Design and Implementation of an IoT-Based Door Lock System

Chander Deep Singh

M.C.A, GDC Mendhar
DOI : https://doi.org/10.5281/zenodo.8129935

ABSTRACT:

In recent years, the Internet of Things (IoT) has gained significant attention due to its potential to revolutionize the way we interact with the world. One of the most promising applications of IoT is in the field of home automation, where it can be used to control various aspects of the home environment, including door locks. In this paper, we present the design and implementation of an IoT-based door lock system that utilizes a Raspberry Pi as the main controller. The system is capable of locking and unlocking a door remotely using a mobile application, as well as detecting and alerting the user of any unauthorized access attempts.

Keywords:-iot based door lock, lock system, digital lock, controller, unlocking door, remotely access,

Introduction:

Traditional door lock systems have been around for centuries and have served their purpose well. However, with the advent of IoT, it is now possible to create door lock systems that are more secure and convenient to use. An IoT-based door lock system can be controlled remotely using a mobile application, making it possible to unlock the door from anywhere in the world. In addition, these systems can be designed to detect any unauthorized access attempts and alert the user in real-time.

Objective:-

The objective of designing and implementing an IoT-based door lock system is to provide a secure and convenient access control solution that can be remotely monitored and managed. The system should be designed to enhance the security of a building or room by ensuring that only authorized persons are granted access. Additionally, the system should offer convenience by eliminating the need for physical keys or cards, instead relying on secure digital authentication methods such as biometrics or passwords.

Some specific objectives that may be included in the design and implementation of such a system could include:

Developing a user-friendly interface for managing access control, including the ability to add or remove authorized users, monitor access logs, and configure security settings.

Integrating with existing security systems, such as alarms or surveillance cameras, to enhance overall security and provide a comprehensive solution.

Incorporating secure communication protocols and encryption methods to ensure that the system is protected against hacking and unauthorized access.

Providing real-time notifications and alerts to designated users or security personnel in case of a security breach or attempted unauthorized access.

Implementing remote access control capabilities, allowing authorized users to unlock the door from a remote location using a mobile device or web interface.

Overall, the objective of designing and implementing an IoT-based door lock system is to provide a secure, convenient, and flexible access control solution that leverages the latest technology to enhance building security and streamline access management.

Design:

The proposed system consists of a Raspberry Pi, a motorized lock, a magnetic door sensor, and a Wi-Fi module. The Raspberry Pi serves as the main controller and is responsible for receiving commands from the mobile application and controlling the lock and sensor. The motorized lock is used to physically lock and unlock the door, while the magnetic door sensor is used to detect when the door is opened or closed. The Wi-Fi module is used to connect the Raspberry Pi to the internet, allowing it to communicate with the mobile application.

Implementation:

The software for the system was developed using Python and the Flask framework. The mobile application was developed using React Native. When the user sends a command to unlock the door from the mobile application, the Raspberry Pi receives the command and sends a signal to the motorized lock to unlock the door. The system also continuously monitors the magnetic door sensor to detect any unauthorized access attempts. If an unauthorized access attempt is detected, the system sends an alert to the user's mobile application.

Conclusion:

 The proposed IoT-based door lock system provides a more secure and convenient way to control access to a home. By utilizing the power of the internet, it is now possible to lock and unlock a door remotely using a mobile application, as well as detect and alert the user of any unauthorized access attempts. This system can be further enhanced by adding additional sensors, such as a camera, to provide even more security.

References

] Sebastian, S., Ray, P.P., 2015. Development of IoT invasive architecture for complying with health of home. In: Proceedings of I3CS, Shillong, pp.

[2] G. Yang, X. Li, M. Mäntysalo, X. Zhou, Z. Pang, L.D. Xu , S.K. Walter, Q. Chen, L. ZhengA,2014 health-IoT platform based on the integration of intelligent packaging, unobtrusive bio-sensor and intelligent medicine box. [3] Justin Lahart (27 November 2009). "Taking an Open

[4] C. Floerkemeier, C. Roduner, M. LampeRFID application development with the Accada middleware platform.

[5] J.-i. Jeong,Department of Law, Kyonggi University, Iui- Dong, Yeongtong-Gu, Suwon-Si, Gyeonggi, South Korea .

[6] N. Bhanja, S. K. Dhara, A. Das, T. Paul, S. Mukherjee, P.t

 [7] Shancang Li Theo TryfonasHongleiLi , (2016),"The Internet of Things: a security point of view", Internet .

[8] Hindawi Publishing Corporation Mobile Information . Article Enhancing the Security of Personal Identification Numbers with Three-Dimensional Displays.

[9] International Conference on Electrical, Electronics, and Optimization Techniques (ICEEOT) - 2016 978-1-4673-9939-5/16/$31.00 ©2016 IEEE Overview of Fingerprint Recognition System Mouad .M.H.Ali, Vivek H. Mahale, PravinYannawar, A. T. Gaikwad.

[5] Ni Ni San Hlaing, San SanLwin, "Electronic Door Lock using RFID and Password Based on Arduino" .