E-ISSN No : 2581-6195 | Volume : 9 | Special Issue | May 2026

SMART MOBILITY LUGGAGE BAG USING IOT

Deepak Mahendra Reddy[1], Manikesh[2], Satyavan[2], Praveen Reddy[2]

Access Online

Article DOI:
10.5281/zenodo.21407999

ABSTRACT

The Smart Mobility Luggage Bag using IoT is designed to provide travelers with a secure, automated, and user-friendly luggage management system. This project integrates sensors, microcontrollers, and wireless communication to monitor and control luggage functions in real time through a mobile application. The proposed system uses an Arduino-based controller connected with GPS, load cell sensors, and locking mechanisms to track the luggage location, measure its weight, and provide digital locking features. The luggage can be monitored using a smartphone application such as Blynk, enabling users to receive live updates, theft alerts, and overweight notifications. This system helps prevent luggage loss, enhances security, and ensures compliance with airline weight regulations. By combining IoT technology with smart sensing and wireless communication, the Smart Mobility Luggage Bag offers a modern solution for travelers seeking safety, convenience, and smart control. The system reduces human effort, improves travel safety, and supports efficient luggage handling in airports, railways, and other transportation environments.

1. INTRODUCTION

The Smart Mobility Luggage Bag using IOT project presents an intelligent, connected travel accessory designed to make modern travel safer, easier, and more efficient. Combining embedded electronics, wireless communication, sensors, and user-friendly software, the smart luggage concept addresses common travel pain points such as misplaced bags, security concerns, manual weighing at check-in, and inconvenient access to personal items. This project demonstrates how affordable hardware, low-power communications, and intuitive mobile applications can transform an ordinary suitcase into a proactive travel companion.

Travelers frequently face problems such as lost or delayed baggage, exceeding airline weight limits, uncertain security of valuables, and inconvenience when accessing items in transit. Traditional luggage is passive — it cannot inform the owner about its location, weight, or whether it has been opened. Airports and transport hubs handle millions of baggage pieces yearly, and even small delays or human errors can cause significant distress. Additionally, modern consumers expect seamless digital experiences; luggage that remains disconnected from digital services provides a poor travel experience in comparison to other smart devices.

2. PROBLEM STATEMENT

In today's fast-moving world, travelers frequently face several difficulties related to luggage safety, tracking, and handling. Traditional luggage bags provide very limited security and no smart monitoring features.

The major problems identified are:

Luggage Loss and Theft Passengers often lose their bags in crowded places such as airports, railway stations, and bus terminals. Conventional bags do not have any tracking system to locate them once

[1] Asst Prof, Guru Nanak Dev Engineering College, Bidar, India
[2] UG Students, Dept of ECE, Guru Nanak Dev Engineering College, Bidar

How to Cite:
Deepak Mahendra Reddy, Manikesh, Satyavan, Praveen Reddy (2026), Smart Mobility Luggage Bag Using Iot, International Educational Journal of Science & Engineering (IEJSE),Vol: 9, Special Issue, May 2026 185-187

Research Paper

misplaced or stolen.

Overweight Luggage Issues
Travelers usually come to know about excess baggage only at airport check-in counters, leading to extra charges, delays, and inconvenience due to manual weight checking.

Lack of Real-Time Monitoring
Normal luggage bags do not provide real-time information about their location, movement, or status, making it difficult for users to monitor their belongings.

Poor Security Mechanism
Traditional locks can be easily broken, duplicated, or forgotten open, increasing the risk of theft. Manual Handling and Effort

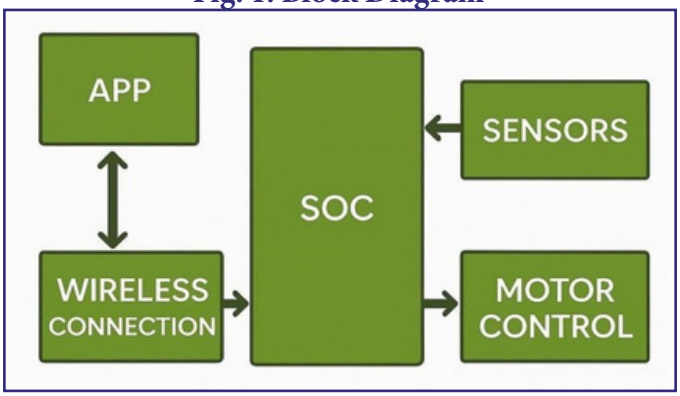
Carrying and monitoring luggage manually is tiring and inefficient, especially for elderly people and frequent travelers.

No Smart Alert System
There is no alert or notification system in conventional luggage to inform users about unauthorized access, overweight condition, or movement.

Because of these limitations, there is a strong need for a Smart Mobility Luggage Bag using IoT that can provide tracking, weight monitoring, digital locking, and alert features to make travel safer, easier, and smarter.

3. BLOCK DIAGRAM

Fig. 1: Block Diagram



BLOCKDIAGRAM DESCRIPTION
The block diagram of the Smart Mobility Luggage System represents the interaction between various hardware and software components that enable intelligent and automated operation of the luggage.
At the core of the system is the System on Chip (SoC), which acts as the central processing unit. It controls all operations, processes data from sensors, and communicates with external devices. The Sensors block is connected to the SoC and is responsible for collecting real-time data such as distance, motion, obstacle detection, or user tracking. This data is sent to the SoC for analysis and decision-making.

The Motor Control unit receives commands from the SoC and drives the motors accordingly. It enables movement of the luggage, such as following the user or navigating around obstacles. The Wireless Connection module provides communication between the luggage system and the mobile application. It typically uses technologies like Bluetooth or Wi-Fi to ensure seamless data transfer.
The Mobile Application (App) acts as the user interface. Through the app, the user can monitor the luggage status, control its movement, and access additional features such as tracking and security alerts. The app communicates bidirectionally with the system via the wireless module.

Overall, the system works in a closed loop where sensor data is processed by the SoC, appropriate actions are taken through motor control, and the user can interact with and monitor the system via the mobile application.

4. EXPECTED RESULTS & DISCUSSION

The smart mobility luggage bag using IoT is expected to improve travel convenience and security by enabling real-time GPS tracking, remote locking, and instant alerts through a mobile application. The auto-follow feature reduces physical effort by allowing the bag to move along with the user while avoiding obstacles using sensors. Additional features like weight monitoring help users avoid excess baggage issues. However, the system's performance depends on reliable internet connectivity and efficient battery management, as continuous tracking and motor operation consume power. Overall, this project shows how IoT can transform traditional luggage into a smart, user-friendly travel solution.

5. CONCLUSION

The IoT-based Smart Luggage System represents a significant advancement in modern travel technology, combining the power of sensors, wireless communication, and cloud connectivity to improve safety, convenience, and efficiency for travelers. Through the integration of modules such as GPS, load cells, RFID, and microcontrollers like NodeMCU or Arduino, smart luggage enables real-time tracking, automatic weight measurement, theft detection, and remote monitoring. The system not only reduces the common problems of baggage loss and overweight issues but also enhances user comfort through intelligent alerts and smartphone connectivity. Research studies by Das Gupta et al. (2025), Jagtap et al. (2022), and Jain et al. (2023) demonstrate that IoT- based luggage can effectively provide continuous updates and ensure better security compared to traditional baggage systems. The use of IoT platforms such as Blynk and cloud databases ensures seamless data communication between the device and the user.

Despite its numerous advantages, certain challenges remain, including power management, network reliability, cost, and adherence to airline regulations regarding batteries and connectivity. In conclusion, IoT- based smart luggage systems offer a promising step toward the future of intelligent travel. With continuous advancements in IoT, AI, and low-power communication technologies, these systems will likely evolve into fully autonomous, self-monitoring travel companions capable of enhancing passenger safety and travel convenience worldwide. Future research should focus on optimizing battery efficiency, improving indoor localization accuracy, and developing secure, scalable cloud frameworks to make smart luggage systems more reliable and widely adoptable

6. REFERENCES

1. Das Gupta, A., Kanjilal, S., Chakraborty, R., Sah, A., Parvez, S., Manna, D., & Banerjee, A. (2025). IoT- Based Real-Time Baggage Tracking System with Fall Detection. IJSRST.
2. Talib, S., Save, T., Ujjainwala, A., & Jaiswal, A. (2022). IoT-based Smart Bag Using Arduino. IJRASET.
3. Al Jabri, K., Al Ajmi, M., Al Saidi, M., & Viswan,V. (2023). Smart Bag – Supported with Mobile App. IJEMD.
4. Abdulham, N. F., & Noor, N. M. (2023). Mobile Application Luggage Tracking System Using GPS Module and NodeMCU. UiTM Journal.
5. Jagtap, A., Kabra, A., Dharmavaram, J., & Raut, S. (2022). Smart Luggage System. IJRASET.
6. Deshpande, R. R., Udbal, S., Tarun, A., Rohith, A., & Asif, S. S. (2024). Smart Luggage for Physically Challenged People. IJRASET.
7. Bhavadharani, M., David, E., Harishma, D., & Anita, N. (2025). IoT-Based Smart Bag with Image Recognition for Automated Luggage Item Tracking. IJERT.
8. Srinivasa Rao, M., Madhava Reddy, V., Vijaya Bhaskar, P. V. M., & Sreenath, K. (2023). Baggage Tracking and Handling by RFID and IoT in Airports Using NodeMCU. PhilStat.
9. Sharma, P., Agrawal, A., Agrawal, I., & Rathore, A. (2020). IoT Based Luggage Security System. IJARCCE.
10. Amin, P. R., Karanth, S. K., Sharanya, M. S., Akshatha, K., & Badiger, M. (2020). Smart Travel Bag. IJERT.
11. Jain, S., Aithal, S., Allamsetty, V., Sarvikasree,K. S., Gobi, N., & Rathi, R. (2023). Smart Luggage Tracking Using IoT and GPS Technology. IJARCCE.
12. Rathinam, A. R., & Chelliah, S. (2023). Bluetooth-based Real-Time Luggage Tracking and Status Updates. XL Science.
13. Basha, K. S., Pravallika, B., Swathi, D., Lakshami Durga, P. S., & SivaTeja, C. (2024). Intelligent Travel Companion: The IoT-Enabled Smart Bag. IJMTST.
14. Kevin Ashton, "That 'Internet of Things' Thing," RFID Journal, 2009.
15. M. U. Farooq, M. Waseem, S. Mazhar, A. Khairi, and T. Kamal, "A Review on Internet of Things (IoT)," International Journal of Computer Applications, Vol. 113, No. 1, 2015.