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INTERNET OF THINGS (IOT) FOR BANK LOCKER

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ABSTRACT

With the contemporary amelioration of web and diversification of systems administration, organizing is capacitated on regular gizmos through the Internet of Things (IoT). Over the most recent few years, IoT is expeditiously flourishing over the globe. The idea is to develop a Bank Locker Security system that permits the manager to see the occurrences from an isolated area and catch the frame depending on its advantage. This will be assimilated by planning site pages, connecting them with the database, picture catching by raspberry pi, face acknowledgment, face discovery, structuring of the application and permitting/denying the client ent

INTRODUCTION

With the rapid evolution of the Internet of Things (IoT) and the increasing integration of smart systems into everyday life, security systems have seen significant technological advancement. Traditional bank locker systems are no longer sufficient in addressing modern-day security threats, necessitating the implementation of more intelligent and responsive solutions. In this context, the development of an IoT-based Bank Locker Security System offers a robust and efficient alternative by leveraging Raspberry Pi, face detection, and face recognition technologies. The proposed system aims to provide enhanced control and monitoring capabilities to bank administrators through a web interface that supports remote surveillance, real-time image capture, and decision-based access control. By designing a system that integrates facial authentication with IoT communication, the project ensures not only physical security but also efficient access management from any location.

LITERATURE SURVEY

1. S. Patil, R. Deshmukh (2021) – IoT Based Smart Bank Locker Security System Using Face Recognition, International Journal of Scientific Research in Engineering and Management (IJSREM)

This paper presents an IoT-driven bank locker security system that uses face recognition for user verification. The system integrates a Raspberry Pi with a camera module and remote access control, allowing secure locker operation only upon successful authentication.

2. A. Roy, M. Jha (2020) – Smart Locker System Based on IoT and Face Recognition, International Journal of Engineering Research & Technology (IJERT)

The authors design a smart locker using Raspberry Pi, IoT modules, and OpenCV for real-time face detection and recognition. It emphasizes enhanced access security and allows administrators to monitor events via cloud-connected dashboards.

3. K. Sharma, V. Bansal (2019) – Intelligent Bank Locker System Using Facial Biometric and IoT, International Research Journal of Engineering and Technology (IRJET)

This research proposes an intelligent locker system where facial biometrics determine access. The system also includes OTP-based verification and logs every attempt to a centralized cloud database for remote access and admin oversight.

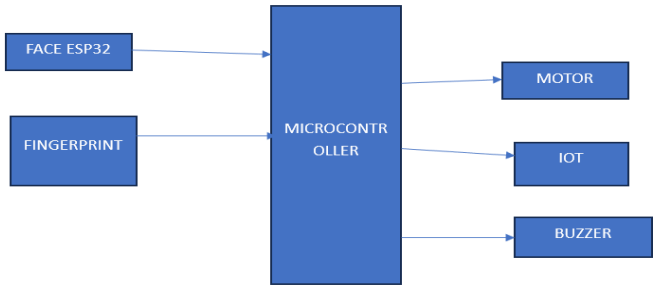
4. R. Singh, N. Kumar (2022) – IoT Based Secure Smart Locker with Real-Time Monitoring and Intrusion Detection, Journal of Emerging Technologies and Innovative Research (JETIR)

This system focuses on integrating sensors, cameras, and facial recognition for smart locker access. The admin can view live feeds and receive intrusion alerts. Real-time image capturing and cloud logging are supported through a web-based interface.

5. A. Yadav, T. More (2023) – Raspberry Pi and IoT Enabled Face Recognition-Based Security System for Banking Applications, International Journal of Computer Applications (IJCA)

The paper details the development of a secure face recognition system using Raspberry Pi and IoT platforms. It includes live monitoring, secure access control, and database-linked authentication for enhanced locker safety in banks.

BLOCK DIAGRAM



POWER SUPPLY

A regulated power supply converts unregulated AC (Alternating Current) into a consistent DC (Direct Current). It ensures reliable results regardless of fluctuations in input. A regulated DC power supply, commonly referred to as a linear power supply, is an embedded circuit composed of multiple blocks.

- Definition of a Regulated Power Supply: A regulated power supply provides a stable DC output by transforming variable AC input.
- Overview of Components: A regulated power supply consists of several key components: a transformer, rectifier, filter, and regulator. Each of these elements plays an essential role in ensuring a stable DC output.
- Rectification Explained: This process entails the conversion of alternating current (AC) to direct current (DC) through the use of diodes, often employing full wave rectification to optimize efficiency.
- Filter Function: Various filters, including capacitor and LC types, are employed to smooth the DC output, thereby minimizing ripple and ensuring a stable voltage.

Regulation Mechanism: Adjustments are made by regulators to stabilize output voltage, safeguarding against fluctuations in input or variations in load, which is crucial for ensuring a dependable power supply.

BUZZERS

In common parlance a Buzzer is a signaling device that is not a loudspeaker. It can be mechanical, electromechanical, or electronic (a piezo transducer). BeStar produces Buzzers in every available configuration for a wide variety of applications. A Piezo transducer can produce the sound for panel mount buzzers, household goods, medical devices and even very loud sirens. When a lower frequency is required an electromagnetic buzzer can fill the need. These are very common in automotive chimes and higher end clinical diagnostic devices. The BeStar buzzer range includes self drive units with their own drive circuitry (indicators), or external drive units, which allow the designer the flexibility to create their own sound patterns. BeStar buzzers, whether a piezo buzzer, or an electro-magnetic buzzer, self (indicator) or non-self (transducer) drive are available with a variety of mounting methods, such as surface mount, thru hole, flange, wire leads or panel mounting. Sealed, high temp, very loud, weather resistant; whatever your application requirement is, BeStar has a piezo buzzer that will meet your design criteria.

ESP8266

The ESP8266 is a low-cost Wi-Fi microchip, with a full TCP/IP stack and microcontroller capability, produced by Espressif Systems[1] in Shanghai, China. The chip first came to the attention of Western makers in August 2014 with the ESP-01 module, made by a third-party manufacturer Ai-Thinker. This small module allows microcontrollers to connect to a Wi-Fi network and make simple TCP/IP connections using Hayes-style commands. However, at first there was almost no English-language documentation on the chip and the commands it accepted.[2] The very low price and the fact that there were very few external components on the module, which suggested that it could eventually be very inexpensive in volume, attracted many hackers to explore the module, the chip, and the software on it, as well as to translate the Chinese documentation.[3] The ESP8285 is an ESP8266 with 1 MiB of built-in flash, allowing the building of single-chip devices capable of connecting to Wi-Fi.[4] The successors to these microcontroller chips is the ESP32 family of chips, including the pin-compatible ESP32-C3.

DC Motor Driver:

The L293 and L293D are quadruple high-current half-H drivers. The L293 is designed to allow for bidirectional drive currents of up to 1 A at voltages from 4.5 V to 36 V. The L293D is planned to provide bidirectional drive currents of up to 600-mA at voltages of 4.5 V to 36 V. Both devices are designed to drive inductive loads such as relays, solenoids, dc and bipolar maltreating motors, as well as other high-current/high up-voltage loads in positive-supply applications.

All inputs are TTL compatible. Each output is a complete totem-pole drive circuit, with a Darlington transistor drop and a pseudo-Darlington source. Drivers are changed in pairs, with drivers 1 and 2 enabled near 1,2EN and drivers 3 and 4 enabled by 3,4EN.When an enable input is high, the linked drivers are enabled and their outputs are active and in phase with their inputs.

When the enable input is low, those drivers are disabled and their outputs are off and in the high-impedance state. With the thoroughly data inputs, each pair of drivers forms a full-H (or bridge) reversible drive suitable for solenoid or motor applications. On the L293, international high-speed output clamp diodes should be used for inductive

transient stifling. A VCC1 terminal, classify from VCC2, is provided for the logic inputs to minimize device power dissolution. The L293and L293D are characterized for operation from 0°C to 70°C.

Fig : L293D IC

D.C. Motor:

A dc motor uses electrical energy to produce mechanical energy, very generally through the interaction of magnetic fields and current-containing conductors. The reverse process, producing electrical energy from mechanical energy, is carried out by an alternator, source or dynamo. Many types of electric motors can be run as sources, and vice verse. The input of a DC motor is current/voltage and its output is torque (speed).

Fig DC Motor

The DC motor has two basic parts: the rotating part that is called the armature and the stable part that includes coils of wire called the field coils. The stationary part is also called up the stator. Figure shows a depict of a distinctive DC motor, Figure shows a picture of a DC armature, and Figure shows a picture of a distinctive stator. From the picture you can see the armature is made of coils of wire wrapped around the core, and the core has an covered shaft that rotates on charges. You should also notice that the ends of each coil of wire on the armature are finished at one end of the armature. The outcome points are called the commutator, and this is where's brushes make electrical contact to bring electrical current from the stationary part to the rotating part of the machine.

MICRO CONTROLLERS

A microcontroller (MC, UC, or μC) or microcontroller unit (MCU) is a small computer on a single integrated circuit. A microcontroller contains one or more CPUs (processor cores) along with memory and programmable input/output peripherals. Program memory in the form of NOR flash, OTP ROM, or ferroelectric RAM is also often included on the chip, as well as a small amount of RAM. Microcontrollers are designed for embedded applications, in contrast to the microprocessors used in personal computers or other general-purpose applications consisting of various discrete chips.

CONCLUSION

In conclusion, the proposed IoT-enabled Bank Locker Security System presents a modern and secure alternative to conventional locker mechanisms. By integrating facial recognition, Raspberry Pi, and a web-based interface, the system provides administrators with the ability to monitor and control access remotely. This ensures that only authorized users are granted entry, significantly reducing the risk of unauthorized access. The system's ability to capture images and maintain logs enhances its reliability and serves as a valuable tool for forensic verification. Overall, the implementation of such a smart security solution demonstrates the potential of IoT and AI technologies in transforming traditional security

infrastructure into intelligent, scalable, and user-friendly systems.

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