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RFID Based Passport Verification

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Abstract: Radio Frequency Identification (RFID) technology has appear as a important device for automatic identification, enabling the storage and retrieval of data through RFID tags. These tags store unique codes, facilitating efficient data access without the need for scanning. In the context of advancing research, the integration of RFID with Internet of Things (IoT) devices holds significant promise, particularly in the enhancement of electronic passports (E-Passports). However, ensuring secure data storage on E-Passports remains a critical challenge. In this paper, we propose an improved remote E-Visa framework with streamlined security measures. The primary objective of this system is to develop a high-quality remote identity and smart card solution that effectively communicates identity details and visa limitations. By leveraging RFID technology and IoT devices, this advanced system aims to mitigate paperwork and document-related issues while enhancing security features. Furthermore, the proposed framework emphasizes the importance of safeguarding customer data through robust security protocols, thus offering a high level of security in data storage and transmission.

Keywords: RFID, Passport, Verification, Esp8266

I. INTRODUCTION

Radio Frequency Identification (RFID) stands as a cornerstone in automated identification systems, revolutionizing the storage and retrieval of data through RFID tags. Each tag is imbued with a distinct code, endowing it with a unique identity and capable of storing up to 2KB of data. The seamless retrieval of information by readers, without the need for physical scanning, underscores the efficiency and convenience of RFID technology.In tandem with the evolution of technology, the convergence of E-Passports with Internet of Things (IoT) devices emerges as a pivotal area of exploration in contemporary research. However, the retrieval of data stored within E-Passports presents a notable challenge. Addressing this challenge, this paper proposes an innovative remote E-Visa framework fortified with streamlined security measures. The primary objective of this advanced system is to devise a sophisticated remote identity and smart card solution, adept at conveying identity details and visa limitations. Leveraging RFID technology, which harnesses radio frequency signals for automated identification, this framework transcends traditional identity and visa documents, ushering in an era of streamlined paperwork and enhanced security features. By substituting conventional identity and visa information with RFID tags, this framework aims to overcome document-related challenges and elevate the security standards associated with identity documents. Furthermore, this advanced system prioritizes the safeguarding of customer data, ensuring a high level of security in information storage.

II. METHODOLOGY

This project is designed for enhancing security measures by distinguishing between authorized and unauthorized individuals. It finds application in real-time systems such as attendance recording in companies, passport access control at airports, and authorization verification in industries. Radio Frequency Identification (RFID) technology, increasingly integrated with biometric systems, forms the backbone of this security solution. The key components of a RFID system include the Transponder (tags attached to objects) and the Interrogator (RFID reader). Communication between the reader and tags is wireless and does not require direct line of sight.

RFID tags are categorized as active (drove by an internal battery) or else passive (without a distinct power source). This project utilizes passive tags, particularly read-only tags programmed with unique data that cannot be modified. The RFID reader performs three main functions: energizing, demodulating, and decoding. The reader antenna emits radio signals to activate and communicate with the tag. In this project, the RFID module reader comprises a transmitter-receiver module, a control unit, and an antenna. Interfaced with a microcontroller, the reader reads data from the RFID card and displays it on an LCD screen. Upon reading the card data, the system compares it with data stored in its memory. If a match is

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found, an authorized message is displayed; otherwise, an unauthorized message is displayed, indicating that access is denied. This methodology ensures efficient and reliable security authentication in various applications.

III. BLOCK DIAGRAM

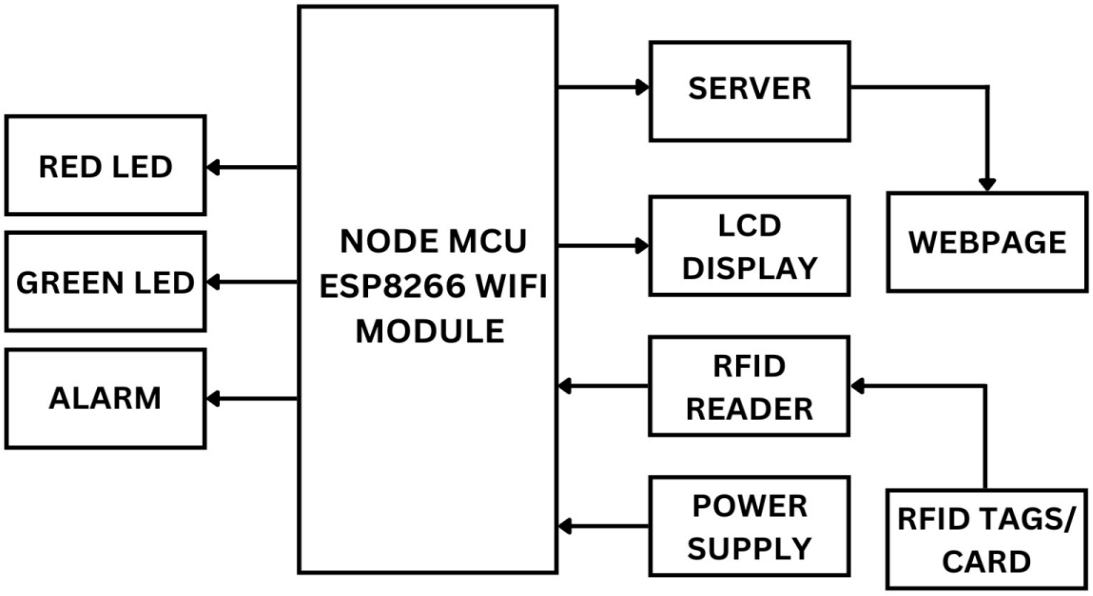

Fig.1 Basic block Diagram

NodeMCU is a versatile open-source platform and development kit utilized for creating Internet of Things (IoT) projects. It is equipped with firmware that conduct on the ESP8266 Wi-Fi SoC (System on Chip) from Espressif Systems, with hardware based on the ESP-12 board. The firmware is programmed using the language of Lua scripting and is built upon the eLua project, which in turn is based on the ESP8266 Espressif Non-OS SDK. The decision to select NodeMCU (ESP8266) as the controller for this project is influenced by several factors. Firstly, its compact size makes it ideal for space-constrained applications. Additionally, it offers a cost-effective solution compared to other controllers. Its reliability and ease of interfacing with various devices make it a preferred choice over alternatives such as Programmable Integrated Circuits (PICs) and Programmable Logic Controllers (PLCs). Overall, NodeMCU provides a robust foundation for developed Iot

When dealing with embedded systems, having a dependable output device is crucial for accessing essential information. Fortunately, the introduction of the 16x2 LCD (16 characters by 2 lines) has provided a solution to this requirement. This versatile display serves various purposes, including alphanumeric output, information display, and monitoring process status. With the 16x2 LCD, users can effectively track every action of the microcontroller, enabling thorough observation and control over the embedded system's operations

A buzzer serves as a compact and efficient component for introducing sound functionality to various projects or systems. Its small, two-pin structure allows for easy integration onto breadboards, perfboards, and even PCBs, making it a highly versatile and commonly utilized element across a wide range of electronic applications.

The RC522 is a versatile RFID module operating at 13.56MHz, powered by the MFRC522 controller developed by NXP Semiconductors. This module boasts compatibility with I2C, SPI, and UART interfaces and typically comes bundled with an RFID card and key fob. Widely employed in attendance systems and various person/object identification applications, the RC522 consists of an RFID reader, RFID card, and keychain. Operating within the 13.56MHz industrial (ISM) band, the RC522 module operates without requiring any licensing. With a typical voltage requirement of 3.3V, it is commonly integrated into designs utilizing this voltage standard. The RC522 module is particularly useful in scenarios where unique identification of individuals or objects is necessary.The included keychain features 1kB of memory, enabling the storage of unique data. Additionally, the RC522 reader module possesses the capability to both read and write data to these memory elements. Notably, the reader is capable of reading data exclusively from passive tags operating on the 13.56MHz

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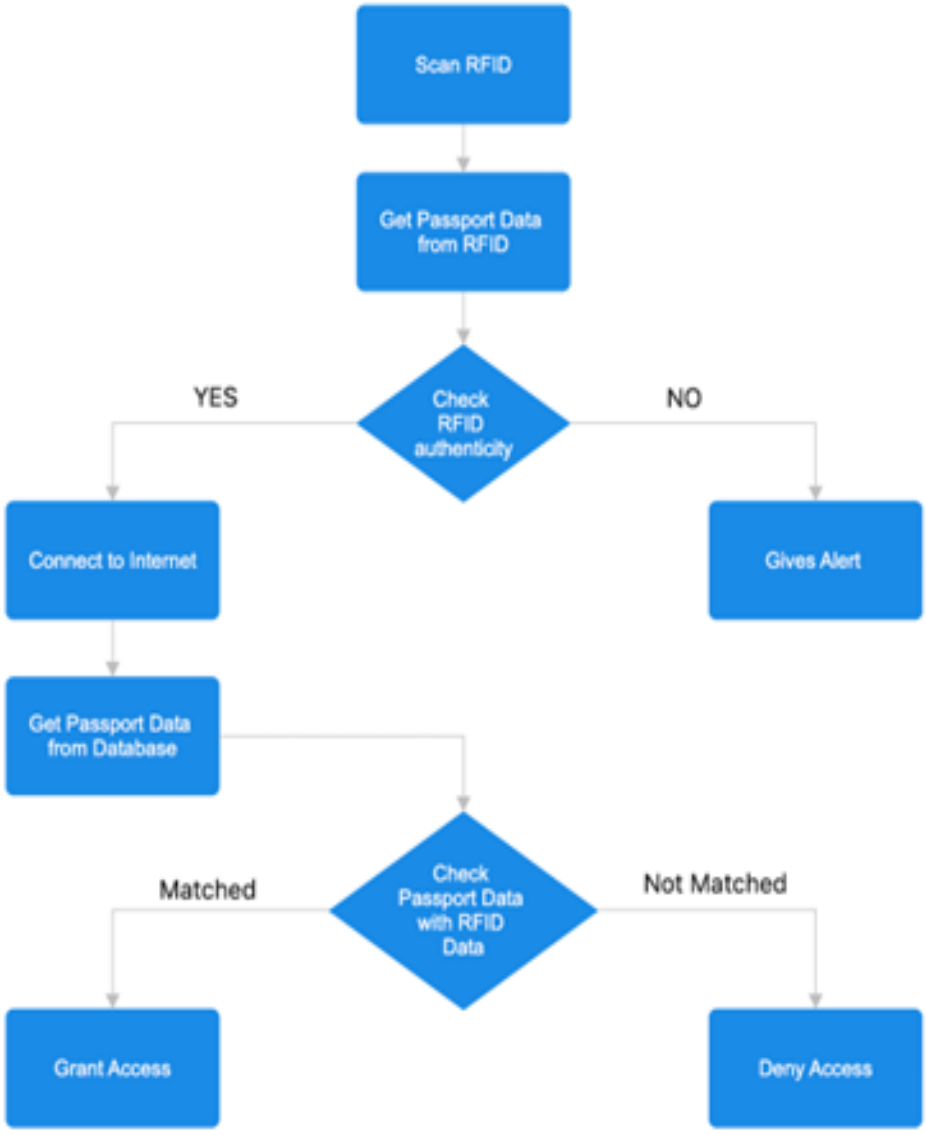
IV. FLOW CHART



V. CONCLUSION

The conclusion presents a system proposal centered on RFID and IoT technologies aimed at replacing traditional paper passports with e-passports. The system suggests two levels of authentication for enhanced security. The first level involves the use of an RFID module, comprising an RFID tag and reader, while the second level incorporates face recognition. IoT technology facilitates the display of passport holder details. Implementing two levels of

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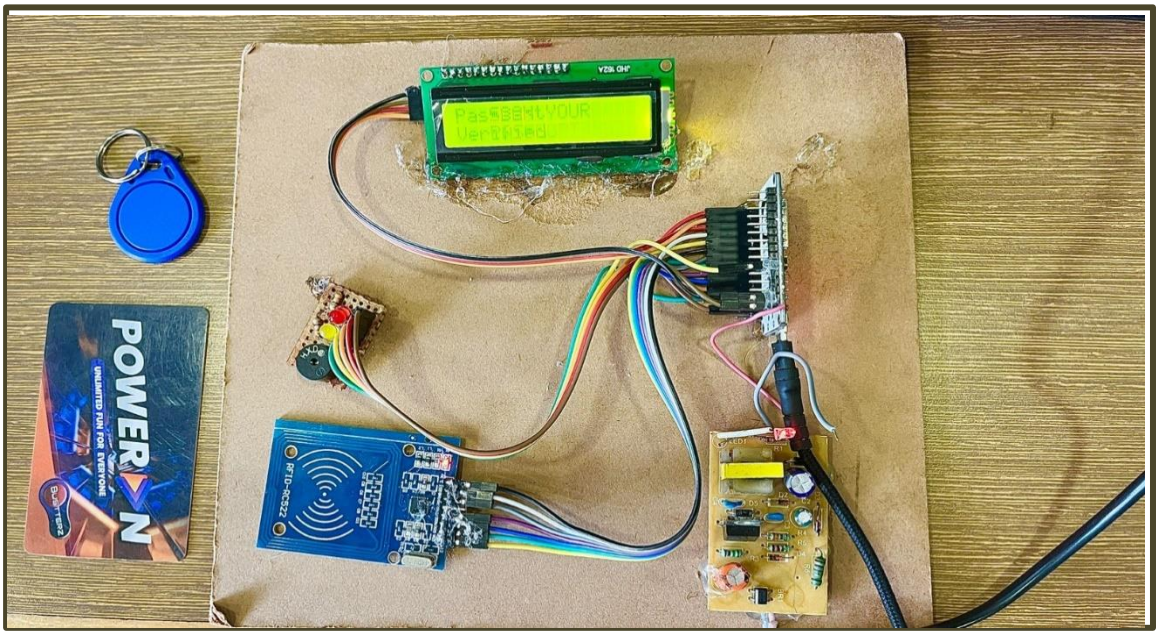
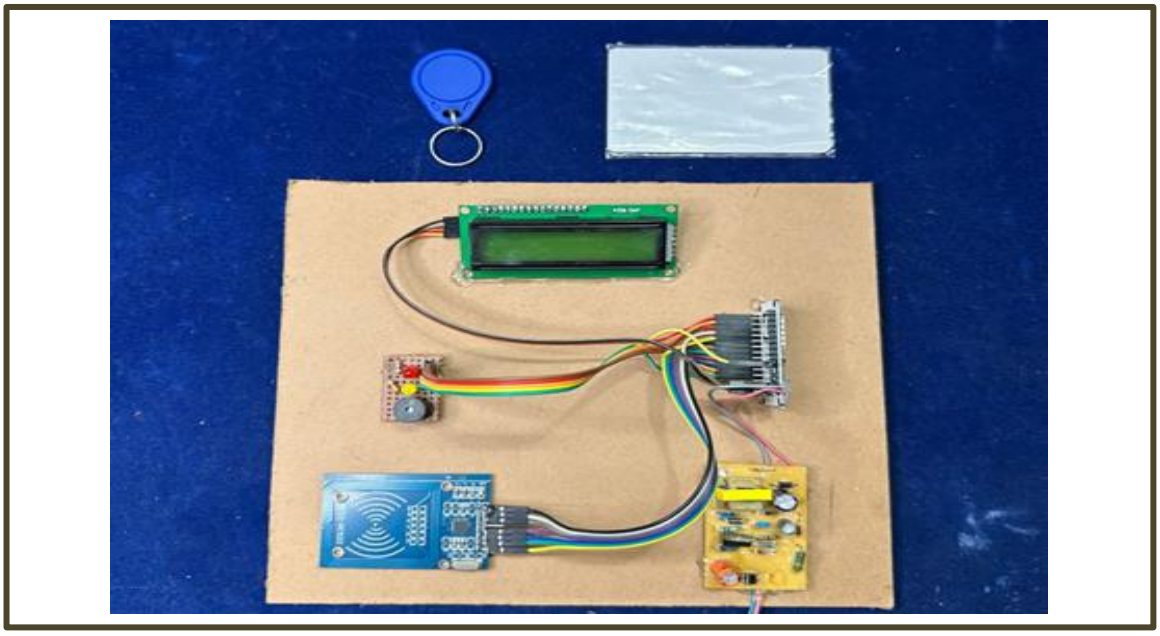
VI. RESULT





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