A Mini Project Synopsis on

"Secure Smart Lock Access Log using Blockchain Technology"

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Abstract

Conventional smart lock access logs are susceptible to manipulation, raising security concerns. This project proposes a novel solution by leveraging blockchain technology to develop a secure and transparent access log system. By integrating a smart lock with a blockchain network, the system immutably records access events with timestamps, unlocking methods, and user identification. This ensures a tamper-proof and verifiable access history accessible to authorized individuals through a user-friendly interface. This project demonstrates the potential of blockchain technology to significantly enhance the security and transparency of smart lock access control systems.

Problem statement

This project tackles the vulnerability of traditional smart lock access logs by proposing a secure and transparent system built on Blockchain technology, ensuring tamper-proof records and clear access history for enhanced security and trust.

Objective

The objective of this project is to design and implement a secure and transparent access log system for smart locks by leveraging blockchain technology. This addresses the vulnerabilities of traditional logs and aims to achieve:

1. **Immutability:** Prevent unauthorized modification of access logs, ensuring data integrity and security.

2. **Transparency:** Provide a verifiable and auditable record of all access events, fostering trust and accountability.
3. **Detailed Records:** Capture essential details like timestamps, unlocking methods, and user identification for comprehensive access analysis.

Methodology

1. Hardware Integration:

- **Smart Lock Selection:** Choose a suitable smart lock with features like:
    - Connectivity (e.g., Wi-Fi, Bluetooth) for communication with the chosen development platform.
    - Ability to record access events with timestamps.
    - User identification mechanisms (fingerprint reader, PIN pad, etc.).
- **Development Platform Integration:** Integrate the chosen smart lock with a development platform like Raspberry Pi. This platform will act as the bridge between the lock and the Blockchain network.
- **Event Recording Implementation:** Develop mechanisms on the development platform to capture access events with timestamps and user identification details whenever the lock is unlocked.

2. Blockchain Implementation:

- **Platform Selection:** Choose a suitable Blockchain platform like Hyperledger Fabric or a cloud-based service. Factors to consider include scalability, security features, and compatibility with smart contracts.
- **Smart Contract Design:** Design and deploy a smart contract on the chosen Blockchain platform. This contract will be responsible for securely storing access event data received from the smart lock.

- **Communication Protocols:** Develop secure communication protocols for data transmission between the smart lock (via the development platform) and the Blockchain network. This ensures data integrity and prevents unauthorized access.

3. User Interface Development:

- **Interface Design:** Create a user-friendly interface that allows authorized individuals to access and visualize the access log stored on the Blockchain.
- **Data Access and Analysis:** Implement functionalities within the interface for:
    - Securely retrieving access logs from the Blockchain network.
    - Filtering and analyzing access data based on specific criteria (e.g., date range, user, and unlocking method).
    - Visualizing the access history in a clear and informative way (e.g., charts, tables).

References

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