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COLLEGE OF ENGINEERING
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Thalavapalayam, Karur – 639 113.

A Minor Project Report
On

Automatic Cloak Room

Submitted by

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BONAFIDE CERTIFICATE

Certified that this Report titled **"AUTOMATIC CLOAK ROOM"** is the bonafide work of **RIZUVANUL RIKBATH N (927622BEE088), SOWMIYA V (927622BEE112), VIDHYALAKSHMI K (927622BEE123)** who carried out the work during the academic year (2024-2025) under my supervision. Certified further that to the best of my knowledge the work reported herein does not form part of any other project report.

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DECLARATION

We affirm that the Minor Project III report titled "**AUTOMATIC CLOAK ROOM"** being submitted in partial fulfillment for the award of **Bachelor of Engineering in Electrical and Electronics Engineering** is the original work carried out by us.

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VISION AND MISSION OF THE INSTITUTION

VISION

- ✓ To emerge as a leader among the top institutions in the field of technical education

MISSION

- ✓ Produce smart technocrats with empirical knowledge who can surmount the global Challenges.
- ✓ Create a diverse, fully-engaged, learner-centric campus environment to provide Quality education to the students.
- ✓ Maintain mutually beneficial partnerships with our alumni, industry and Professional associations.

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

VISION

To produce smart and dynamic professionals with profound theoretical and practical knowledge comparable with the best in the field.

MISSION

- ✓ Produce hi-tech professionals in the field of Electrical and Electronics Engineering by inculcating core knowledge.
- ✓ Produce highly competent professionals with thrust on research.
- ✓ Provide personalized training to the students for enriching their skills.

PROGRAMME EDUCATIONAL OBJECTIVES(PEOs)

- ✓ **PEO1:**Graduates will have flourishing career in the core areas of Electrical Engineering and also allied disciplines.
- ✓ **PEO2:**Graduates will pursue higher studies and succeed in academic/research careers
- ✓ **PEO3:** Graduates will be a successful entrepreneur in creating jobs related to Electrical and Electronics Engineering /allied disciplines.
- ✓ **PEO4:** Graduates will practice ethics and have habit of continuous learning for their success in the chosen career.

PROGRAMME OUTCOMES(POs)

After the successful completion of the B.E. Electrical and Electronics Engineering degree program, the students will be able to.

PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals,and an engineering specialization to the solution of complex engineering problems.

PO2: Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design/Development of solutions:

Design solutions for Complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal and environmental considerations.

PO4: Conduct Investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6: The Engineer and Society: Apply reasoning in formed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7:Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and Team work: Function effectively as an individual, and as a member or leader in diverse teams, and in multi-disciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multi-disciplinary environments.

PO12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

PROGRAMSPECIFIC OUTCOMES(PSOs)

The following are the Program Specific Outcomes of Engineering Students:

- **PSO1:** Apply the basic concepts of mathematics and science to analyse and design circuits, controls, Electrical machines and drives to solve complex problems.
- **PSO2:** Apply relevant models, resources and emerging tools and techniques to provide solutions to power and energy related issues & challenges.
- **PSO3:** Design, Develop and implement methods and concepts to facilitate solutions for electrical and electronics engineering related real world problems.

Abstract(Key Words)	Mapping of POs and PSOs
Automation, Convenience, Unique Identifier, Storage Area.	PO1, PO2, PO3, PO4, PO5, PO6, PO7, PO8, PO9, PO10, PO11, PO12. PSO1, PSO2, PSO3.

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ABSTRACT

The Automatic Cloak Room reimagines the traditional concept of public storage solutions by incorporating advanced automation to streamline and secure the process of storing personal belongings in high-traffic areas, such as temples, shopping malls, and offices. Unlike manual cloakrooms, which are often prone to inefficiencies, mismanagement, and theft, this system utilizes a seamless integration of IoT technology, PIR (Passive Infrared) sensors, conveyor belts, and servo motors to automate each step of item handling, from drop-off to retrieval, with minimal human intervention. Upon arriving at the cloak room, users place their items in designated slots. The system assigns a unique identifier to each item, ensuring precise tracking and management. Once the item is placed, a conveyor belt transports it to a secure storage area. To retrieve belongings, users scan their unique identifier, which activates the conveyor to bring their item to the pick-up point automatically. This closed-loop system minimizes the risk of lost or misplaced items and enables a faster, user-friendly experience, especially beneficial during peak hours when storage demand is high. In addition to security and convenience, the Automatic Cloak Room is designed with energy efficiency in mind. The inclusion of PIR sensors allows the system to detect the presence of individuals near the storage areas, triggering the activation of components as needed while conserving power in low-traffic periods by entering standby mode. The automation of the cloak room not only reduces the need for staffing but also decreases operational costs, making it a scalable solution adaptable to various public spaces with large foot traffic. With its robust design, the Automatic Cloak Room addresses common concerns in traditional storage, such as theft and inefficiency, while also enhancing user experience through faster, more reliable service. By merging IoT and automated mechanisms, this innovative solution presents a forward-thinking alternative to conventional cloakrooms, offering public spaces a reliable, secure, and energy-conscious approach to personal item storage.

CHAPTER 1
LITERATURE REVIEW

Paper1: Automated Storage and Retrieval Systems (AS/RS)

Inference: Automated Storage and Retrieval Systems (AS/RS) utilize advanced technologies to manage the storage and retrieval of items in various environments. These systems increase efficiency, reduce labor costs, and minimize errors by automating the handling of goods. Research in this area focuses on system design, performance metrics, and real-world applications in logistics, which can provide valuable insights for developing an automated cloak room solution.

Paper2: IoT Integration for Enhanced Security

Inference: The integration of Internet of Things (IoT) technology in security systems revolutionizes how data is collected, processed, and utilized. IoT devices can monitor user interactions and track stored items in real-time, enhancing security measures and operational efficiency. Studies on IoT applications in public safety highlight their potential for creating secure, automated environments, which is crucial for the effective functioning of an Automatic Cloak Room.

Paper3: Sensor Technologies in Public Safety Applications

Inference: Sensor technologies, particularly Passive Infrared (PIR) sensors, play a vital role in monitoring movements and optimizing energy consumption in automated systems. Research in this domain explores how sensors detect user presence, facilitate item retrieval, and contribute to energy-efficient designs. Understanding these technologies is essential for developing a cloak room that balances user convenience with operational efficiency.

Paper4: RFID and Item Tracking Mechanisms

Inference: Radio Frequency Identification (RFID) technology offers a robust solution for tracking and managing items in automated storage systems. By assigning unique identifiers to each item, RFID enables accurate tracking, reduces loss, and simplifies the retrieval process. Research on RFID applications in inventory management can inform the design of an automatic cloak room, ensuring secure and efficient handling of users' personal belongings.

Paper5: Scalability and Adaptability of Automated Storage Solutions

Inference: Scalability and adaptability are essential features of automated storage systems, especially in dynamic environments with fluctuating demand. Studies on scalable design principles explore how automated systems can be customized to accommodate varying volumes of user traffic and different operational contexts. Insights from this research can help in designing an Automatic Cloak Room that can grow and evolve with changing user needs and technological advancements.

CHAPTER 2
PROPOSED METHODOLOGY

2.1 BLOCK DIAGRAM

The block diagram of the Automatic Cloak Room illustrates the system's core components and their interactions. Users interact with the User Interface to drop off or retrieve items, which are processed by the Control Unit. The Sensor Unit detects user presence, activating the system, while the Identification System tracks items using RFID technology. The Conveyor System transports items to the secure Storage Unit, ensuring safe and efficient handling throughout the process.

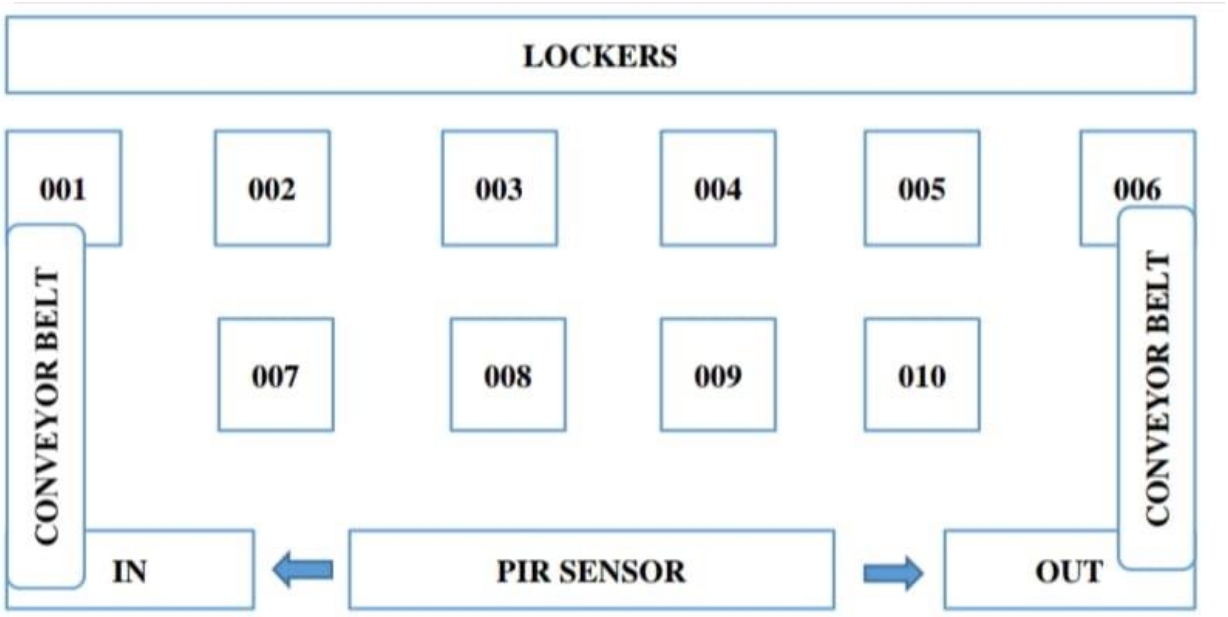

Fig: 2.1 Block Diagram

2.2 DESCRIPTION

The Automatic Cloak Room is an innovative solution designed to enhance the security and convenience of storing personal belongings in high-traffic public spaces such as malls, temples, and workplaces. Traditional cloakrooms often rely on manual processes, leading to inefficiencies and heightened risks of theft. By integrating advanced technologies, this automated system provides a seamless, efficient, and secure experience for users. Users begin their experience at an intuitive User Interface, where they can easily select options for dropping off or retrieving items. Once an item is placed in the designated slot, the RFID technology assigns a unique identifier to it, allowing for accurate tracking throughout the storage and retrieval process.

The PIR sensors detect the presence of users near the cloak room, ensuring the system is activated only when needed, which contributes to energy efficiency. When users are ready to retrieve their belongings, they can scan their unique identifiers, prompting the automated conveyor system to transport the items back to the pick-up area efficiently. This automated approach significantly reduces the risk of theft, as personal items are stored without direct human interaction, and it minimizes operational costs by eliminating the need for extensive staffing. Additionally, the design allows for scalability, making it adaptable to various environments and user volumes, ensuring that it can meet the demands of different public spaces. The Automatic Cloak Room not only revolutionizes the traditional cloakroom experience but also enhances user satisfaction through faster and more reliable service. With its focus on security, efficiency, and user-friendliness, this innovative system stands to redefine how personal belongings are managed in crowded environments, ultimately providing a secure and convenient solution for users.The Automatic Cloak Room to continuously evolve and adapt to the specific needs of its users and the environment, ultimately fostering a more efficient and secure experience. As urban spaces become increasingly crowded, solutions like the Automatic Cloak Room are essential in addressing the challenges of public storage, offering a modern, intelligent alternative to traditional cloakroom services.

2.3 PROJECT TOTAL COST

S.NO	COMPONENT DESCRIPTION	QUANTITY	COST
01	PIR SENSOR	1	300
02	LOCKERS	1	300
03	KEYBOARD	1	350
04	SCANNER	1	400
05	MISCELLANEOUS	FEW	750
		TOTAL	2100

Table: 2.1 Project Total Cost

CHAPTER 3
RESULT AND DISCUSSION

3.1 HARDWARE COMPONENT DESCRIPTION

PIR SENSOR

A Passive Infrared (PIR) sensor detects motion by measuring changes in infrared radiation emitted by warm objects, such as humans or animals. It consists of a pyroelectric sensor, which generates a voltage in response to temperature changes, and lenses that expand its detection range. PIR sensors are widely used in security systems, automatic lighting, and home automation due to their energy efficiency, reliability, and low cost. They provide an effective solution for detecting occupancy and triggering actions in various applications.

Fig: 3.1 PIR Sensor

LOCKERS

Lockers are secure storage units designed to hold personal belongings, typically found in public spaces like gyms, schools, and workplaces. They are equipped with locking mechanisms, which can be mechanical, electronic, or keypad-based, ensuring that only authorized users can access their contents. Lockers come in various sizes and configurations to accommodate different items and user needs. Their primary purpose is to provide a safe and convenient solution for temporary storage, helping to prevent theft.

Fig: 3.2 Lockers

RELAY

A keyboard is an input device that allows users to enter text and commands into a computer or other electronic devices. It consists of a set of keys, each representing a specific character, number, or function, organized in a standard layout. Keyboards can be mechanical, membrane, or virtual, with varying features such as backlighting and customizable keys. They serve as essential tools for typing, gaming, and controlling software applications, enabling efficient interaction with computers and other technology.

Fig: 3.3 Relay

3.3 WORKING PRINCIPLE

The Automatic Cloak Room is an advanced, fully automated system designed to efficiently store and retrieve personal belongings in high-traffic public areas, such as malls, temples, and workplaces. The process begins with user interaction through an intuitive interface, typically featuring a touchscreen or keypad, allowing users to easily select options for dropping off or retrieving their items. Once a user decides to drop off an item, they place it into the designated drop-off slot, where a Passive Infrared (PIR) sensor detects their presence, activating the system to ensure energy efficiency by operating only when needed. After the item is deposited, it is tagged with a unique identifier using Radio Frequency Identification (RFID) technology, which allows for precise tracking throughout the entire storage and retrieval process. This tagging significantly reduces the chances of loss or theft, providing peace of mind to users. The system's conveyor mechanism is then activated, transporting the item from the drop-off area to secure storage compartments designed to be inaccessible to unauthorized users, thereby enhancing security. When users wish to retrieve their belongings, they input their unique identifier at the user interface, prompting the control unit to process the request and activate the conveyor system for a swift retrieval. The conveyor brings the item back to the designated retrieval area, where the user can easily collect it, ensuring a quick and efficient experience. Additionally, the system logs the retrieval for record-keeping, further enhancing operational transparency. Throughout the entire operation, the PIR sensors continue to monitor the surrounding area, allowing the system to enter standby mode when not in use to conserve energy and reduce operational costs. This automated approach not only minimizes the need for human intervention but also significantly lowers the risk of theft, creating a secure environment for users to store their personal items. Overall, the Automatic Cloak Room combines advanced technologies to automate the management of personal belongings, effectively streamlining the process while ensuring user satisfaction and security, and offering a modern solution that enhances convenience and safety, making it an essential addition to any high-traffic environment.

CHAPTER 4

CONCLUSION

In conclusion, the Automatic Cloak Room represents a transformative advancement in the management of personal belongings within high-traffic public spaces. By integrating cutting-edge technologies such as Radio Frequency Identification (RFID), Passive Infrared (PIR) sensors, and automated conveyor systems, this innovative solution not only enhances security but also streamlines the storage and retrieval process, providing a user-friendly experience that caters to the needs of diverse users. The system's ability to tag items with unique identifiers significantly reduces the chances of loss or theft, instilling confidence in users that their belongings are protected.

Moreover, the automatic nature of the cloak room minimizes the need for human intervention, which decreases operational costs and allows staff to focus on other important tasks within the facility. The incorporation of energy-efficient features, such as standby modes activated by PIR sensors, further emphasizes the system's commitment to sustainability and responsible resource management.

Ultimately, the Automatic Cloak Room stands as an essential service in modern public infrastructure, prioritizing user convenience and safety. By adopting this innovative solution, facilities can significantly improve operational efficiency, enhance user satisfaction, and create a secure environment for personal belongings, making it a vital addition to any high-traffic area. As technology continues to advance, the Automatic Cloak Room sets a benchmark for future developments in secure storage solutions, illustrating the potential for innovation to enhance everyday experiences in public spaces.

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