

# Air Bag Tracker Using GPS Enabled QR Code System

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**Abstract:** Traveling is an essential part of life, whether for business or pleasure, and it's usually done with the intention of creating memories that will last a lifetime. However, lost luggage can make the experience stressful because it often contains essential vacation necessities. Because losing luggage can lead to significant expenses and challenges, travellers must make sure their gear is safe and secure. The cost and complexity of integrating modern technology, like RFID tags, notwithstanding their utility, expose travellers to potential losses. A React Native mobile application that works seamlessly on iOS and Android smartphones was developed in order to address this issue. Customers can add their luggage information to the app by scanning a unique QR code. Each QR code connects to a GPS-enabled device attached to the bag. By scanning the QR code, the user may see the current location of their baggage, making it simple to follow them while traveling. This user-friendly yet effective solution increases security and gives travellers a practical way to keep an eye on their belongings, resulting in economical luggage management and peace of mind.

**Keywords:** GPS, QR code, RFID

## I. INTRODUCTION

The problem of lost luggage are addressed by the IoT-Based Baggage Tracking System, which integrates modern technologies into the luggage management process. Providing an accurate and user-friendly means of real-time baggage tracking is the aim of this system. In contrast to conventional methods, this Internet of Things solution enables users to track their bags from any location via a smartphone app, providing a seamless travel experience. This method is extremely useful in locations where there is a higher risk of missing luggage, such as plane terminals, train stations, and bus stops. Many of the current tracking methods have limitations, such as requiring passengers to carry individual gadgets that are susceptible to physical damage and may not receive reliable GPS signals. Some systems that use RFID tags are not only require regular replacement because to wear and tear, but their signal range is also restricted. Though they can be useful in certain circumstances, QR codes are vulnerable to physical harm and are not very effective when not online.

While biometrics offer a certain level of security, they are often ineffective offline and often generate false alarms. The current approaches are less reliable due to these flaws, which highlight the necessity for a more thorough approach. Moreover, GSM tracking apps find it challenging to give real-time position updates due to issues with signal strength, power limitations, and sensor inaccuracy. Conventional airline baggage monitoring systems that attempt to use RFID often fail to provide passengers with a smooth tracking experience because of these problems. The IoT-Based Baggage Tracking System addresses these issues and focuses on increased accuracy, robustness, and usability to provide a modern, efficient alternative to reliable luggage tracking. The primary premise behind this proposed system is its simplicity and convenience of usage, as it utilizes a device that most passengers are unlikely to forget—their cell phone. Customers can utilize an IoT-enabled smartphone app to access their baggage location at any moment, negating the requirement for specialized knowledge. The gadget tracks the bags' precise location in real time using GPS and is connected to a smartphone app that provides the location information upon request. By ensuring that travellers are continuously connected to their devices, this tactic not only reduces dependency on additional devices but also enhances the travel experience. their baggage. The IoT-Based Baggage Tracking System ultimately aims to make travellers more comfortable by providing a hassle-free experience that effectively lowers the likelihood of luggage loss or theft. This innovative solution eliminates the restrictions of previous methods and allows real-time tracking, allowing travellers to enjoy their journeys without worrying about the safety of their belongings. The project is the ideal option for vacationers, frequent travellers, and anyone else looking for a reliable way to protect their luggage because it aims to set a new standard for ease of use and baggage security.

## II. RELATED WORK

IOT Based Baggage Tracking System: Santosh .M, R Ayshwarya, S Janane [1] – The IoT-Based Baggage

Tracking System offers real-time luggage tracking, which improves travel convenience and security. It uses GPS to pinpoint the precise location of luggage, assisting travelers in monitoring their possessions in crowded places like stations and airports. A motion detector alerts users if their luggage unexpectedly moves, adding an extra degree of security against theft. In order to minimize the possibility of baggage mix-ups, the system also incorporates BEACON technology, which allows for short-range tracking even on conveyor belts. The system's integration of motion detection, GPS, and BEACON technology guarantees continuous tracking and enhanced security. With the assurance that their luggage is safe and easily found, customers can travel with confidence and peace of mind thanks to an all-inclusive solution that tackles common travel worries.

Design And Optimization Of Luggage Tracking System On Airport : Varun Gupta, Roushan Kumar, Raj Gaurav Mishra, Anirudha Semwal and Sweety Siwach [2] – Effective tracking solutions are necessary, as seen by the rise in luggage mishandling and loss at airports. Issues with current devices include poor accuracy and significant power consumption. In this study, a portable, dependable, and effective luggage tracking system based on microcontrollers is presented. Long battery life is ensured by the system's minimal power consumption, which uses an accelerometer to only start monitoring when movement is detected. By giving each piece of luggage real-time, personalized tracking, it improves monitoring and makes it simpler to find misplaced items. Real-time luggage tracking is possible with a web application and GSM module on desktops or cell phones. Users receive text alerts when their luggage is lost or in transit, providing precise tracking and traveller peace of mind.

Design And Implementation of An IOT Based Baggage Tracking System: Olamilekan Shobayo, Ayobami Olajube [3] – Passengers experience stress as a result of baggage loss, improper handling, and theft in the aviation and transportation industries. A novel IoT-based luggage tracking system is suggested as a solution to this problem. In order to give travellers real-time location updates and guarantee that they always know where their luggage is, it makes use of a GSM/GPS module. The Arduino microcontroller, which is at the heart of the system, uses GPS data processing to identify the location of the luggage. Passengers can receive SMS updates

from anywhere in the world thanks to the GSM module, which transmits this information. By preventing theft and misplacement, this real-time tracking lowers stress. By incorporating IoT technology, the system provides a useful, affordable solution that enhances customer happiness and simplifies baggage handling, which benefits travellers as well as the aviation sector.

RFID Based Airport Luggage Checking and Tracking System Using Gsm Technology: D. Balakrishna, A. Raghuram [4] – The suggested approach enhances airport security and baggage tracking by utilizing RFID technology. Every piece of luggage has a passive RFID tag attached to it that contains passenger information and unique identification. As luggage passes through airport security, these tags allow for effective tracking. To ensure real-time surveillance, RFID readers at checkpoints scan the tags and send the information to a central processing unit. By identifying forbidden objects like metals, an integrated metal sensor improves security. The device sounds an alarm and sends the passenger a GSM message if such objects are discovered. The technology ensures seamless operations by storing all findings in a central database for analysis. This method streamlines airport procedures, increases security, and improves luggage management by fusing RFID and automated security inspections.

Smart Baggage Tracker: Sree Lakshmi Done, P. Mounika, K. Srilaxmi, K. Leela Satya Manikanta [5] – The suggested Driver Safety System can help lower the rising number of traffic accidents in India, which are frequently brought on by human error such as DWI and drowsiness. The Internet of Things (IoT) and machine learning (ML) are used in this system to solve these problems. ML algorithms identify tiredness indicators like yawning and frequent blinking, and they notify the driver via a sound system or buzzer. Before the vehicle starts, the driver must blow into a mouthpiece as part of IoT sensors' real-time sobriety checks. The system inhibits ignition in the case that alcohol is detected. Everyone drives safer because to this real-time, ongoing monitoring, which lowers accidents caused by alcohol and exhaustion, encourages responsible driving, and improves road safety.

Smart Luggage Tracking and Alert System Using Arduino: S. Karthick, Jibin Joel, S. Balaji, T.P. Anish [6] – Travelers' stress levels are decreased by the suggested luggage tracking system, which helps avoid luggage loss or improper handling. It tracks

luggage in real time using a GPS module coupled to an Arduino microcontroller. Through a GSM module, the location information is transmitted to a cloud database, enabling travellers to view the status of their luggage at any time and from any location. Each person can safely track their luggage using a password and unique ID. Passengers can monitor the position of their missing luggage in real time online. To enhance security and lower the danger of theft, a fingerprint sensor makes sure that only authorized people may access the bags. By providing a safe, practical, and instantaneous luggage tracking option, this device reduces travel anxiety.

Airline Baggage Tracking System Using IOT: Merlyn Melita Mathias, Ajin Raj, Kiran K, Safnaaz, Samrin Banu [7] – A rising problem that raises expenses and causes aggravation to passengers is baggage loss and improper management. Airport baggage handling still requires a great deal of human intervention, slowing down the process and increasing errors despite progress. By automating the baggage transit procedure, the suggested solution seeks to increase precision and effectiveness. The device enables real-time, personalized luggage tracking through the use of sensors and QR codes. Passengers can now conveniently track the whereabouts of their baggage via a web application. By addressing concerns like accuracy, mobility, and energy consumption, this system improves the whole travel experience by providing a more dependable and affordable option for both travellers and airlines.

Smart Luggage Tracking System: Ashutosh Kabra, Abhishek Jagtap, Jayaprakash Dharmavaram, Shital Raut [8] – Interest in using embedded technologies like Raspberry Pi and camera modules has increased as a result of recent developments in smart luggage tracking systems. By enabling real-time luggage tracking, these technologies enhance security and provide passengers peace of mind. In order to prevent loss or theft, travellers can continuously monitor the whereabouts of their bags by incorporating a camera module for visual monitoring and using a Raspberry Pi as the central CPU. In order to tackle issues like camera precision, power consumption, and system integration, this research article investigates the design and development of such a system. The outcomes show that the system significantly improves the travel experience and lowers the chance of luggage loss, representing a breakthrough in luggage management.

Architectural Optimization of Luggage Tracking System: S. Aarthi, Abhishek Jaiswal, Harsh Varddhan Singh, Nikhilan Velumani [9] – An Assisted GPS (A-GPS) module coupled with an Arduino UNO is used to track each item of luggage, which is uniquely identified using Near Field Communication (NFC) tags. Real-time position data is provided by the A-GPS module and sent to a GSM component for user communication. Passengers may log in and track their bags from any location thanks to the location data being saved in the AWS cloud. Furthermore, the customer receives regular updates on the location and status of their luggage via SMS messages sent to their mobile phone by the GSM module. By providing greater transparency and traveller peace of mind, this method not only improves the overall baggage handling procedure but also improves the customer experience.

Baggage Tracking and Handling by RFID And IOT In Airports Using NodeMCU: M. Srinivasa Rao, V, Madhava Reddy, P.V.M. Vijaya Bhaskar and K. Sreenath [10] -- The proposed baggage handling system integrates Radio Frequency Identification (RFID) technology with cloud computing to track luggage effectively at two critical stages within the airport: the departure section and the destination section. Each piece of luggage is fitted with a RFID tag containing essential traveller information. As the baggage moves along the conveyor system through various checkpoints within the airport, RFID readers positioned at each section detect the signal from the RFID tag and capture the associated data, such as the bag's current location and its intended destination.

### III. ARCHITECTURE DIAGRAM

The luggage tracking system's architecture is centered on a number of essential parts that cooperate to offer smooth tracking and real-time updates. The Node MCU board, which serves as the main controller, is at the center of the system. It establishes a connection with a GPS module to obtain the information on the luggage's location. Following processing, the customer's information is added to this data and input into the system. A distinct QR code is created from the processed data, which includes the customer's details and GPS locations. The luggage has this QR code printed on it. By using a web interface or mobile application that can scan the QR code, the user can access the data stored in the system and see the current location of their luggage, either the local server or the cloud. To guarantee precise

tracking, the Node MCU board transmits and updates the GPS coordinates on a constant basis. Transparency and comfort during the trip are provided by the user's ability to check the status of their luggage at any moment using the app. Furthermore, if the luggage goes beyond of a predetermined range, the system can promptly notify the user via their mobile device.

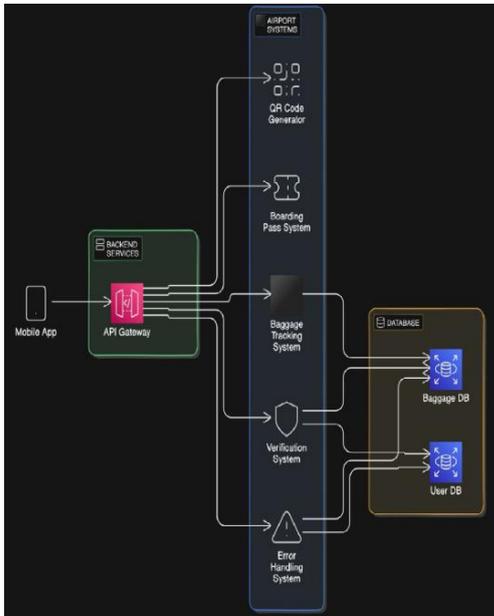


Fig. 1. Architecture Diagram of the baggage tracking process

#### IV. PROPOSED SYSTEM

React Native, a framework that makes it possible to create cross-platform apps for iOS and Android devices, has been used to create a mobile application. This software was created especially to improve visitors' luggage monitoring experiences by offering a smooth and intuitive interface. After installation, customers can enter the details of their luggage into the app, which associates each item of luggage with a distinct QR code. This QR code serves as the key to obtain up-to-date tracking details on the luggage, establishing a safe and effective way to keep an eye on travel bags. The location of the luggage can always be followed thanks to the pairing of each QR code with a GPS-enabled device fastened to it. The user can view real-time updates on the condition of their luggage thanks to the GPS module's constant transmission of location data to the app. Users can view the current location of their baggage on an instant basis by simply scanning the QR code with their mobile device. This feature lets passengers know where their baggage are at all times, which is especially helpful on lengthy flights, during layovers, or while switching aircraft. By improving luggage

security and lowering concerns about possible loss or misplacement, the app's live tracking feature has several advantages. Travelers feel more safe about their goods when they know that the bags may be watched in real-time, especially when passing through crowded airports or areas where luggage handling is common. Travelers can handle any problems or inconsistencies right away if their luggage does not arrive as planned thanks to this extra layer of tracking, which gives them a sense of control and assurance.

#### V. CONCLUSION

In conclusion, the mobile application with QR code and GPS monitoring offers a highly effective and affordable solution to a typical problem faced by travellers: the loss of luggage. By integrating QR codes with GPS-enabled devices, the system allows real-time tracking of baggage, providing users throughout their trip, they felt comfortable and secure. The app's simplicity and ease of use ensure that it is accessible to a wide range of travellers, offering an effective alternative to more expensive and complex systems like RFID. It ensures that users can always stay informed about the location of their luggage, significantly reducing the chances of losing important items. The cost-effective nature of this solution makes it a viable option for both frequent and occasional travellers. This program provides a scalable and useful method of luggage management without requiring expensive hardware installations or intricate systems. By using distinct QR codes, the extra security measure makes sure that only people with permission may access the bags, safeguarding possessions of the user. All things considered, this system improves the journey by offering a dependable and reasonably priced luggage tracking tool, fostering global travellers peace of mind.

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