

# Smart Hotel System: Keyless Freedom Effortless Room Entry with Secure Cloud-Powered Access

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## ABSTRACT

The project introduces a revolutionary Smart lock system designed to improve the guest experience in the hospitality industry. By seamlessly integrating Near Field Communication (NFC) technology with a cloud-based hotel reservation platform, we provide a comprehensive solution that goes beyond the limitations of traditional key-based methods. Guests can easily book accommodation through our user-friendly online platform and receive a virtual key directly on their smartphone upon check-in. The NFC-enabled smart lock allows guests to unlock their room with a simple tap of their device, eliminating the inconvenience and security risks associated with physical keys. This innovative system not only improves guest satisfaction, but also streamlines hotel operations and enhances security measures. By adopting our smart lock technology, hotels can deliver a more modern, convenient and secure experience to their guests, setting new standards for the industry.

## Keywords

- NFC Technology:** A contactless communication method used for secure and convenient data transfer.
- Cloud-Based Platform:** A centralized system for managing hotel bookings, guest information, and virtual keys
- Virtual Keys:** Digital codes generated and transmitted to guests' smartphones for room access.
- Enhanced Security:** Improved protection against key loss, theft, and unauthorized access.
- Seamless Guest Experience:** A streamlined check-in and check-out process without physical keys.
- Operational Efficiency:** Reduced administrative tasks and improved staff productivity.
- User-Friendly Interface:** Intuitive and easy-to-use design for both guests and hotel staff.
- Cost-Effective Solution:** Potential for long-term savings by eliminating the need for physical keys and reducing maintenance costs.

## 1. INTRODUCTION

The hospitality industry is constantly looking for ways to improve the guest experience by making check-in, room access, and overall hotel operations safer, more efficient, and smoother. However, traditional room access methods, such as physical keys or key cards, pose significant challenges. Keys can be lost or stolen, creating a security risk,

while key card systems can be prone to malfunction or duplication. These issues not only threaten guest safety, but also contribute to operational inefficiencies, such as long wait times at check-in desks and delays in room allocation. Additionally, the lack of integration between the hotel booking platform and room access technology results in a disjointed guest

journey, making the process tedious and time-consuming for both guests and hotel staff.

To address these challenges, the proposed smart lock project aims to revolutionize access to hotel rooms using Near Field Communication technology integrated into smartphones. The smart lock system will allow guests to unlock their rooms using their phones, using virtual keys sent to them after successful booking and verification upon check-in.

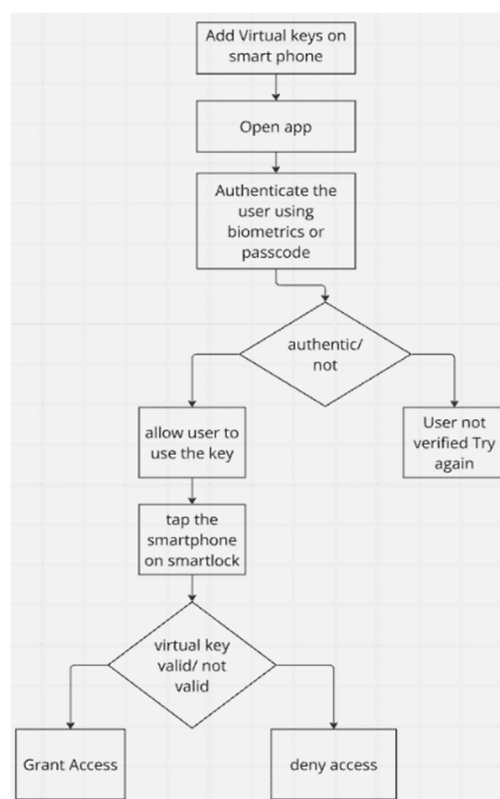
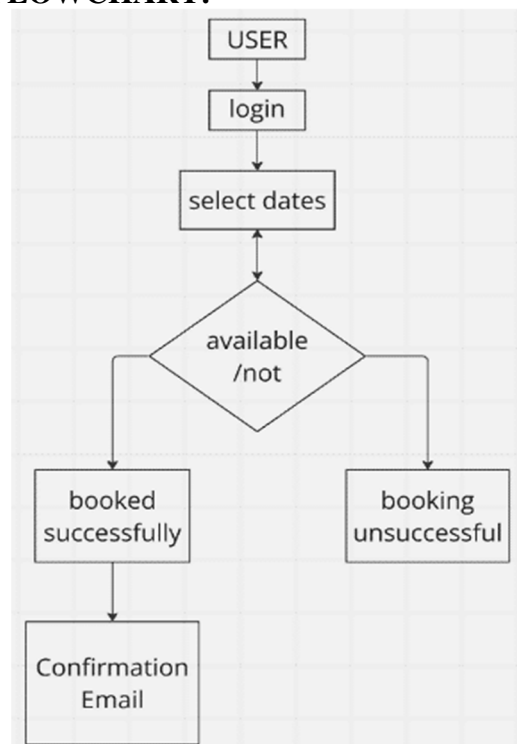
The project involves developing a cloud-based hotel booking website that allows guests to book rooms and receive these virtual keys via email after their identity is verified by hotel staff at the front desk.

The system offers many benefits, especially in terms of improved guest safety and operational efficiency. By eliminating physical keys, the risk of loss or unauthorized access is significantly reduced, while the digital nature of the system allows for better control and monitoring.

Guests can enjoy a smoother check-in process, reduced wait times, and instant access to their rooms without physical interaction.

For hoteliers, the system simplifies room access management, provides better security monitoring, and integrates seamlessly with existing hotel booking platforms, creating a more consistent and efficient experience for all involved.

**2. FLOWCHART:**



**Caption:** Overview of the Smart Hotel Key System. The system comprises an NFC-enabled smart lock, a smartphone as the virtual key, and a cloud-based booking platform. Upon booking confirmation and check-in verification, a virtual key is generated and sent to the guest's smartphone via email. The guest can then unlock their assigned room by tapping their phone on the NFC reader at the door, enhancing both convenience and security.

**3. MOTIVATION:**

1. **Enhanced Customer Security:** Traditional key systems pose significant security risks due to the risk of key loss, theft or duplication. By switching to smartphone-based NFC virtual keys, customer security is significantly improved as access is digitally controlled and monitored in real time.
2. **Operational Efficiency:** The manual process of issuing and managing physical keys is time-consuming and prone to human error. Smart locking systems help reduce this inefficiency by automating room access, streamlining check-in process, and reducing wait time at the reception.
3. **Seamless Integration:** Existing hotel systems often lack integration between the booking platform and room access technology, creating a disjoint guest experience. The project provides an

unified platform that allows booking and access management into a single, streamlined process, ensuring a smoother customer journey.

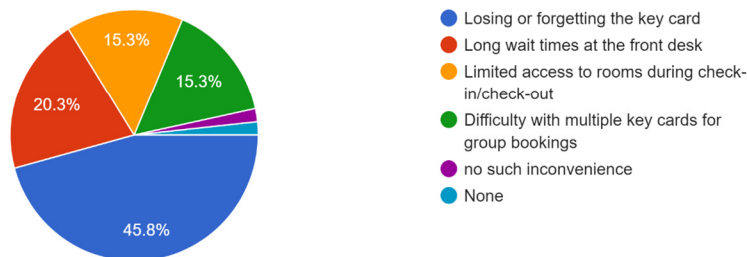
4. **Reduces Costs:** By eliminating physical keys and the need to maintain a card system, hotels can reduce long-term operational costs. Cloud-based systems require minimal physical infrastructure and offer easy scalability as hotel operations grow.

In summary, the need for increased guest security, the inefficiency of traditional locking systems, the fragmented integration between reservation and access technology, and the potential to reduce operational costs are all compelling reasons to implement a smart locking system for hotels using NFC Technology and a cloud-based booking platform.

**4. SURVEY:**

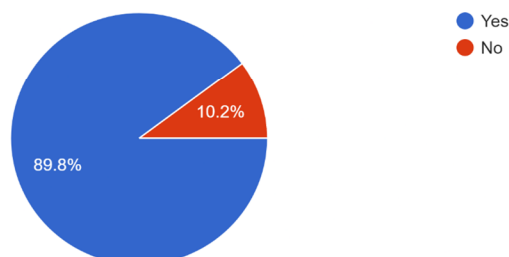
What are the primary inconveniences you've experienced with traditional key cards?

59 responses

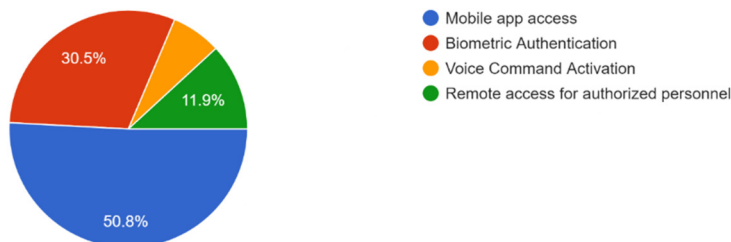


Would you like to use smart locks that would eliminate physical keycards and replace them with virtual NFC cards?

59 responses



What features or improvements would you like to see in a hotel room access system?  
59 responses



## 5. SYSTEM:

The project consists of an NFC-based smart lock system, a cloud-based booking platform, a virtual key management system, and an integrated authentication process.

Guests interact with the system through a web-based hotel booking platform that allows them to book rooms seamlessly. Upon successful verification during check-in, the system generates a virtual key, sent to the guest's email, which can be used to unlock the hotel room using the NFC chip on their smartphone. This eliminates the need for traditional physical keys or key cards.

The NFC smart lock ensures secure room access by digitally controlling entry to the room. Guests can tap their smartphones on the door's NFC-enabled lock to gain access, improving security and reducing the risk of lost or duplicated keys.

A cloud-based verification system manages the authentication and distribution of virtual keys. During check-in, reception verifies guest details, and once approved, the virtual key is sent to the guest's email. This key is valid only for the duration of the stay, providing an additional layer of security.

The system also integrates with the hotel's existing operations, offering a unified platform for booking, check-ins, and room access,

enhancing operational efficiency and creating a smooth guest experience.

The smart lock system offers a secure, efficient, and streamlined solution for hotel management, improving both guest security and hotel operations.

## 6. CONCLUSION:

The NFC-based smart lock system and cloud-based booking platform provide an innovative solution to the existing challenges in hotel management, particularly in the areas of security and operational efficiency. Traditional key systems, often prone to loss or duplication, pose security risks to guests and can disrupt the check-in process. By leveraging smartphone NFC technology, the project offers a secure and seamless way for guests to access their rooms, eliminating the need for physical keys or cards. This not only enhances the overall safety of the guests but also simplifies room access, making the guest experience more convenient and less time-consuming.

Additionally, the cloud-based platform integrates room booking, verification, and key management into a unified system, addressing the fragmentation that often exists between hotel booking systems and access technologies. The ability to automatically generate and send virtual keys upon successful verification streamlines hotel operations, reducing the workload on front desk staff and allowing for more efficient management of guest check-ins. This also paves

the way for remote check-in options, further enhancing the guest experience by reducing wait times and improving overall service quality.

The project's emphasis on security, convenience, and integration demonstrates its potential to transform hotel operations. As the hospitality industry continues to evolve, this system could serve as a model for future developments in hotel technology, offering scalability and adaptability to meet the needs of different hotel chains and guest preferences. Future iterations of the system may incorporate additional features, such as biometric verification or advanced encryption protocols, to further enhance both guest safety and operational efficiency. Overall, this smart lock system provides a comprehensive and forward-thinking approach to solving current issues in the hotel industry, with potential for continued growth and improvement in the years to come.

## 7. ACKNOWLEDGMENTS

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