011.

[4] M. A. Mohd Nasir and W. Mansor, "GSM base motorcycle security system," *IEEE Control and System Graduate Research Colloquium*, 2011.

[5] P. A. Shinde, Y. B. Mane, and P. H. Tarange, "Real time vehicle monitoring and tracking system based on embedded Linux board and android application," *International Conference on Circuit, Power and Computing Technologies (ICCPCT)*, 2015.

[6] A. Khanna, and R. Anand, "IoT based smart parking system," *International Conference on Internet of Things and Applications (IOTA)*, 2016.

[7] Y. B. Mane and P. A. Shinde, "Advanced vehicle monitoring and tracking system based on raspberry Pi," *IEEE 9th International Conference on Intelligent Systems and Control (ISCO)*, 2015.