

ANTI-THEFT LUGGAGE TRACKER

R.Gautham¹

,R.Naveen², S.MadhanRaj³, S.Usha⁴

^{1,2,3}U.G Student, Rajalakshmi Engineering College, Chennai, gautham.r.2013.it@rajalakshmi.edu.in

⁴ Assistant Professor-IT, Rajalakshmi Engineering College, Chennai, usha.s@rajalakshmi.edu.in

Abstract: Luggage Tracker is a small portable Wi-Fi based tracking device stuck to your baggage lets you to keep your belongings vigilant with the help of your Smartphone. The prime objective behind this proposed system is to provide security with a cost effective component. The design Structure of this device is so simple that it encloses a Wi-Fi hotspot module and a rechargeable battery, to power the thing. Whenever the need arrives to track the luggage or some assets, the device is turned on. Next, the Smartphone is connected with this module by switching on the Wi-Fi. So, the Device acts as a Wi-Fi hotspot creator and the Smartphone as a host. The device is then fastened onto some luggage that the user will carry. Then the luggage could be tracked using this is non-complicated Wi-Fi connection. The Connection will get disconnected from the Smartphone as soon as the luggage goes some far from the user. This acts as a security warning and alerts the user with some sound sense.

In order to enhance the alert message with user-interface and compatible for different Smartphone OSs, an app has been created to facilitate the user to customize the alert. With the inherent advantage of Smartphone's, there is a special feature available to detect the level of signal strength. By making use of the notified Signal Strength, the distance between the Smartphone and luggage is detected and alerted as needed for the user.

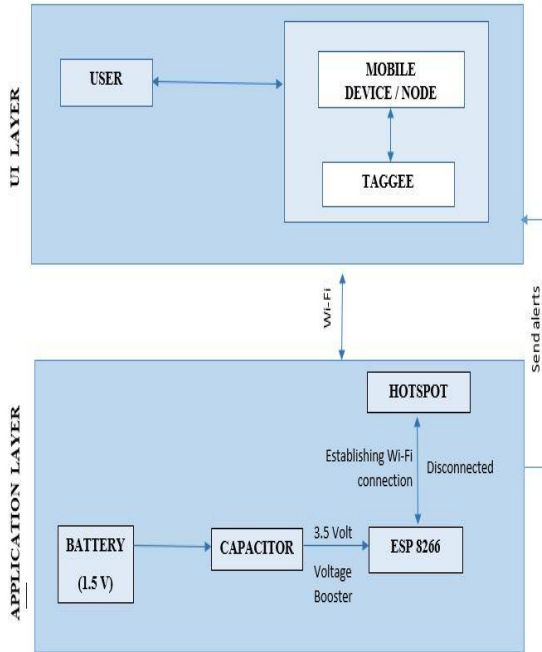
Keywords: Luggage Tracker, Smartphone, Wi-Fi, Wi-Fi Hotspot, Signal Strength, Luggage.

1. INTRODUCTION

Nowadays, the handling of luggage during travelling is a great challenge and causes headaches to the passengers or users. Such issues faced during travelling can be overcome by means of this Taggee. There is a risk of unstable or least the fear of theft for people irrespective of age factor when one steps out of his home with some valuables with him. This doesn't mean that there are no adequate resources to secure but do means there is a little enhancement in the techniques used by robbers. Earlier, the robbery is usually performed with knifepoint. Owing to the advancements in security, due to pervasive technologies like mobile communication, the act of seizing a thief red-handedly had become quite easy. Of all these, it is better to keep our belongings safe and noticeable range.

Even if we try to keep an eye on our things all the time, sometimes our attention may divert either naturally or with the intention of some stealer to cause to rob our assets. The other problem is to be cautious with our luggage during travelling. It is comparatively difficult to track our luggage with us on a public transit. Hence, this paper aims to bring in an IOT that helps to aid the mentioned difficulty. The structure of this thing resembles a small Tag or Keychain, so that it is possible to be fixed onto a luggage or whatever to be tracked.

Fig.1. General Framework - Architecture Diagram for Luggage tracker.



The User Interface layer consists of a mobile node, a Wi-Fi hotspot device and an ultimate user, who is the supreme controller and beneficiary of this system. The Mobile node holds the Interface position for both the luggage tracker and the user, since the mobile extracts signals from hotspot device and conveys the status of the connection to the User. The connection between the mobile node and the hotspot device would always be agile and it will be monitored for its existence by the Mobile node.

The Hotspot device(ESP8266) needs to be powered all the day using a portable, handheld battery. Hence, a conventional battery which is meant for normal day-to-day life purpose is used. However, the power dissipated is much lower than the actual power required by the device. To boost the voltage of the power supply, a capacitor is used through to boost the voltage. The output of the capacitor is measured as 3.5 Volt which is appropriate for the device to be powered up. The output of the capacitor is fetched to the Vcc of the ESP8266 Wi-Fi module. Once the

device is powered on, it creates a hotspot area of about 10 metres radius. The mobile node is then made to be present in this area to connect with this hotspot device. By tapping the desired SSID name in the WLAN list provided in the smartphone, the Wi-Fi connection is established between the device and the mobile node. The connection needs to be always intact so that the mobile node knows that the luggage is within the reach of 10 metres. Once the connection between the device and the mobile node gets disrupted, it shows that the luggage is 10 metres away from the user. Moreover, it induces an alert in the mobile node so that the user got intimated by the theft.

A hotspot is a physical location which provides Internet access for users by using Wi-Fi technology, in a wireless local area network (WLAN) by means of a router linked to an internet service provider.

The Wireless hotspots can be categorized into two types, Public and Private. Nowadays, several businesses and mobile applications makes use of public hotspots and which can be used by the customers in various settled urban areas all over the world, a few applications like coffee shops, hotels guest rooms or in the hall. The main difference between Hotspots and wireless access points is the hardware devices used for providing a wireless service. The second class, private hotspots allows the Internet access for devices such as tablet, smart phones and so on.

II. LITERATURE SURVEY

Deepti Mishra et al., (2010) In this paper, they proposed security for luggage tracking system particularly in the aviation industry, most of the airports is making use of RFID technology for

providing security for the baggage which has been handled for a long time ^[1].

Debra Lindberg et al., (2013) The proposed system is implemented based on the techniques such as hotspot policing and crime mapping which are considered as efficient methodology and used by Portland Police Bureau for minimizing the number of crimes and illegal activities that occurs in the Portland. By this system, the circumstances of the society are improved to greater extent ^[2].

Ting Zhang et al., (2008) In this paper, the RFID-based baggage tracking system is employed in the Beijing Capital International Airport, for to improve user management and satisfaction. This system works well in real time situations, even it is more efficient in handling high noisy environment. ^[3]

D. Balakrishna et al., (2014) This paper is mainly focused on tracing and checking the luggage at various security platforms at the airports. The passenger will be notified about the status of his/her luggage each time the luggage passes each platform. The user luggage is attached with a RFID tag which in turn has a unique number. The unique number is given to each and every passenger when getting into the airport. The inspection of metals in the luggage was completed by the metal sensor. If it senses any metals or restricted devices, the system intimates through alarm signals by means of sending the message to the user mobile via GSM modem and it is updated to the database. ^[4]

Rohit N. Bhoi et al., (2015) This work focusses on monitoring the child in and around the school and also ensures the mood of the child such as laughter or crying of a child and it will be conveyed to their parent's mobile phone by using GSM technology. The mood of the child is identified by using voice

recognition technology which investigates the recorded voice of the child through the voice playback circuit. ^[5]

Nestor Alvarez-Diaz et al., (2017) This paper is mainly intended on the control points to accelerate passenger flow and create additional security over baggage control. This sheltered and uninterrupted tracking is possible in the current scenario by applying homomorphic cryptography technique along with Near-Field Communication. ^[6]

AsmaeBerrada et al., (2015) The recommended system in this paper is an improved RFID-based approach to trace the location of traveler's luggage. Here, a Bracelet kind of device is employed that interactively communicates with the RFID system through a database application. ^[7]

Shona Jainwar et al., (2016) This paper proposes an Intelligent suitcase which can help in tracking the passenger's suitcase by implementing technology such as GPS and RFID cards. The RFID cards will be provided with the unique number for each suitcase of the passenger travelling in the plane. The device is controlled by the smartphone and Bluetooth technology assist in digital locking, location tracking and identification along with various features. ^[8]

Peter D. DeVries et al., (2008) This paper is mainly focused on providing the security for the Baggage in the airport using RFID technology. The RFID technology has been implemented because it is more acceptable and easily affordable. ^[9]

GangiRaghu Ram et al., (2017) The suggested system aids to identify an object in motion within a wireless environment even it doesn't have any wireless facilities, so this system is the integration of RFID technology with the wireless networks in order to provide a low cost solution for identifying the objects and tracking the various applications. ^[10]

The Structure of this device is so simple that it encloses a Wi-Fi hotspot module and a rechargeable battery, to power the thing. Whenever the need arrives to track the luggage or some assets, the device is turned on. Next, the smartphone is connected with this module by switching on the Wi-Fi. So, the Device acts as a Wi-Fi hotspot creator and the Smartphone as a host. The device is then fastened onto some luggage the user carries. Then the luggage could be tracked using this is non-complicated Wi-Fi connection.

The Connection will get disconnected from the smartphone as soon as the luggage goes some far away from the user. This acts as a security warning and alerts the user with some sound sense.

To enhance the alert message with user-interface and compatible for different smartphone OSs, an app has been created to facilitate the user to customize the alert. In order to extend the advantage of Smartphones, there is a feature to detect the level of signal strength. With the help of the Signal Strength, the distance between the smartphone and luggage is detected and alerted as needed.

The aspect of this paper is to introduce a device with more featured, non-complexity, cost-effective system that lasts longer by shaping it with a common and more settled technology like Wi-Fi. The Assurance is so strong that the device won't go deprecated unless the Wi-Fi feature has been succeeded by some advanced technology.

III. PROPOSED SYSTEM

The prime objective of this paper is to bring in a cost-effective thing that from the user's perspective should be simple to use without any complexities. In additional to this, it needs to revolutionize the world with a simple existing thing that makes the thing less

tangled. By implementing this IOT, it helps to aid the mentioned difficulty of tracking the luggage all the time the user walks out of the house. The structure of this thing resembles a small Tag or Keychain, so that it is possible to be fixed onto a luggage or whatever to be tracked. The Mobile application in turn is light weight and hence it is easy to get installed in the smart phone.

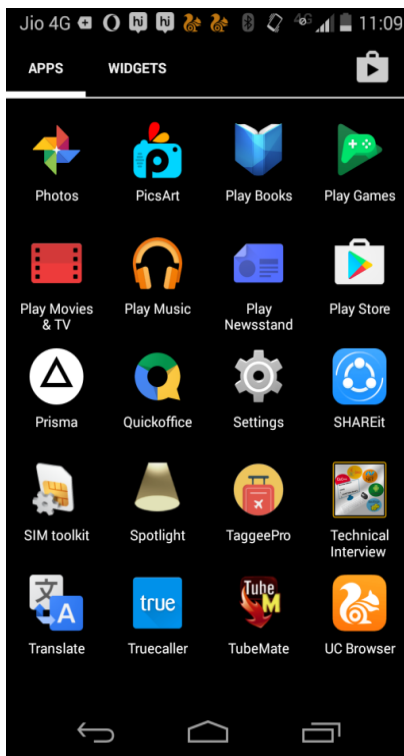
The Below figure 2 represents the overall functionality of the entire Taggee system. The user has to fasten the Taggee device onto the luggage and switch on the device. Then, the user is instructed to open the Taggee mobile application in the smartphone. The user has to latch to the available nearby Wi-Fi hotspots. The Application will now start monitoring the device which is fixed onto a luggage with the help of the Wi-Fi connection. The Wi-Fi connection will remain intact up to 10 metres, if it goes afar the limit it will send the security alert messages to the user indicating that luggage is under some stranger's control. With the help of the alert from the smartphone, the user should take essential steps to possess again the luggage.

Fig.2.Overview of the System



Taggee is a Tracking device that comes with a dedicated mobile application which helps tracking of luggage more easier in a secured way. The app is represented in the below figure,

Fig.3.Taggee among other apps



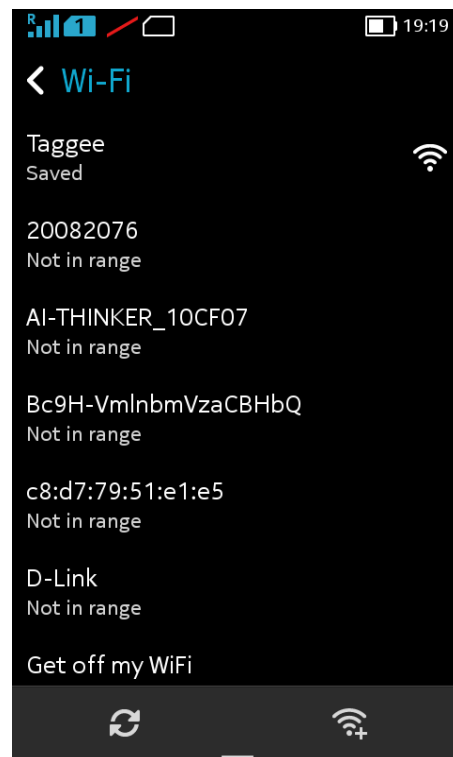
The user has to tap on the opened lock to start monitoring the luggage. It will navigate you to the next screen where the nearby Wi-Fi hotspots are displayed. These functions are represented in the below figure

Fig.4.Main Activity



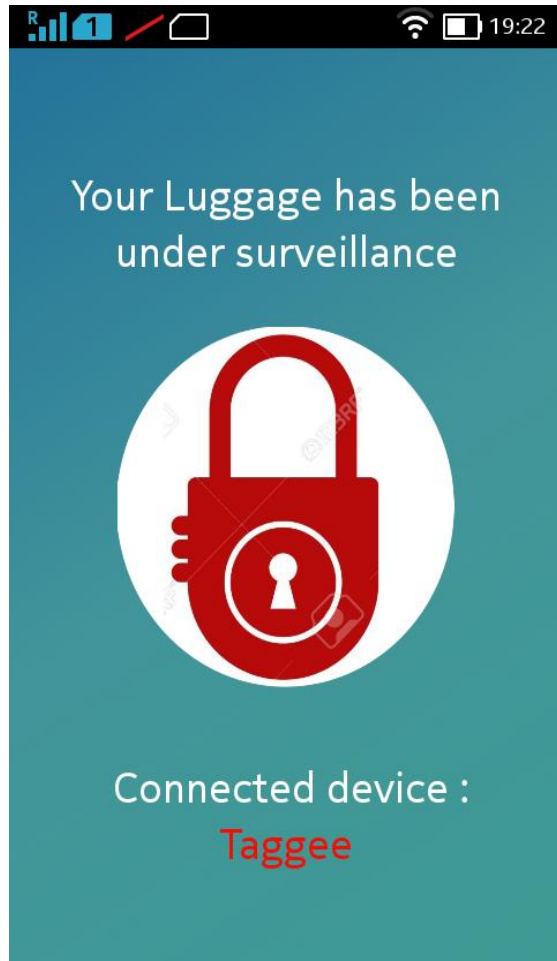
The Figure shows the available nearby Wi-Fi devices. The user has to select the appropriate Taggee device which has got fixed onto the Baggage and connect with it.

Fig.5.Choosing the Taggee



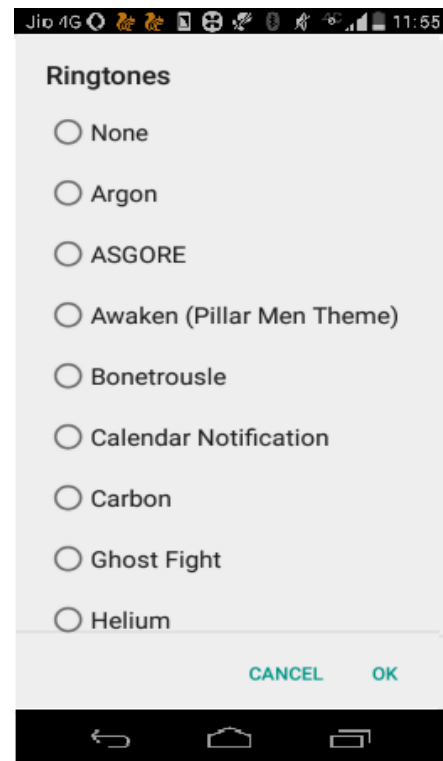
Next, a screen flashes which shows that the luggage is under surveillance. It also shows the SSID name of the hotspot being connected for additional clarification. The forthcoming screenshot shows the Luggage Tracker being connected with the smartphone application.

Fig.6.App starts to monitor



With the assistance from the Settings menu, the user is able to select the desired alert tone for setting the alarm tone. The figure given down shows the screenshot of the mobile application in which the user chooses the alert tone.

Fig.7. Selecting the alert tone



The below figure shows the Launcher icon of the Taggee Mobile application.

Fig.8.Icon of the application



Components	Cost in INR
Wi-Fi module (ESP8266)	₹ 350
1.5 Volt Battery (2 No.s)	₹ 14
Connecting wires	₹ 20
Capacitor	₹ 10
Total	₹ 394

IV. CURRENT STATUS AND FUTURE WORK

The Taggee will serve as an efficient solution to overcome the problem of luggage theft when travelling in public transit. This proposed system will overcome all the issues faced by the common people in the existing system during travelling from one location to another location. This will assist the passenger need not worry about their luggage during travelling. This Taggee will act as a traveller's friend by reducing stress of passengers regarding luggage.

ACKNOWLEDGEMENT

I acknowledge my sincere gratitude to Rajalakshmi Engineering College, Chennai for their help and support.

REFERENCES

1. Deepti Mishra, Alok Mishra, "Improving Baggage Tracking Security and Customer Services with RFID in the airline industry", 2010, Vol. 7(2), 139-154.
2. Dr. Debra Lindberg, "Implementing Hotspot Policing: A Review of the Literature", 2013, Paper (4), 1-11
3. Ting Zhang, Yuanxin Ouyang, Yang He, "Traceable Air Baggage tracking system based on RFID Tags in the airport", 2008, Vol. 3(1), 106-115.
4. D. Balakrishna, A. Raghuram, "RFID based Airport Luggage checking and tracking system using GSM Technology", 2014, Vol. 3(31), 6279-6284.
5. Rohit N. Bhoi, Dr. V. V. Shete, S.B. Somani, "Child Tracking system on Mobile Terminal", 2015, Vol. 4(6), 213-217.
6. NéstorÁlvarez-Díaz,Pino Caballero-Gil,and Mike Burmester, "A Luggage control System based on NFC and Homomorphic Cryptography", 2017, Vol. 2017, 1-11
7. AsmaeBerrada, YassineSalih-Alj, "An Efficient RFID based tracking system for airport luggage", 2015, Vol. 4(3), 64-73.
8. Shona Jainwar, B. Hari Kishore Rao, Khyati Varma, Honey Tamrakar, "The intelligent suitcase", 2016, Vol. 4(9), 40-43.
9. Peter D. DeVries, "The state of RFID for effective Baggage Tracking in the airline industry", 2008, vol. 6(2), 151-164.
10. Gangi Raghu Ram, N. Rajesh Babu, N.P. Sudhakar, BalanaguRaviteja, K. Rammohanarao, "Tracking objects using RFID and Wireless sensor networks", 2017, Vol. 2(3), 513-517.