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A Survey on Smart Parcel Receiver

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Abstract: ***The rapid growth of e-commerce has increased the need for secure parcel delivery systems. This paper presents an IoT-based Smart Parcel Receiver using ESP32, sensors, servo motor, LCD display, and Wi-Fi communication. The system automatically detects parcels, secures them inside a locked box, and sends real-time notifications to users. The proposed system improves parcel security, reduces theft risk, and enhances delivery convenience.***
Index Terms: Internet of Things (IoT), ESP32, Smart Parcel Receiver, Parcel Security, Smart Home Automation, Embedded Systems.

I. INTRODUCTION

The growth of e-commerce platforms and online delivery services has significantly increased the number of home-delivered parcels worldwide. Although online shopping provides convenience to users, parcel delivery security remains a major challenge. In many situations, delivery personnel attempt delivery when recipients are absent from home. Packages are often left at doorsteps or with neighbors, increasing the possibility of theft, loss, or damage. Traditional delivery methods do not provide secure automated storage for parcels during the absence of users. In addition, there is no reliable real-time monitoring mechanism to inform customers about successful delivery. These limitations create inconvenience for users and financial losses for delivery service providers. To overcome these problems, this paper proposes an IoT-based Smart Parcel Receiver system capable of automatically receiving and securing parcels without human involvement. The system uses sensors to detect parcel placement and a servo-controlled locking mechanism to store the parcel safely. Real- time notifications are transmitted to the user using Wi-Fi communication. The proposed system improves parcel security and supports smart home automation applications.

II. LITERATURE REVIEW

Parallel Transmission of Power and Signal Based on The Combination of Inductance and Capacitance for EV Dynamic Wireless Charging System (2022) Authors: Fan Zheng, Xiaofei Li, Yilin Tan, Chunsen Tang, Zhihui Wang.

1) This paper proposed an IoT-based smart locker system for secure parcel delivery applications. The system uses sensors and microcontrollers to automatically detect parcel placement and provide secure storage. Real-time monitoring and remote user notifications were implemented to improve parcel security and delivery reliability. IoT Based Smart Locker System for Parcel Delivery (2021) Authors: S. R. J. Ramson, S. Vishnu, and M. Kirubasankar.

2) This research introduced a smart package delivery box using the ESP32 microcontroller and IoT communication technologies. The system provides automated locking and unlocking mechanisms with Wi-Fi-based monitoring. The proposed approach enhances delivery safety and allows users to monitor parcel status remotely. Design and Implementation of a Smart Package Delivery Box using ESP32 and IoT (2021) Authors: M. A. Al-Khafaji and J. S. Aziz.

3) This paper presented an automated parcel delivery and retrieval system using One-Time Password (OTP) authentication and SMS notifications. The system improves delivery security by allowing only authorized users to access stored parcels. The work focused on reducing parcel theft and improving unattended delivery reliability. Automatic Parcel Delivery and Retrieval System using OTP and SMS Alert (2021) Authors: P. N. Patil, A. S. Shinde, and R. M. More.

4) This work proposed a real-time security system for smart lockers using an ESP32 camera module and wireless communication. The system captures parcel delivery images and sends them to users for verification. The integration of wireless communication improves remote monitoring and enhances locker security. Real-Time Security System for Smart Lockers using ESP32 Camera and Wireless Communication (2022) Authors: L. A. T. Nguyen and M. T. Vo.

5) This paper developed a smart electronic locker system for courier delivery applications using GSM communication and the ESP32 microcontroller. SMS alerts were used to inform users about delivery status, while electronic locking mechanisms ensured secure parcel storage. Smart E-Locker System for Courier Delivery with GSM and ESP32 (2021) Authors: K. Aman and R. Singh.

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6) This research proposed an IoT-enabled parcel delivery box using a solenoid lock and DC motor control mechanism. The system automatically secures parcels after delivery and provides user notifications through internet connectivity. The design focused on low-cost implementation and reliable automation. IoT-Based Parcel Delivery Box with Solenoid Lock and DC Motor Control Mechanism (2020) Authors: J. Wang, H. Lee, and T. Kim.

7) This paper discussed a web-based monitoring and control system for smart lockers using the ESP32 microcontroller. The proposed system allows users to remotely monitor locker status, access delivery records, and control locker operations through a web interface. Web-Based Monitoring and Control of Smart Lockers using ESP32 Microcontroller (2022) Authors: R. Gupta and P. Sharma

8) This study focused on authentication and verification mechanisms for delivery personnel in smart locker systems. The work implemented secure verification methods to ensure that only authorized delivery agents could access parcel lockers, thereby improving system reliability and user trust. Authentication and Verification of Delivery Personnel in Smart Locker Systems (2019) Authors: T. S. Kumar and M. Reddy

III. SUMMARY OF LITERATURE SURVEY

Several research works have proposed smart parcel delivery solutions using IoT, smart lockers, GPS tracking, image processing, and authentication mechanisms such as OTP and cryptographic algorithms. These systems aim to improve delivery security, enable remote monitoring, and allow unattended parcel receiving. Some studies also focus on optimizing delivery operations using mobile lockers and advanced algorithms. However, many existing systems depend heavily on stable internet connectivity, complex security mechanisms, or expensive hardware, which may limit practical implementation. Therefore, there is a need for a cost- effective, secure, and reliable smart parcel delivery system that ensures safe parcel storage and easy user access.

IV. CONCLUSION

This paper presented an IoT-based Smart Parcel Receiver system for secure and automated package delivery. The proposed system uses ESP32, load sensors, servo motor control, LCD display, and Wi-Fi communication to provide safe parcel storage and real-time user notification. The system minimizes parcel theft, improves user convenience, and supports smart home automation. The implementation demonstrates efficient performance and reliability for modern parcel delivery application.

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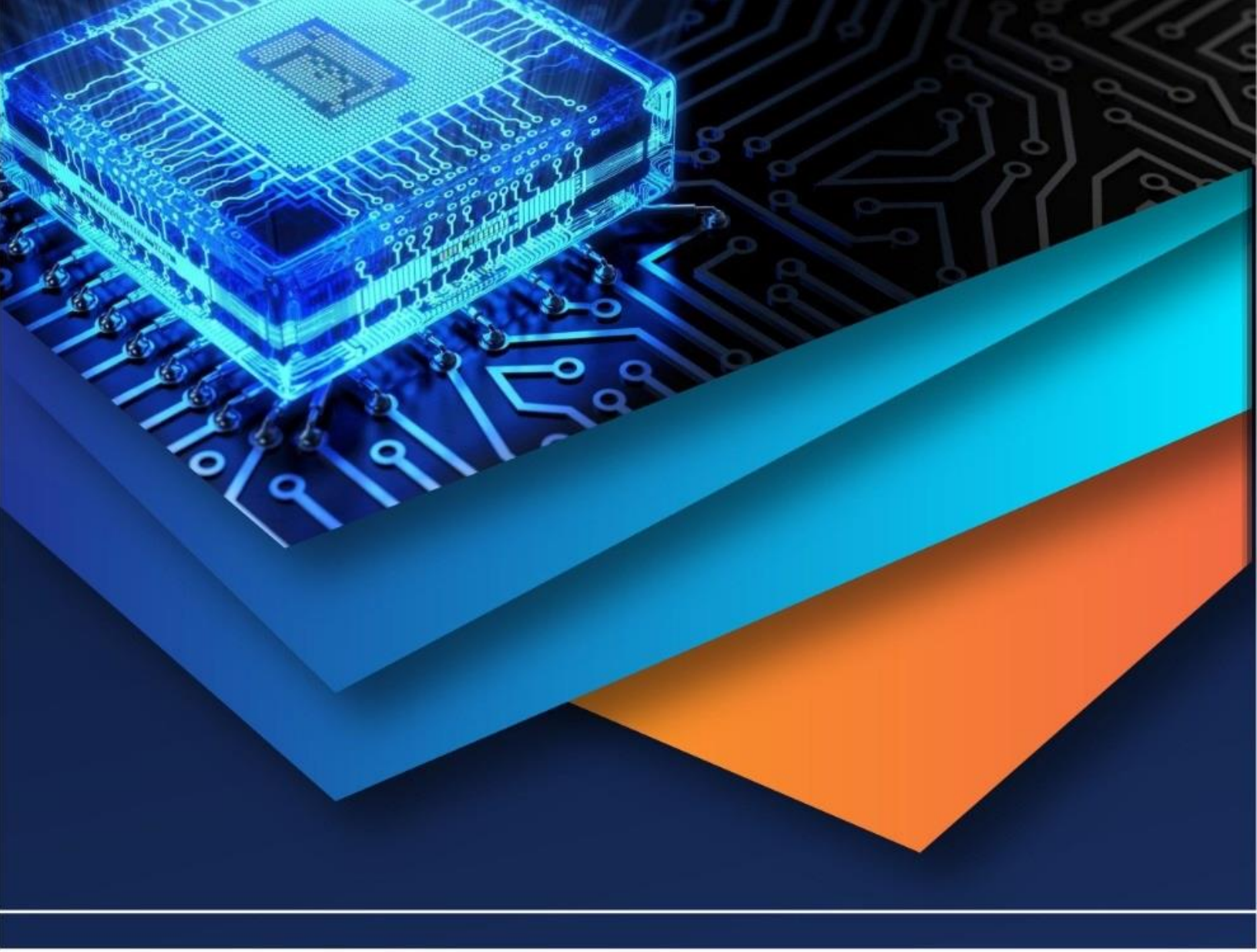
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