IJARCCE

International Journal of Advanced Research in Computer and Communication Engineering

ISO 3297:2007 Certified ⁜ Impact Factor 8.102 ⁜ 26 may 2023

DOI: 10.17148/IJARCCE.2023.12xx

DEVELOPING A VIRTUAL ASSISTANT TO HELP PASSENGERS FIND THE MISSING LUGGAGE AT AIRPORT

Dr Anand S N[1*], Larsen Mathias[2], Devi Prakshath[3] and Adarshkumara M[4]

[1*]Professor and HOD, Mangalore Institute of Technology and Engineering, Moodabidri, India

[2,3,4,5] UG Students, Mangalore Institute of Technology and Engineering, Moodabidri, India

*Corresponding author: hodaer@mite.ac.in

Abstract

In the field of aviation, lost or misplaced baggage is a common problem faced by passengers, which can lead to frustration and inconvenience. In this study, we propose an automated solution using programming languages such as Python and Arduino boards to reduce the incidence of lost baggage. Our model is based on an automated tracking system that records the location of the luggage at every point of transfer, which can be accessed by the passenger through a website. In case of misplaced baggage, our system sends notifications to the passenger regarding the last point where the luggage was scanned. Our proposed model incorporates an interactive virtual assistant that responds to passenger queries regarding the location of their baggage, enhancing the passenger experience. By implementing this model, we aim to reduce the incidence of lost baggage, improve passenger satisfaction, and decrease operational costs for airlines. Our proposed solution is cost-effective, efficient, and easy to integrate into existing baggage handling systems. We believe our model can significantly reduce the incidence of lost baggage and improve passenger experience. We look forward to presenting our findings and discussing the potential implications of our proposed solution at the upcoming aviation industry conference.

Keywords: Virtual assistant, Aviation industry, Automated tracking system, Lost baggage, cost-effective and efficient

1. Introduction

Airline transportation is a rapidly developing and highly preferred sector, but due to its wide network and appealing to millions of people, it cannot be prevented from experiencing some problems in air travel and airports. The virtual assistant is proposed in such a way that it scans a QR code generated with Arduino technology. made for humans to retrieve when people lose their luggage in public areas like airports and railway stations. It is very important to track the luggage in case of loss or misplacement. The Android software provides the location status of luggage. It also has a calling feature that will call the respective owner of the luggage and update them the location of the luggage. by which they keep their important things safe and secure, and if there is a change in the path of the luggage, then the assistant will send a message to your mobile phone and also call regarding the location of stored warehouse. As an add-on, it can also take the calls from people and interact with them.One of the major problems encountered is luggage misplacement, according to a report from the U.S. Department of Transportation, the rate of stolen or damaged luggage has been on the decline in recent years. However, baggage still goes missing at airports every day. There are a number of reasons why baggage might go missing at an airport. One of the most common is that it is accidentally sent to the wrong destination. This can happen if a bag is mislabeled or if it is placed on the wrong conveyor belt. There are many ways to find missing baggage at an airport using Python automation scripts. One way would be to use a Python script to automatically check the airport's lost and found database. Another way would be to use a Python script to scan the airport's security cameras for any bags that have been lost or left behind. Communication is essential for guaranteeing the rapid recovery of lost things in the case of misplaced luggage. Airlines may be contacted in a number of ways, including phoning and messaging. The anxiety and frustration brought on by lost luggage might be lessened with effective communication between travelers and airlines. Thus, all this points to the need for a cheaper and more efficient solution to the luggage issue that will benefit the airline industry.

2. System architect and Methodology:

The steps taken in this project to achieve the desired result:

- conducted a literature review to better grasp the requirement for the problem statement that was provided.
- For the scanner we used ESP-32 cam module + FTDI.
- The code for the connecting the esp32 with python script was written and connected to database.
- The code for retrieval of the information and the calling feature

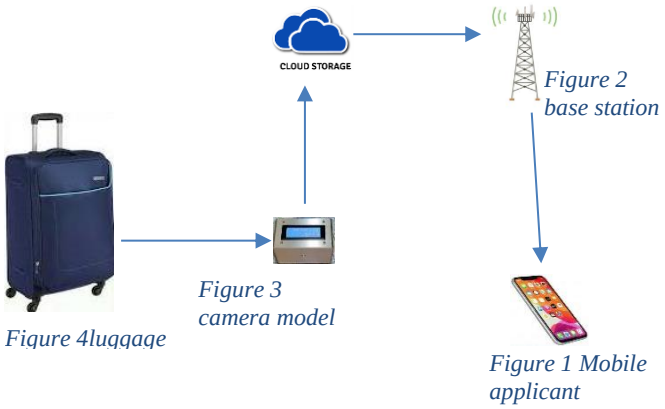


Figure 2 base station

Figure 3 camera model

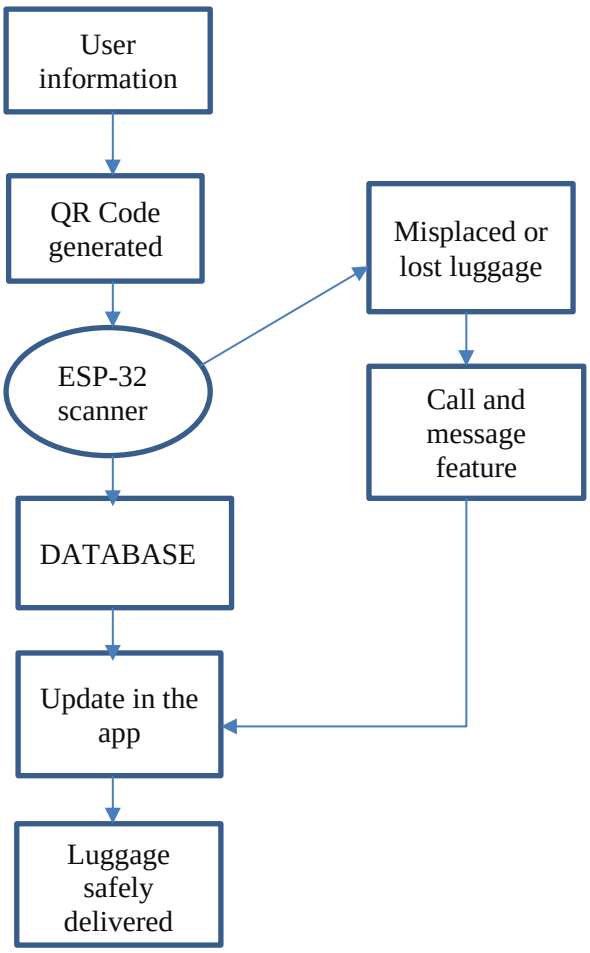
Figure 4luggage

Figure 1 Mobile applicant

SYSTEM ARCHITECH

3. BLOCK DIAGRAM AND ITS WORKING

;



According to the "Société Internationale de Télécommunications Aéronautiques" (SITA) Baggage Report 2019, Global rate of mishandled bags was estimated 5.69 per thousand passengers. This indicate that to approximate 25.8 million mishandled or lost bags out of 4.5 billion passenger journeys worldwide. This report also note that while the overall rate of mishandled bags has been decreasing over the years due to the emerging technology, the absolute number of mishandled bags has been increasing due to the growth in passenger numbers. In terms of the reasons for mishandled bags, the same report states that the majority (64%) of bags are mishandled due to "transfer mishandling", which refers to bags which are not properly transferred between flights during connecting journeys. Other reasons for mishandling include "failure to load" (13%), "sorting errors" (10%), and "tagging errors" (9%). As for the potential impact of the proposed technology, it's difficult to provide an exact percentage of how much it could reduce the number of mishandled bags without more information about the specific features and implementation of the technology. However, it's clear that any improvement in baggage handling processes and tracking systems has the potential to reduce the rate of mishandled bags and improve the overall passenger experience.

Figure 1 The scanner

- Initialising with the ESP32 module, we programmed it to scan QR codes using its camera module and transfer the data to a cloud server.
- The data from the QR codes will be stored on a cloud server. The server was configured to obtain luggage-related data from the ESP32 module and store it in a database.
- To retrieve the information from the server, we developed a mobile app that could access the cloud server and display the luggage information. The app was designed to be user-friendly and intuitive, allowing the user to easily view the location and status of their luggage.
- The QR code for the project is generated using the information collected during the flight ticket booking. Based on the flight path, the information stored in the database has a unique code that can be scanned. The location of the ESP-32 scan is compared with that of the already stored database;

if there is a change in the luggage path, then misplacement is shown in the app.

- We performed a number of experiments to see whether the cloud server's information retrieval and QR code scanning were accurate.

4. Element and Methods

The ESP32 is a well-known microcontroller that, due to its low power consumption, low cost and excellent performance characteristics, is frequently utilized in IoT and embedded systems. Based on the Xtensa LX6 CPU, it has dual-core processing, integrated Bluetooth and Wi-Fi, and compatibility for a number of different communication protocols, including CAN, SPI, and I2C.

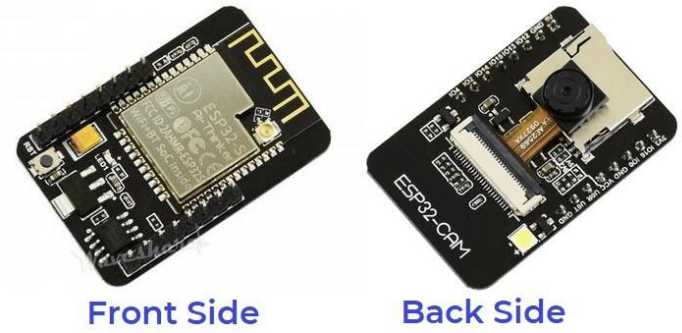


Figure 2 ESP-32 CAM Module

The ESP-32 cam module needs an FTDI (Future Technology Devices International) module, and the FTDI chip can be used to provide a USB interface for the ESP32 to communicate with a computer or other device. This allows for easy data transfer and programming of the ESP32-based camera module. Also, the FTDI chip is used to provide power to the ESP32, resulting in simplified wiring and power management of the camera module.

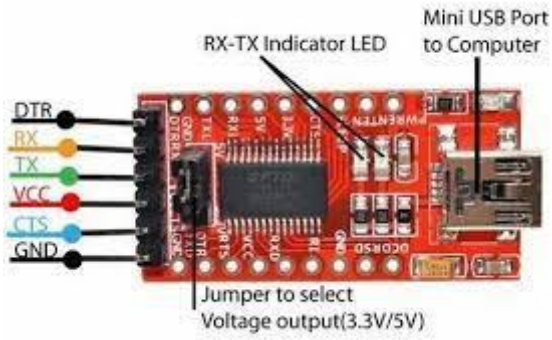


Figure 3: FTDI Module

Pros of using ESP32 as a camera module to pairing it with an FTDI chip.

1. Wi-Fi and Bluetooth connectivity: The ESP32 features built-in Wi-Fi and Bluetooth modules that make it simple to connect to other devices and networks, making it the perfect choice for IoT applications.
2. Low energy intake: The ESP32 is built to use less power, making it appropriate for battery-operated applications.
3. Strong computing capability: The ESP32 includes a dual-core CPU that can operate at up to 240 MHz, offering strong processing capability for applications that need it.
4. Broad collection of peripherals: The ESP32 has a comprehensive range of peripherals, including UART, SPI, I2C, and ADC, which makes it simple to connect to additional sensors and devices.
5. Economical: The ESP32 is a cost-effective alternative for embedded systems and Internet of Things applications, making it a great option for developers.

The use of QR codes in the luggage tracking project offers several advantages:

1. Easy to generate and faster to scan: QR codes can be generated easily and can be scanned using a smartphone camera.
2. Accuracy in identification: The QR code contains a unique identification number linked to a specific luggage item. Thus, ensuring accurate identification of the luggage and minimizing the risk of mishandling.
3. Real-time tracking: By scanning the QR code, the luggage owner can get real-time updates on the location and status of their luggage.
4. Economic solution: The use of QR codes is a cost-effective solution for luggage tracking compared to other technologies such as GPS. QR codes can be printed on luggage tags or stickers at a relatively low cost, making it an affordable option for both airlines and passengers.

Circuit connection:

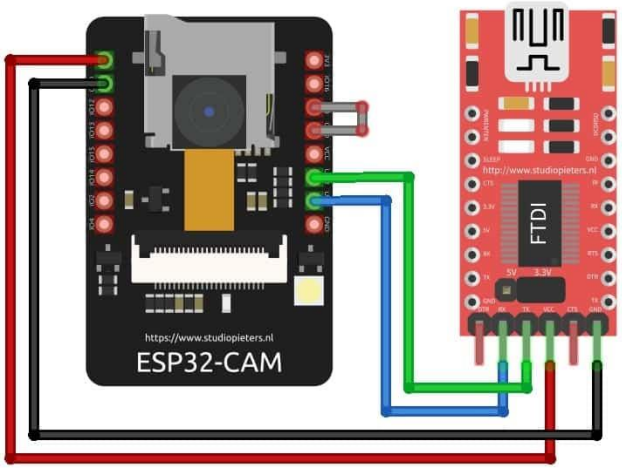


Figure 5: esp32 +FTDI module

ESP32-CAM	FTDI Programmer
GND	GND
5V	VCC
U0R	TX
U0T	RX
GPIO0	GND

Figure 6: Connection Tables

5. Literature survey:

The article [1] "Luggage Tracking System Using IoT" Here we know that the purpose of a luggage tracking system is to track down lost bags in public and other circumstances. The suggested solution is intended to address the risk of luggage and bag theft that exists whenever folks travel. The Arduino Uno board and a GPS module are used to set off an alarm as part of the luggage tracking system's alarming mechanism. Additionally, the alarm is activated the moment the bag goes missing and leaves a predetermined area. Finally, a map is produced that allows us to track the location of the bag. To do this, IoT components like an Arduino board, a GPS module, and a frontend or mobile application are needed.

In this article [2] "Smart Luggage Tracker" provides a major loophole in the Aviation industry is luggage mishandling. Luggage is often misplaced or lost and cases of damage to belongings are common. In this article, we proposed and implemented a luggage tracking and handle system using RFID tag which gets stored on cloud server. This algorithm is highly secure and the details of passengers and airlines are fetched in it. A prototype at the two locations of check-in and check-out are developed. Authentic-time location is also detected and fetched in a cloud server. Each passenger has a unique RFID code that has to be entered to find the precise place on the webpage and status of their luggage. Details include the exact time of arrival of luggage, location, net weight before and after loading. This information lets the passenger take necessary action if the luggage has been misplaced, stolen or tampered.

The article [3] "Smart Bag with Theft Prevention and Real-Time Tracking" establishes the studies related to smart bag. This technology enhances that the bag can be activated only by the owner and also location can be tracked using GPS and GSM.

In [4] "Rail Rush System for Crowd Analysis" The proposed system provides the location of the train along with the number of crowds in each coach. The user will be able to track the train anywhere and can catch the train easily. For the number of crowds, there will be an image processing technique. GPS will be used for tracking the train.

In this article [5] "Using RGB-D sensors for the discovering of abandoned luggage" This article provides functioning in dynamic environments. This approach consists of two sensors, the RGB and Depth sensor. The RGB sensor is used to extract type of discarded pieces of luggage and verify them. The Depth sensor is used to identify users and remove persons from the list of assumed objects.

In this paper[6] "RFID Application to Airport Luggage Tracking as a Green Logistics Approach" provides a Green Airport luggage tracking system by developing RFID architecture, components, functioning, and middleware roles and then provides access to RFID data making authentication methods more robust and flexible.

This article [7] "Remote Control and Tracking Dual-Mode Smart Suitcase" provides an intellectual travel case that can be vaguely inhibited. It can be used in airports, railway stations, etc. In an open and large space, the travel case can find the users position and track it and in case of a busy place, the working direction can be controlled. This system is also useful for cargo Handling.

In article [8] "Tripartite Authentication Protocol RFID/NFC Based on ECC" The proposed system is based on the communication between the reader and the background. If it is unsafe the reader and background mutually authenticate each other besides the protocol provides a public secret for three participants to read and modify data.

This paper [9] "Color tracking technique by using pixy CMUcam5 for wheelchair luggage follower" This proposed method is used for Wheelchair follower which uses a color tracking system. Pixy CMUcam5 sensor is used for color detection and Arduino MEGA is the controller for input and output data. Servo motor acts as a director of the front wheel while the ultrasonic sensor is used to avoid collision and transaxle motor is performed through the motor driver.

This paper [10] "Towards smart wearable real-time airport luggage tracking" consists of a innovative system for luggage tracking using the android application and smartwatch. This software is used to detect the advent of luggage. We also developed a Smart power Management model which can recharge the tag.

6. Result and Discussions:

Figure 7: Android application where the luggage status is updated.

Figure 8:generation of QR and assigning the unique code

Figure 9: ESP-32 + FTDI module during testing stage

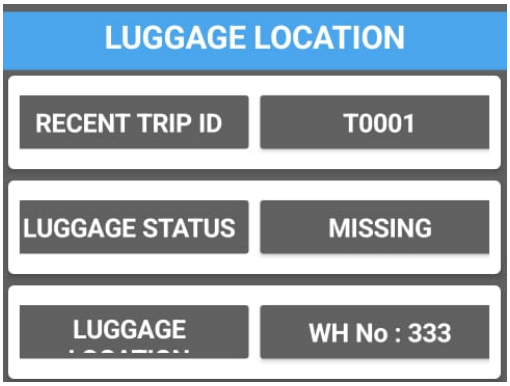


Figure 10: An update in the app shows the location of the warehouse where the luggage got collected.

7. Conclusion

Goal of this initiative is to find lost or missing baggage. Here, we offer an ESP-32 module for tracking down lost luggage by comparing the scanned position to information gleaned from the booking. Consequently, the chance of the luggage becoming lost is lower. Additionally, a QR code is utilized to provide a unique identification for the data that is stored on the cloud server. The biggest benefit is that it requires less time and is less expensive. Thus, a smart baggage system facilitates and eases a person's life. and also aiming to reduce the misplacement of the luggage by using a virtual assistant to call, message in case of loss

7.

1.
2.
3.
4.
5.
6.

8. Reference

[1] D. Plackett and M. J. H. Simmons "Development of soy protein-based resins for use incomposite materials" Published in the Journal of Materials Science in 2018.

[2] Sudha Senthil Kumar, Brindha. K, Rathi. R, Charanya. R, MayankJain, Professor, VIT, Vellore – 632014. Tamil Nadu, India “Luggage Tracking System Using IoT”, 2017, International Journal of Pure and Applied Mathematics Volume 117, No. 17, 2017.

[3] Keerti S. Nair, Anjitha Jyothi Kumar, A. P. Anushka Pillai, M. S. Greeshma, Jibin Joseph “Smart Luggage Tracker”,International Journal of Research in Engineering, Science and Management Volume-2, Issue-6, June-2019.

[4] Ankush Sutar, Tukaram Kocharekeal, Piyush Mestry, PrathameshSawantdesai, Mrs. Suhasini S. Goikar, “Smart Bag with Theft Prevention and Real-Time Tracking”, International Journal of Trend in Scientific Research and Development, Volume 2, 2018.

[5] Ravi Jadiwal, Abhishek Parmar, Leena Raut,”Rail Rush System for Crowd Analysis” 2018 International Conference on Smart City and Emerging Technology

[6] M. Ajami, B. Lang, “Using RGB-D sensors for the detection of abandoned luggage”,7th International Conference on Imaging for Crime Detection and Prevention 2016

[7] YassirRouchdi, AchrafHaibi, Khalid El Yassini, Mohammed Boulmalf,KenzaOufaska,

[8] F. Chen, et al, "Soy protein-based resins for composite materials: synthesis, properties and applications". Published in the Journal of Polymer Science in 2019.

[9] S. K. Nayak and S. K. Mohanty. Published inthe Journal of Applied Polymer Science in 2019. "Jute fiber-reinforced soy protein-based composites: preparation, characterization and properties".

[10] Chhavi, Deepmala KM, Singh VK*, Sakshi Chauhan and Naman Jain. “Soy Protien based green composite”. Research and Reviews: Material and science. DOI: 10.4172/2321-6212.1000171.

[11] Asheesh Kumar and Anshuman Srivastava "Preparation and Mechanical Properties of Jute Fiber Reinforced Epoxy Composites".

[12] Industrial engineering & Management-January2017.

[13] M.d Sanaual Rabbi, M.d Tansirul Islam. "Jute fiber reinforced polymer

[14] Composites". Research gate June 2020.

[15] Mian Riaz. "Textured soy proteins and its uses". Research gate September 2001.

[16] Jose' Martins Ferreira, Carlos Capelaa,b*, Joa~o Manaiab , Jose Domingos Costaa. "Mechanical properties of woven mat jute/epoxycomposites". Material research 2015-0422.

[17] Virtual Personal Assistant for the Blind 1Rutuja V. Kukade, 2Ruchita G. Fengse, 3Kiran D. Rodge, 4Siddhi P. Ransing, 5Vina M. Lomte