Radio Frequency Based Bank Locker Security System

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Abstract- *The main objective of this report is to convey and implement a bank locker security system based on two-factor authentication that improves the safety and security of bank lockers. In this system only the authentic user recovers the possessions from the lockers and the two independent authentications used. The main goal of this system is to design a locker security system using RFID and OTP verification. In this system, only authenticated person can open the door. A security system is implemented containing door locking system using passive type of RFID which can activate, authenticate, and validate the user and unlock the door in real time for secure access. The advantage of using passive RFID is that it functions without a battery and passive tags are lighter and are less expensive than the active tags. This system consists of microcontroller, RFID reader, and PC. This system is more secure than other systems because two codes protection method used.*

I. INTRODUCTION

Intelligent, programmable and computing electronic device designed to perform specific tasks based on a fixed time frame. An embedded system is a combination of hardware and software, perhaps with some mechanical and other components designed to perform a specific task. Electronics usually uses either a microprocessor or a microcontroller. Some large or old systems use general-purpose mainframes computers or minicomputers. It is very reactive and real time constrained. Increasingly high-performance. Application specific processor design can be significant component of embedded system. It acts as a single function not used as general purpose. Processor is a digital circuit designed to perform computational tasks. An Embedded system consists of single purpose processor rather than general purpose processor. Single purpose processor better then general-purpose processor. A fixed size volatile memory such as DRAM or SRAM & non-volatile memory such as EPROM or Flash, connected to microcontroller/processor is used. This is mainly used for the purpose of storage but this storage is not unlimited. It is the silicon chip with an array o fun connected transistors. It includes gate arrays and standard cell ICs.

II. RFID READER (EM-18)

Radio frequency Identification (RFID) is a wireless identification technology that uses radio waves to identify the presence of RFID tags. Just like Bar code reader, RFID technology is used for identification of people, object etc. presence. In barcode technology, we need to optically scan the barcode by keeping it in front of reader, whereas in RFID technology we just need to bring RFID tags in range of readers. Also, barcodes can get damaged or unreadable, which is not in the case for most of the RFID. RFID is used in many applications like attendance system in which every person will have their separate RFID tag which will help identify person and their attendance. RFID is used in many companies to provide access to their authorized employees. It is also helpful to keep track of goods and in automated toll collection system on highway by embedding Tag (having unique ID) on them.
RFID based system has two basic elements

RFID Tag:

RFID tag includes microchip with radio antenna mounted on substrate which carries 12 Byte unique Identification number.

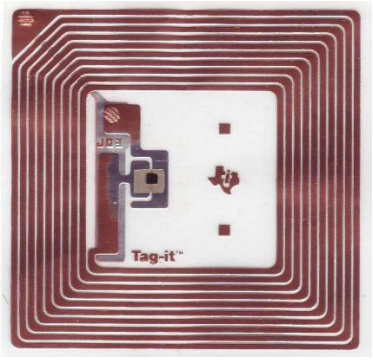

Fig: 4.1.1 RFID Tag Inside

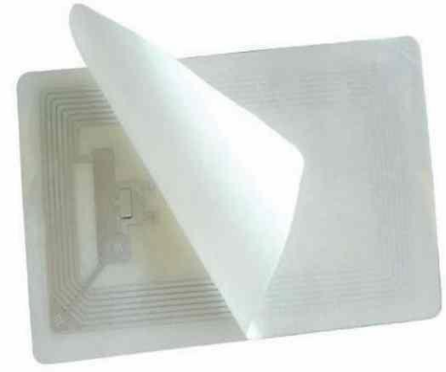

Fig : 4.1.2 RFID Tag

RFID Reader:

It is used to read unique ID from RFID tags. Whenever RFID tags comes in range, RFID reader reads its unique ID and transmits it serially to the microcontroller or PC. RFID reader has transceiver and an antenna mounted on it. It is mostly fixed in stationary position.

Fig: 4.1.3 EM18 RFID Reader Module

III. NODE MCU

The Node MCU (Node Micro Controller Unit) is an open source software and hardware development environment that is built around a very inexpensive System-on-a-Chip (SoC) called the ESP8266. The ESP8266, designed and manufactured by Espressif Systems, contains all crucial elements of the modern computer: CPU, RAM, networking (WIFI), and even a modern operating system and SDK. That makes it an excellent choice for IoT projects of all kinds.

However, as a chip, the ESP8266 is also hard to access and use. You have to solder wires, with the appropriate analog voltage, to its PINs for the simplest tasks such as powering it on or sending a keystroke to the "computer" on the chip. And, you have to program it in low-level machine instructions that can be interpreted by the chip hardware. While this level of integration is not a problem when the ESP8266 is used as an embedded controller chip in mass-produced electronics, it is a huge burden for hobbyists, hackers, or students who want to experiment with it in their own IoT projects.

Borrowing a page from the successful playbooks of Arduino or a Raspberry Pi, the Node MCU project aims to simplify ESP8266 development. It has two key components.

1. An open source ESP8266 firmware that is built on top of the chip manufacturer's proprietary SDK. The firmware provides a simple programming environment based on eLua (embedded Lua), which is a very simple and fast scripting language with an established developer community. For new comers, the Lua scripting language is easy to learn.
2. A DEVKIT board that incorporates the ESP8266 chip on a standard circuit board. The board has a built-in USB port that is already wired up with the chip, a hardware reset button, WIFI antenna, LED lights, and standard-sized GPIO (General Purpose Input Output) pins that can plug into a bread board. Figure 1 shows the DEVKIT board, and Figure 2 shows the schema of its pins.

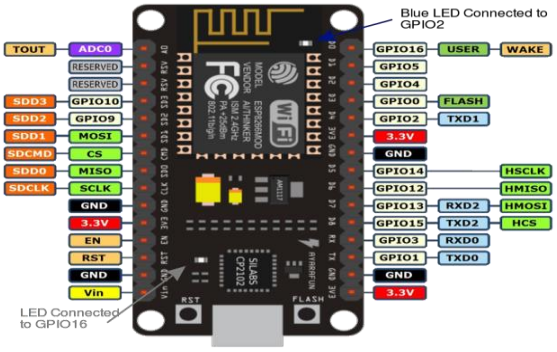

Fig: 4.4.1 Node MCU

The Node MCU DEVKIT board that comes preloaded with the firmware can be purchased for $8 USD a piece, which makes it a very economical device for prototyping and even for production use.

IV. CONCLUSION

1. An advanced and cost-effective feature for bank locker security has been proposed.
2. This system is distinctive in many ways from existing Bank Locker intrusion and theft control systems.
3. Existing system are either very expensive and not reliable.
4. The proposed system is reliable, inexpensive with appropriate design.

REFERENCES

[1] Parvathy A, Venkata Rohit Raj, Venumadhav, Manikanta, "RFID Based Exam Hall Maintenance System'', IJCA Special Issue on "Artificial Intelligence Techniques - Novel Approaches & Practical Applications" AIT, 2011

[2] Gyanendra K Verma, Pawan Tripathi, "A Digital Security System with Door Lock System Using RFID Technology", International Journal of Computer Applications (IJCA) (0975 – 8887), Volume 5– No.11, August 2010

[3] Kumar Chaturvedula .U.P, "RFID Based Embedded System for Vehicle Tracking and Prevention of Road Accidents", International Journal of Engineering Research & Technology (IJERT) , Vol. 1 Issue 6, August – 2012, ISSN: 2278-0181

[4] Islam, N.S. Wasi-ur-Rahman, M. "An intelligent SMSbased remote Water Metering System". 12th International Conference on Computers and Information Technology, 2009, 21-23 Dec. 2009, Dhaka, Bangladesh.

[5] Mohd Helmy Abd Wahab, Siti Zarina MohdMuji, Fazliza Md. Nazir. "Integrated Billing System through GSM Network". In Proceeding of 3rd International Conference on Robotics, Vision, Information and Signal Processing 2007 (ROVISP2007), Penang, 28 – 30 November 2007

[6] Mohd Helmy Abd Wahab, Azhar Ismail, Ayob Johari and Herdawatie Abdul Kadir. "SMS-Based Electrical Meter Reading". In Proceeding of International International Journal of Computer Applications (0975 – 8887) Volume 57– No.18, November 2012 20 Conference on Rural Information and Communication Technology 2009 (r-ICT), 17 – 18 June 2009, Bandung, Indonesia

[7] Malik Sikandar Hayat Khiyal, Aihab Khan, and ErumShehzadi. " SMS Based Wireless Home Appliance Control System (HACS) for Automating Appliances and Security", Issues in Informing Science and Information Technology. Vol. 9. pp. 887 – 894. 2009.

[8] Al-Ali, A.R. Rousan, M.A. Mohandes, M. "GSM-Based Wireless Home Appliances Monitoring & Control System", Proceedings of International Conference on Information and Communication Technologies: From Theory to Applications, pp 237-238, 2004.

[9] Md. Wasi-ur-Rahman, Mohammad Tanvir Rahman, Tareq Hasan Khan and S.M. Lutful Kabir, "Design of an Intelligent SMS based Remote Metering System", Proceedings of the IEEE International Conference on Information and Automation, 2009, pp. 1040-1043.

[10] Carelin Felix and I. Jacob Raglend, "Home Automation Using GSM", Proceedings of 2011 International Conference on Signal Processing, Communication, Computing and Networking Technologies, pp. 15-19, 2011.