1.1 INTRODUCTION

In our daily lives, safety is a major concern. Every person requires a sense of safety. Our security pattern includes an access control system for doors. Traditional locks are no longer as secure as they once were; anyone can gain access by breaking these locks. We need to create a system that will assist 24 hours a day, seven days a week. Only authorized individuals have access to restricted areas thanks to a RFID door lock system. Furthermore the old system makes it difficult to manage dorm rooms on a campus hostel. As a result for my project I am proposing to create a system that manages hostel rooms on the campus, in addition having RFID chips in a student id card that unlocks the smart lock on the room.

1.2 BACKGROUND OF THE PROJECT

The idea of smart door locks dates back to the early 2000s when companies like Kwikset and Schlage started to experiment with electronic keypad locks. These locks allowed users to enter a code to unlock the door, eliminating the need for physical keys. Over time, new technologies such as RFID, Bluetooth, Wi-Fi, and biometrics were added to smart door locks to provide higher levels of security, convenience, and customization.

Smart door locks have become increasingly popular in recent years, driven by advancements in technology, increasing concerns about security, and the rise of the Internet of Things (IoT). According to a report by MarketsandMarkets, the global smart lock market is expected to grow from $1.28 billion in 2016 to $2.67 billion by 2023, at a compound annual growth rate of 13.11% (MarketsandMarkets, 2018).

One of the main drivers of the smart lock market is the growing interest in home automation systems. Smart door locks can be integrated with home automation systems, allowing users to control other home devices such as lights, thermostats, and cameras. They can also be accessed remotely through a mobile app, allowing users to lock and unlock their doors from anywhere.

Another driver of the smart lock market is the increasing concern about security. Smart door locks use advanced technologies such as biometric authentication, which are difficult to duplicate or hack. They also eliminate the need for physical keys, reducing the risk of lost or stolen keys.

Overall, the background of smart door locks is rooted in the desire for higher levels of security, convenience, and customization. As technology continues to advance and the demand for home automation systems increases, smart door locks are likely to become even more popular in the years ahead.

1.4 PROBLEM STATEMENT

As a student at the University I have dealt with my fair share of problem for applying for accommodation on the emhare. Most of the time the website is unresponsive and out of service. After getting selected for a room, paying and getting the keys for the room are two different processes. The keys for almost 500 rooms are being managed by one person which takes time to look for a specific key, while we have student id card which are fairly useless for an average student throughout whole semester. For the past year there have been same fires and one big fire in the dome rooms due misuse of electrical components. The lack of knowledge of the rate of use of the electricity for each room in the accommodation section leads to fires and over use of the electricity. The main objective of this project is create an efficient system that manages dorm room easily by using a web app for the hostel managers, uses students id card as key cards on your allocated room and manages electric components in the room by an application

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1.5 AIMS

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1.6 METHODS AND INSTRUMENTS

- Create the User Interfaces and Database

  React.js for the web application

  React native for the mobile application

  SQL

- Create the hardware system for the lock and lights

  esp32

  RFID reader and card

- Use the application to unlock the door and control the electric components in the room

SQL Database

PHP

- Use the RFID card for a specific student to unlock a specific door

1.7.1 EXPECTED RESULTS

A system that:

- uses the student id card as a key for the room allocated for that specific room.
- Allows the student to unlock the room with an application
- Allows the manager to manage the hostel with a website and have the information on the entry log of every student in the hostel
- Uses the managers id card as a key card on every room in the hostel
- Gives access to the room the a specific student after the the application process automatically for a time period and revokes the access at the end automatically
- Records when the door is unlocked and send a notification to the student app
- Allows a student to turn on the light through an application

1.7.2 SIGNIFICANCE OF THE PROJECT

Enhanced security: Smart door locks offer added security features that traditional locks cannot provide, such as biometric recognition, remote access control, and activity monitoring. This allows homeowners and businesses to have better control over who enters their property and when.

Convenience: Smart door locks offer added convenience compared to traditional locks. For example, with a mobile app lock, users can remotely control the lock from their smartphone or tablet, allowing them to grant access to guests or service providers even when they are not at home.

Customization: Smart door locks are highly customizable, allowing users to set up schedules, create temporary access codes, and integrate with other smart home devices. This allows homeowners and businesses to tailor the lock's features to their specific needs.

Integration with home automation systems: Smart door locks can be integrated with home automation systems, allowing users to control the lock along with other smart devices such as lights, thermostats, and security cameras. This provides a seamless and comprehensive smart home experience.

Increased property value: Smart door locks can add value to a property and make it more attractive to potential buyers or renters. This is especially true for properties that are marketed as smart homes or for short-term rentals such as Airbnb properties.

Overall, the significance of smart door locks lies in their ability to provide enhanced security, convenience, customization, integration with home automation systems, and increased property value. As technology continues to evolve, smart door locks are likely to become even more advanced and widely adopted.

1.8 FEASIBILITY STUDY

A feasibility study on RFID door locks and smart door locks would involve assessing whether these types of locks are practical and viable for use in homes and businesses. The study would consider factors such as cost, security, convenience, compatibility, and installation, among other factors.

RFID Door Locks

1. Cost: RFID door locks can be more expensive than traditional locks, as they require specialized hardware and software. The feasibility study would need to assess whether the cost of the lock is reasonable and within the budget of the homeowner or business.

2. Security: RFID door locks are highly secure, as the tags or cards can be programmed to only grant access to authorized users. The feasibility study would need to assess whether the security features of the lock are sufficient for the specific security needs of the homeowner or business.

3. Convenience: RFID door locks are convenient, as users do not need to carry a physical key or remember a code. The feasibility study would need to assess whether the convenience of the lock is worth the additional cost compared to traditional locks.

4. Compatibility: RFID door locks may not be compatible with all types of doors or frames. The feasibility study would need to assess whether the lock is compatible with the door being used and whether any modifications would need to be made to the door or frame.

5. Installation: RFID door locks may require professional installation, which can add to the overall cost of the lock. The feasibility study would need to assess whether professional installation is necessary and whether the cost is reasonable.

Smart Door Locks

1. Cost: Smart door locks can vary significantly in price, from under $100 to several hundred dollars. The feasibility study would need to assess whether the cost of the lock is reasonable and within the budget of the homeowner or business.

2. Security: Smart door locks offer added security features that traditional locks cannot provide, such as biometric recognition, remote access control, and activity monitoring. The feasibility study would need to assess whether the security features of the lock are sufficient for the specific security needs of the homeowner or business.

3. Convenience: Smart door locks offer added convenience compared to traditional locks, such as remote access control and the ability to grant access to guests or service providers from a mobile app. The feasibility study would need to assess whether the convenience of the lock is worth the additional cost compared to traditional locks.

4. Compatibility: Smart door locks may require a hub or other device to connect to a home automation system. The feasibility study would need to assess whether the lock is compatible with the system being used and whether any additional devices or modifications would be necessary.

5. Installation: Some smart door locks can be easily installed by the user, while others may require professional installation. The feasibility study would need to assess whether the level of technical expertise required to install the lock is reasonable and whether professional installation is necessary.

User Interfaces
1. Cost: Coding the application and website is free
2.

1.9 ENTHICS CONSIDERATION

Smart door locks raise several ethical considerations, including:

1. Privacy: Smart door locks may collect and store personal data, such as access logs and biometric data. It is important to ensure that this data is secure and protected from unauthorized access or use. Additionally, users should be informed about what data is being collected and how it will be used.

2. Discrimination: Biometric locks may not work well for people with certain medical conditions that affect their fingerprints or facial recognition, such as diabetes or facial deformities. It is important to ensure that the lock does not discriminate against certain individuals based on their physical characteristics.

3. Vulnerability to hacking: Smart door locks may be vulnerable to hacking or other security threats if the system is not properly secured. It is important to choose a lock that has strong encryption and authentication protocols to prevent unauthorized access.

4. Accessibility: Smart door locks may not be accessible for people with disabilities, such as those who are visually impaired or have limited mobility. It is important to ensure that the lock can be easily used by all individuals, regardless of their physical abilities.

5. Equity: Smart door locks may be more expensive than traditional locks, which can create an equity issue for lower-income households or businesses. It is important to consider the cost of the lock and whether it is accessible for all individuals.

Overall, it is important to consider the ethical implications of smart door locks, including privacy, discrimination, vulnerability to hacking, accessibility, and equity, when choosing and using these devices. By addressing these considerations, users can ensure that smart door locks are used in a responsible and ethical manner.

1.10 DELIMITATIONS AND LIMITATIONS OF THE RESEARCHES

The prototype being developed in this thesis is intended to offer high security and easy access control. The development phase will rather focus on delivering a prototype that is well-protected against malicious attacks than extensive user functionality. This can lead to a product that has high security. However, it would need some further development and optimization to fit the purpose of a user-friendly product.

1.11TIMELINE AND BUDGET

1.12 CONCLUSION

In conclusion, both smart locks and RFID door locks offer innovative and secure access control solutions that have transformed the way we secure our homes and offices. Smart locks provide a wide range of features such as remote control, integration with smart home devices, and keyless entry. RFID door locks offer an efficient and secure access control system that eliminates the need for traditional keys.

Both technologies have their advantages and limitations, and it is crucial to consider these factors when choosing which type of lock to install in a particular setting. Smart locks and RFID door locks can enhance security and convenience, but they also have potential vulnerabilities, such as hacking or power outages, that can affect their functionality.

Overall, the introduction chapter on smart locks and RFID door locks provides valuable insights into these two technologies and highlights the importance of keeping up with the latest advancements in security systems to ensure the safety of our homes and businesses. Ultimately, the choice between these two technologies depends on the specific needs and requirements of the user, and a careful evaluation of their respective benefits and limitations should be undertaken before making a decision.