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RFID And Image Identification Based Anti-theft Security System

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***Abstract* - In today's world many of the people lost their valuable assets unknowingly or sometimes theft steals it intentionally for their own needs. Incase peoples forget their belongings at public places or at bus and so on. Complaints against those stuffs is such a big deal for one to find without any evidence. Hence there is a smart way to find those lost things with an ease, that the proposed system came up with the solutions like tracing the location, capture the locality or image of misplaced stuffs. In addition it is well known for anti-theft protection. Even though it is always costlier than the regular bag, it is well-made and looks lustrous along with some additional supremacy than normal one. Thus, it had been overcome by using raspberry pi 2 controller which in turn has features like program memory (RAM), processor and graphics chip, CPU, GPU, Ethernet port, GPIO pins, Xbee socket, UART, power source connector and various interfaces for other external devices Hence, the proposed system has several aspects like notification to the user about the lost stuff, capture the image of the theft or the background of the misplaced goods for every two minutes and sends it to the respective registered mail id thereby helps to track the location of the belonging with the help of GPS module.**

Keywords – GPS module, Camera module, RFID Reader & tag, Wi-Fi, Raspberry pi 2.

I. Introduction

Anti-theft security system is an advanced technology that is been invoked in valuable belongings in order to make it much secure and protective. It is made much more compactable that make it a better alternative than the regular ones. By making use of raspberry pi 2 controller the entire system is made more smart and approachable. A detailed view of prototypical security system is given below:

- Through the aid of smartphone Wi-Fi, the goods or the belongings is interfaced with mobile unit.
- Another part is the RFID reader that is used mainly for distance measurement (i.e,10 cm) between smartphone and the stuffs. When the stuffs and the device are apart from each other for more than 2 minutes, this module is triggered as "lost mode" on the paired device.
- With the help of portal text local messenger, the alert message automatically intimated to the registered mobile number.
- In addition, the GPS Module which makes tracking of lost or stolen things a possibility as if it is been employed with the security system. Once it is in the "lost mode", GPS module would then be exploited to track its exact location.
- Another interesting feature being implemented in proposed system is that the Camera module. It captures the pictures of the theft or the surrounding of the lost stuff where it is been misplaced. It triggers by itself whenever it is in lost mode. The captured image is sent to the registered user mail id.

The entire paper is organized as follows, Section II describes Literature survey and Motivation for the work. Section III discuss proposed system and modules for security system. In section IV complete circuit diagram of the anti theft security system is described. Section V covers the features. Section VI and section VII describes the result after the implementation and conclusion of the paper.

II. Literature Survey

Shabinar Binti Abdul Hamid, Widad Ismail, Aimi Zulliayana Rosli, [1] Design and Implementation of RFID based Anti-Theft System. This paper describes the RFID based implementation of anti-theft system to protect valuable assets such as artwork, museum art facts and rare books moved by curatorial staffs. Thus it is achieved by RFID tag which is used to monitor and senses the tampered event thereby sending the received signal to the reader. based upon the received signal the warning is send to the interfacing unit such that the curators have enough time to react before the stolen asset is going out of sight. Maheswari V. Chandrawar., Miss.Shital Y. Gaikwad.,[2] Anti-theft Security System based on ARM 7, the aim of this paper is design and develop a sustainable system to prevent automobile from theft. This is done by implementing GPS, GSM, RFID and two sensors to develop an Internet of things (IOT) platform for monitoring and analyzing using an ARM 7 microcontroller. Divya R, J P Kirthana Barathy, G Kannan,[3] "Smart Wallet Kit by Using Android Application and Bluetooth and GPS", This paper discuss about the tracing the location of lost gadgets using Bluetooth tracker. Ankita S. Patil., Saurav P. Belhekar., Rutuja S.Burkul., Mamata V. Sambare.,[4] Anti-theft Smart Wallet, this paper proposes a smart wallet with features like notification to the user once the wallet is out of range as it is been associated with the mobile phone via blue tooth module. The entire process and instructions are executed by making use of Arduino Nano Processor Board. Srushti Avhad., prajakta Bhosale., Abhishek Kulkarni., Runali Patil.,[5] "Smart Wallet", the main objective of this paper is to track the location of the misplaced wallet and sends the notification to the user about the lost wallet since the wallet is paired with the smartphone via blue tooth module. Hence, this is achieved by using Arduino Duo Board processor. Similar kind of project by company Walli was implemented one year ago, this wallet consists of six card slots, etc. But, in this wallet there is no hidden camera for capturing the pictures.

The Proposed System

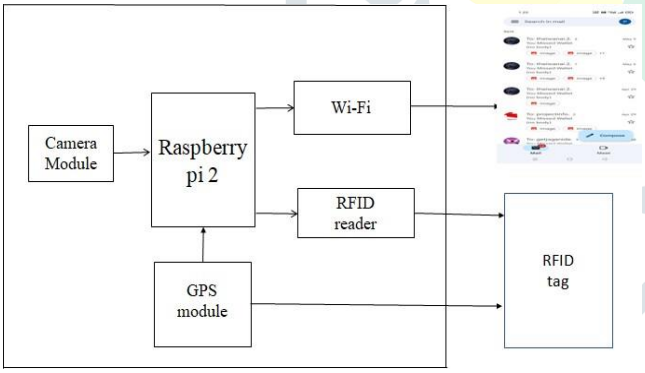


Figure 1. The Proposed System

This section describes the block diagram of the proposed anti-theft security system. Figure 1 illustrates the proposed system. Each module of this proposed security system is described as follows.

3.1 Mobile Unit (Smartphone)

The mobile unit is interfaced with the valuable belonging with the help of Wi- Fi module. This module is turned on once the wallet enters into the lost mode. Automatically GPS send the live location of the misplaced or stolen stuff to this unit and hence it would be traced with help of this module. In addition the captured images of the theft would be sent to this module (i.e., mail id). Text local message portal and GPS module are established and interfaced with the security system employed stuff with the help of this unit.

3.2 RFID Reader

RFID is expanded as Radio Frequency Identification which comprises of tag with unique id. This module is basically used for Distance measurement between reader and its tag. Firstly, the device which had been employed with the proposed security system must be paired with the mobile unit. If the RFID tag goes beyond the distance of 15 m the alert message will be sent to the registered mobile number. Indicating the user that the wallet has entered in lost mode.

3.3 GPS Module

This module helps to trace the location of the belonging once it enters into the lost mode. The GPS module traces the location of the lost/stolen stuffs and sends the live coordinates of the misplaced thing to the mobile unit with the help of text messenger portal.

3.4 Camera Module

This module is used to capture the pictures of the theft/misplaced surrounding whenever the wallet is in lost mode. The clicked images are sent to the registered mail id by making use of Dongle (Wi-Fi).

3.5 Controller Unit

The controller is foremost important thing and the main unit of the entire proposed system. It controls the entire proposed anti- theft security system. Raspberry pi 2 controller is been used for controlling and working of the system. All the instructions and commands fed by the user are controlled and executed by this unit.

3.6 Wi-Fi Module

Wi-Fi module helps to interface the mobile unit with raspberry pi. Thus, it helps to send the captured image of the theft or the surrounding of the misplaced asset once it is in lost mode. With the help of dongle which has been established with the raspberry pi, the captured image is sent to the registered mail id via Wi-Fi connectivity.

III. The Schematic Diagram

This section describes about the schematic of anti-theft security system and is illustrated in figure 2 and is shown below. This system comprises of three main components, i.e., GPS module for tracking, Distance measuring using RFID reader and alert message using online text messenger portal with the help of Wi-Fi and also hidden camera for taking pictures once it is in lost mode.

GPS module in the proposed system is basically used to track the current location of the lost/stolen stuff.

- Distance measuring using RFID reader measures whether the RFID tag is within the location or far away from it i.e, the distance is of about 10m apart from the reader.
- Hidden camera which is employed in the system is used to take pictures of suspicious person or location.

Initially, the entire proposed system/kit must be paired with mobile unit with the help of Wi-Fi module. If suppose the user belonging is misplaced/stolen, and as if the user moves beyond distance of 15 m then immediately it enters into the lost mode and the alert message will be intimated to the users registered mobile number.

The GPS module traces the location of the device that is paired with the security system as well as with the mobile unit. Once it is paired it sends the live coordinates of the device to the mobile unit with help of Pulse larsen antenna. Online text messenger portal coordinate with the mobile unit and is used to send alert messages to the registered mobile number.

Camera module is used to take the pictures of the theft once the bag/valuable asset is in lost mode i.e, the RFID tag is far away from the reader. The captured images of the thief is automatically sent to registered mobile number with help of Wi-fi in order to view the images that had been captured by the camera module.

The processor unit is the heart of the proposed RFID and Image Identification Based Anti-Theft Security system. This unit monitor and controls the entire system such as execution of instructions, controlling the system and follows the commands that is fed by the user etc.

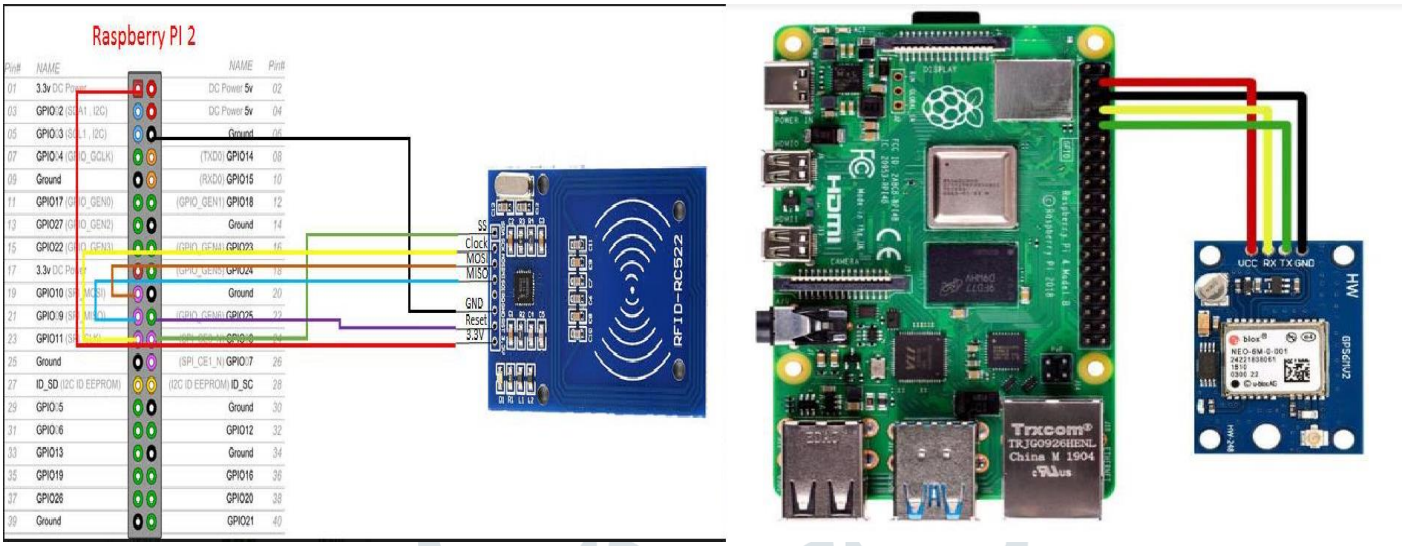


Figure 2. The Schematic Diagram

Flow Chart :

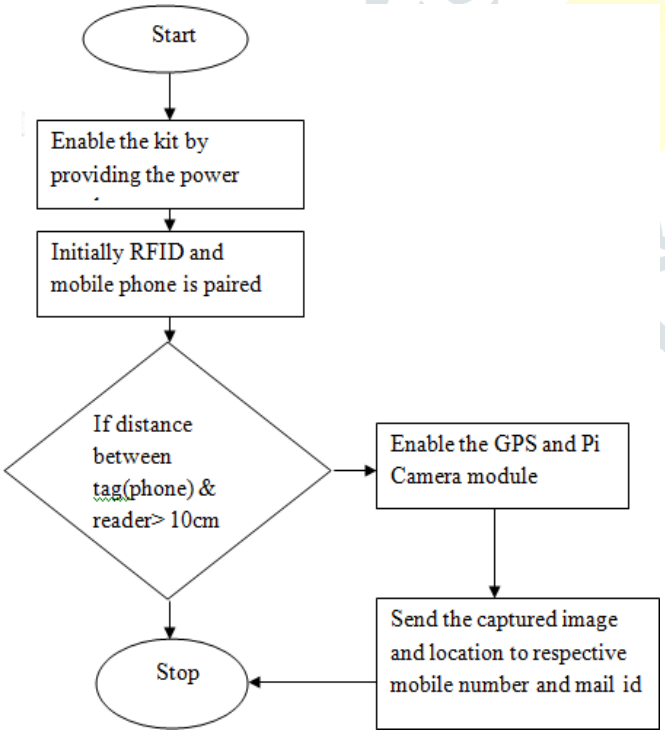


Figure 3. The Working of Anti-theft Security System

The wi-fi module interfaces the raspberry pi and the mobile unit. Also the smartphone and the RFID tag are being paired. When the RFID tag is distanced apart by 15 m the camera module is turned on and captures the live location, automatically the

alert message is sent to the registered mobile number. The image captured by the camera module is sent to the registered mail id.

IV. The Features of Smart Wallet

In this section the important features of anti-theft security system has been explained in detail. Now let us discuss some of the important features of the proposed system.

- Notification to smart phone when valuable belonging/asset is left behind.
- Compactable design as the components used here had been reduced.
- The images are sent to the mail id once it is in lost mode.
- Track the location of the misplaced stuff.
- Anti-lost distance alert message.

V. RESULT AND ANALYSIS

In Section VI the result obtained after implementing this proposed project was discussed. Figure 4 shows the actual prototypical model of the anti-theft security system.

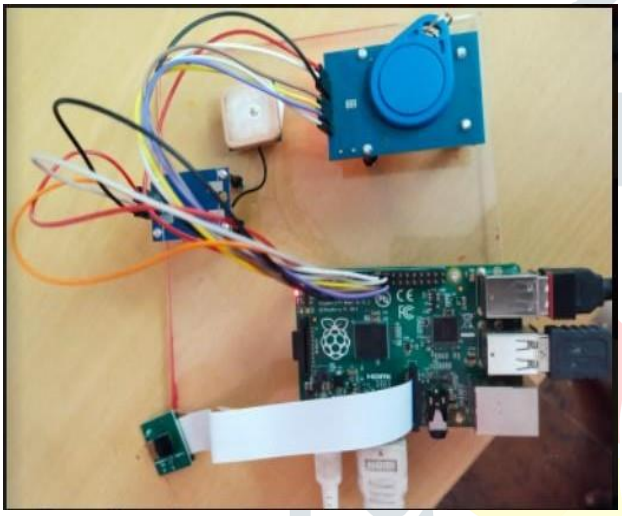
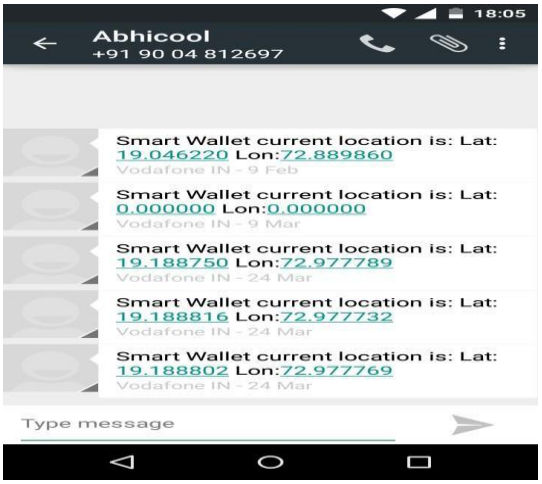


Figure 4. The Prototype Circuit

The model consists of raspberry pi 2, RFID Reader, Camera Module along with WI-FI module, online text message portal and GPS Module. In the proposed system, the system which is enveloped with the security system is tracked using Global positioning System (GPS) which keeps you connected with the asset thereby preventing it from being stolen/misplaced. Thus, ensuring safe mode at each time. The tracked location is then communicated to the registered mobile number in the form of link, by clicking the link it will be redirected to google map which helps to find the lost wallet. Also the camera module which is invoked with the raspberry pi captures the image for every 2 minutes once it is in lost mode and sends it to the respective users Mail ID.



camera module that is been sent to the respective registered mail ID which has been specially designed for any valuable belonging.

Figure 5 shows the screenshot of the coordinates of the stolen bag which has been employed with this proposed anti-theft security system on the user's phone traced by the GPS module. These coordinates are sent by an online local message portal to the users phone in the form of link and hence by tracing these coordinates the current location of the lost or stolen bag is easily found.

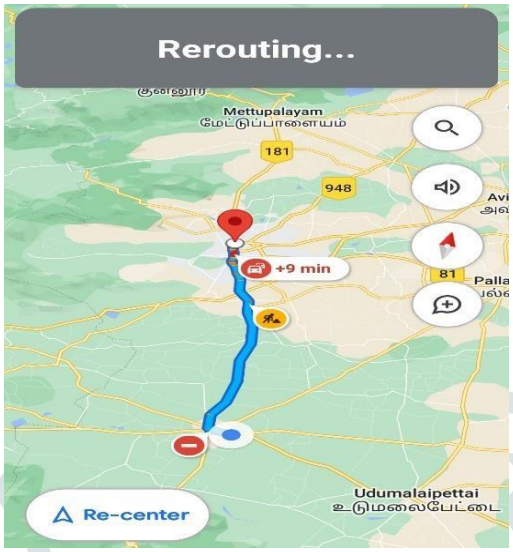


Figure 6. The screenshot of the location tracking with the help of received Coordinates

Figure 6 shows the screenshot of the location of the stolen anti-theft security bag coordinates on the users phone. With the help of this coordinates the live location is been traced by using Google maps in users phone. These coordinates are send by text message portal to the users phone and by tracing these coordinates the user would get the current location of the lost/stolen bag.

Figure 5. The Screenshot of GPS Coordinates on users smartphone

Figure 7 & 8 given below shows the screenshot of the image captured by the

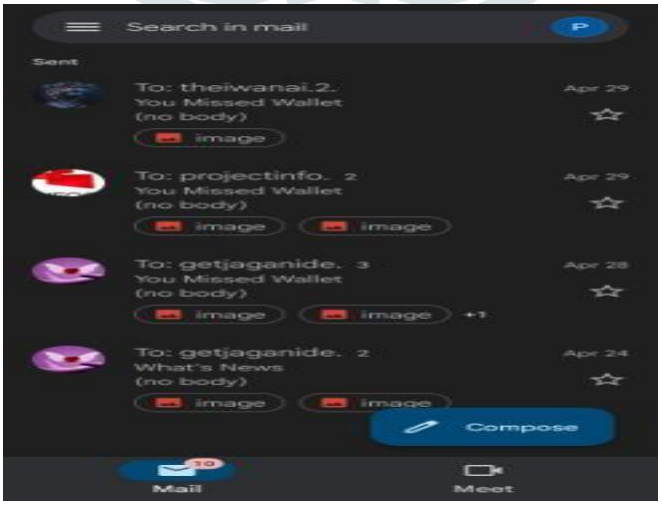


Figure 7

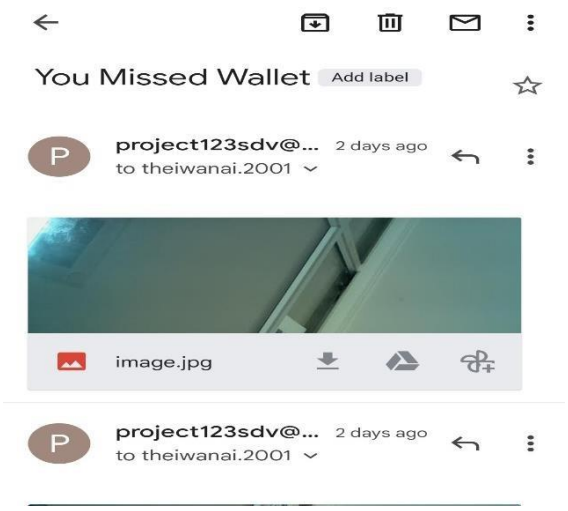


Figure 8

Figure 7 & 8. The Screenshot of the sent & received mail of the captured image

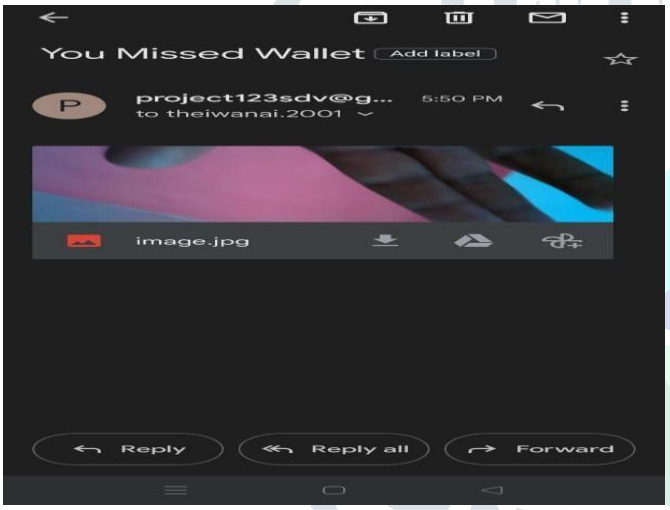


Figure 9. The Screenshot of captured image to the mail

Figure 9 shows the screenshot of the captured image which had been sent to the mail. The captured location of stolen bag is shown below.

Figure 10. Captured image in lost mode Figure 10 depicts the image taken by the camera module once the security system employed device is at out of range.

CONCLUSION :

The developed prototype is an advanced feature of an anti-theft security system that overcomes the problem being faced by peoples by losing their valuable stuff. The proposed system implements the use of real time scenarios, which accounts for the proper functioning of the GPS system along with Camera Module. As soon as the device which had been employed with this security system is unpaired with users Smartphone the GPS coordinates in the form of link is sent to the specified phone number using online text messenger portal and Wi-Fi module. In addition, the image captured by the camera module is sent to registered mail ID once the device is in lost mode This system also has some inbuilt features like location tracing, to view the captured image of the theft or surrounding location of the misplaced stuffs, much more compact than before and so on.

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