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Nfc Based Dual Authentication Access Control System With Biometric

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Abstract **- This paper introduces readers to the world of information technology and data security as a part of it. It talks about access control, its components, and levels and types of access control. The paper recognizes the importance of identifying and authenticating any given user in the business areas. Therefore, it gives full attention to biometrics as one of the access control technology and discusses variety and performance of other known techniques; points out the advantages and disadvantages of using them. The paper also presents some real life examples of companies, implementing biometric solutions in their businesses. In this article show how Near Field Communication with biometric authentication with the more security of Server authentication. , it can be connected to the internet using the Ethernet port or by Wi-Fi connectivity. It results in convenience, energy efficiency, and safety benefits leading to improved quality of life. Its futurity, energy efficiency, control over the appliances from any location makes it very handy to use. So, concerning size, power, and price of the Raspberry Pi is qualified for a house-controller.**

Keywords- **NFC, GPIO, Wi-Fi, and Raspberry Pi.**

I. INTRODUCTION

We live in the era of digital kingdoms and computer slaves, who make human life much easier, but not necessary more secure. Just think how simple it was back in the Stone Age when probably the only valuable data was on a gigantic stone, where to steal or modify such a thing would require a tremendous human strength. Even just few decades ago to commit a crime one had to think of a way to do it, being visible, touchable, and recognizable. In other words one had to be physically present at the scene of a crime. Today, it is easier than ever to commit a felony. While some individuals are still trying to rob banks, many discovered a more comfortable way. In the privacy of their own home they compensate sleepless nights and absence of social.

 life by mastering their computer skills, aimed to get into the unreachable. It starts as a joke or a new challenge, but often grows into an illegal activity. Why just search the Internet, when there are ways to modify it and force to play your own games? Who likes to work to make money when it is possible to change a payroll and get a bonus? Invisible criminals succeed and it is getting harder and harder to catch and prosecute those who dare to intrude the security areas. Authentication in RF card is an area which has grown over the last decades, and will continue to grow in the future. It is used in many places today and being authenticated has become a daily habit for professional life. Near Field Communication (NFC) is proposed as a solution that is considered the most human-centric or user-friendly and the quickest for the passing of small amounts of data at close range.

NFC is a wireless short range communication technology, allowing us to transfer over a distance of up to 10 cm, but typically around 0-4 cm in practical. The major ad-vantage of NFC compared to other wireless technology is its simplicity. Simply by touching a reader, another NFC device or a NFC compliant tag, transactions are initialized automatically. In this article we introduce NFC in a access control sce-nario, where people can get quick access to their Office /home on their NFC card / devices by using either their biometric authentication thus deploying a two-factor authenti-cation scheme based on biometric .

II. REVIEW OF ACCESS CONTROL SYSTEM

Dhiraj Sunehra (2019), in recent days, security and safety of the homes has become a major challenge with increase in thefts and robberies. House with a traditional door lock system can be easily intruded. Also, a lost key

can create problems if it is misused by unauthorized persons. Home owners cannot open the door when the key is lost. Sometimes the user can fail to remember to lock the door. The users don't have an option to check whether the door is locked or unlocked. In this paper, a Web controlled door lock system with email alert using Raspberry Pi is developed. The main objective of the system is to provide security and simple authorized access to a home. The owner is alerted when there is someone in front of the door or when someone knocks the door. The user can check the image of the visitor through the e-mail sent by the system. The door can be remotely locked/unlocked and opened/closed by the user through a secured web page. The owner can also verify the status of the door and he/she can control it accordingly. This system becomes a desirable component in today's smart home environment and can be used alongside conventional door-lock system

Shwetank Mishra (2018), nowadays, providing a security system for Office has become a vital research in which the latest technologies are being adopted to serve this purpose. Wireless network is one of the technologies that have been used to provide remote monitor and control for the office appliances. This paper aims to propose a security door lock system based on Raspberry pi technology where cameras, keypad and pi-lids are being utilized to provide an alarming system that has the ability to notify , as well as, recognizing user by giving them a user-id. In this vein, the authorized individuals are only the ones who will get the permission to access the doors. The system works by taking snaps for the guest through a code and camera pi positioned in the doors then, such snaps will be sent to the owner. The proposed system can be extended to be used for different properties and facilities such as banks and office.

S. O. Anaza (2017),Threat to life and property necessitate the need for security (lock) systems which has evolved with technological advancement. Existing literature does not present firsthand information to researcher to Ascertain the research gap. This paper presents a review of some literatures in intelligent security lock systems, by presenting their concepts, the advantages and the drawback of such concept and the possible modification. Each of the literature reviewed is categorized into either single or multiple protocols depending on the number of security feature in the lock system. A single protocol system has one security feature while the multiple protocols have several security features. The approach produces a unique result which solves the problem of laborious literature survey.

Crystalynne et al., (2016), developed a microcontroller-based biometric locker system with short message service (SMS). The system scans fingerprint, match it with the saved pattern and unlock the locker. The global system for mobile (GSM) module was able to send text message containing the auto-generated pass code of the locker when an unrecognized fingerprint was encountered. It is a simple and reliable way of safeguarding a lock system, but the system has no registration mode mechanism to register finger pattern of new user. An improvement can be made by incorporating registration mode and adding another security features to increase the security reliability.

Sourav Roy (2018), Privacy and Security are two universal rights and, to ensure that in our daily life we are secure, a lot of research is going on in the field of home security, and IoT is the turning point for the industry, where we connect everyday objects to share data for our betterment. House security matters and people always try to make life easier at the same time. That's why we put up with this project, Face Recognition Door Lock System. Facial recognition is a well-established process in which the face is detected and identified out of the image. We aim to create a smart door, which secures the gateway on the basis of who we are. We want to develop this system based on Raspberry-pi 3, to make the house only accessible when your face is recognized by the recognition algorithms from Open CV library and meanwhile you are allowed in by the house owner, who could monitor entrance remotely. By doing so, the system is less likely to be deceived: since the owner can check each visitor in the remote console, getting recognized by the camera using a photo won't work. I want to add passcode function for entrance in case that face recognition part corrupts.

R.Dhana Lakshmi (2017), the system works on real time monitoring and voice control, so that the camera and switches can be remotely controlled and monitored with or without an android based app. It uses various sensors to not only monitor the real time device tracking but also maintaining the security of your house. The proposed outcome of the project aims as multiple benefits of saving on Security of the home as well as keep the users updated about their home security with an option of controlling the switching of the devices by using their voice or simple toggle touch on their Smartphone, and If someone enters in to the home when the owner is not available then owner can able to view the person from anywhere and also they can instruct them via live voice.

Pradnya R. Nehete et al. (2016), in most of systems, SMS technique is used for communication so the system will become cost effective, more reliable and it will take less time to deliver message. As security becomes major problem nowadays, the security monitoring systems today needs to make use of the latest technology. In some papers, the authors have presented door lock security monitoring system based on embedded and Zigbee and sometimes the lock is protected by automatic password

hence it could not easily hack by hackers. Also the enhanced security systems are available based on android platform, wireless techniques and embedded systems. A lot of modification takes places in various Door lock security from the last few years, in next coming years many changes will takes place.

III. PROBLEM DOMAIN

As per the current industry approach which is running from long decade office are converted and enabled the Access controlled tdoor to manage the Employee flow and control on user. To avoid rush and thief, management used the access control system. They use RFID card to open the door, but with the condition there is lot of drawback is there. Later on new feature added pin and card id. But still people the pin and card to make the proxy. Later finger module has been added in the access control system. But still some the technology of the RF id is is going to be expire due to memory and extra key needs to carry every . so there is need of card which can be used with the daily life. Since nFC chip enabled Mobiles are already in the market. So there is need of the same NFC chip needs to be used with biometric system.

IV. SOLUTION DOMAIN

There is a need for Access Control System technologies to be: -

- Cost effective
- Easy to install
- Flexible with many network infrastructures and appliances

Our project is based on server client service. The client requests the server for the service which is provided through software called **webiopi.** This software enables us to have access to the GPIO pin of the Raspberry pi. The JavaScript, CSS and HTML file is directed over **webiopi** to link the custom created webpage hence one can control the components linked via network.

Using bridge rectifiers, the intensity of the light and accordingly gives the data to the pi which controls the embedded system. Apart from it, we are having a concept of Door locking system with intelligent sensor like R-307 Finger print module. The module collects the finger prints of the person and authenticates with the match, if match is found then door will be opened otherwise it gives a non-authenticate signal.

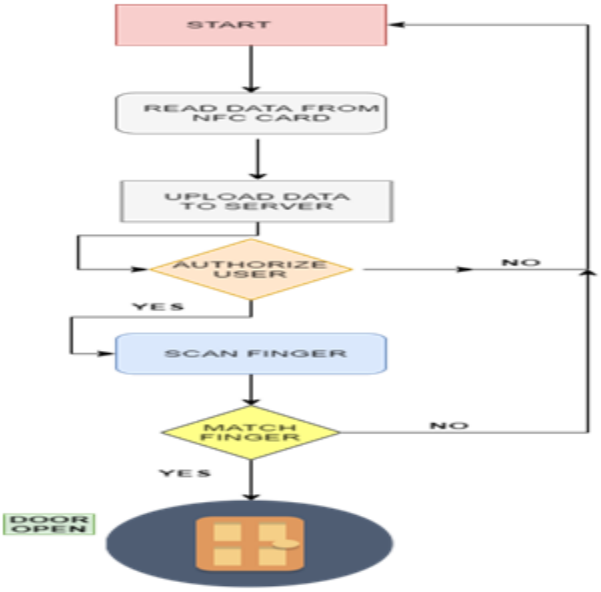

Fig.1.Proposed Working Flow Chart

V. MODULES DETAIL

Let's have a look at the required hardware devices used in the project.

1. Required Components:

- Raspberry Pi.
- UART for USB to Serial converter.
- Fingerprint Module (R305).
- Reds Led.
- MFC Card Reader.
- RF-ID Tag.

For better understanding and to have an overview look at the figure below:

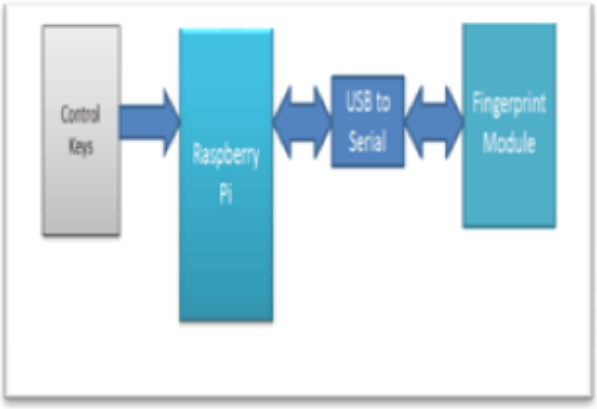

Fig.2. Overview of Home Automation System.

Let us have a brief discussion of each and every component:

1. **Raspberry Pi**

The Raspberry Pi is a series of small single-board computers developed in the United Kingdom by the Raspberry Pi Foundation to promote teaching of basic computer science in schools and in countries. The Raspberry Pi hardware has evolved through several versions that feature variations in memory capacity and peripheral-device support.

2. UART for USB to Serial converter

UART stands for Universal Asynchronous Receiver/Transmitter. It's not a communication protocol like SPI and I2C, but a physical circuit in a microcontroller, or a stand-alone IC. A **UART's** main purpose is to transmit and receive serial data.

3. Fingerprint Module (R305)

R307 Fingerprint Module consists of optical fingerprint sensor, high-speed DSP processor, high-performance fingerprint alignment algorithm, high-capacity FLASH chips and other hardware and software composition, stable performance, simple structure, with fingerprint entry, image processing, fingerprint matching, search and template storage and other functions.

4. Leds.

One is to use individual ***LEDs*** that emit three primary colors—red, ***green***, and blue—and then mix all the colors to form white light. The other is to use a phosphor material to convert monochromatic light from a blue or UV ***LED*** to broad-spectrum white light, similar to a fluorescent lamp.

5. NFC Card Reader.

The **NFC Reader** is a PC-linked contactless smart **card reader**/writer developed based on 13.56 MHz Contactless (RFID) Technology. ... Furthermore, the **NFC Reader** is available in module form, permitting easy integration into bigger machines, such as POS terminals, physical access systems and vending machines.

6. RF-ID Tag

A **Radio Frequency Identification** Tag (RFID tag) is an electronic tag that exchanges data with a RFID reader through radio waves. Most RFID tags are made up of at least two main parts. The first is an an antenna, which receives radio frequency (RF) waves.

VI. RESULT OF ACCESS CONTROL SYSTEM

Using this dual authentication concept more security been implemented. So that corporate can ensure their security and operation. Using this concept of the NFC based authentication where server also involved to make sure high security solution any secured area like data center, hub room. many cases theft is compromise the security to stolen card and bypass the finger print . But with the Server based authentication will provide another later of security . Overall with this solution Corporate office can ensure their security most secure .

VII. CONCLUSION AND FUTURE ENHANCEMENTS

1. **Conclusions:** We have measured the performance of nfc based fingerprint recognition based on servers . The results indicates this type of solution can provide more solution in the Access control point of view . We integrated this experiment into a realistic usage scenario, where the fingerprint recognition is combined with Server authentication. We have shown that a Biometric finger print and a NFC chip, can be used as a two-factor authentication with another security of server authentication for access controlled door . We gave a brief description of NFC technology and protocols and a protocol for P2P communication over NFC and how we used this technology to build a Server based authentication model. The concept is currently implemented as a prototype, where NFc and biometric with server authentication is used as a token to open a door.

2. **Future Enhancements:** This project is our take on trying to create a prototype of a fully working Home, canteen system , visitor management, gym Automation System. Although every effort has been made to make it a complete and very much closer to an ideal solution product that we wanted to achieve, there always remain areas where further improvements are possible. By interfacing various sorts of sensors, we can program the automatic controlling of the appliances. As for example, using temperature sensors to log the current temperature of a room, we can control the automatic turning ON/OFF of the heater or fan. We could also interface Arduino to raspberry pi so that we can increase the number of appliances that can be controlled remotely.

REFERENCE

[1]. Anushri J, Vijay L K & Barkha N (2015): RFID and GSM Based Attendance Monitoring System using door locking/unlockingsystem and Its Hardware Implementation, Journal of Management Engineering and Information Technology (JMEIT), Vol. 2 (3), pp5-10.

[2]. Crystalynne, D. C., Jaswinder, S. B., Jocelyn, R. H., Ditche, J. C. A., Melvie, S. D. C. & Jaira, C. I. (2016): Development ofMicrocontroller-Based Biometric Locker System with Short Message Service" Lecture Notes on Software Engineering, Vol. 4 (2),pp 103-106.

[3]. Fathima G. DivyaBarathi A, Jaya S & Manjushree R (2015): Intelligent Secure System for Vehicles, International Journal forScientific Research & Development (IJSRD), Vol. 3 (02), pp 438-442,

[4]. Geoffrey, C. T. S. (2012): Automatic Access Control System using Student Identification Card Based on

RFID Technology,Unpublished Undergraduate Project of Faculty of Electrical Engineering Universiti Teknologi Malaysia, pp 1-4.

[5]. Gowsalya, M., Sangeetha, M., Sri, D. K. K., Divya, N. & Devika, T. (2014): A Novel Approach Automatic Digital Door Openingand Closing Security System, International Journal of Innovative Research in Electrical, Electronic, Instrumentation and ControlEngineering, Vol. 2 (2), pp 991-996.

[6]. Gyanendra, K. V. & Pawan, T. (2010): A Digital Security System with Door Lock System Using RFID Technology, internationalJournal of Computer Applications, Vol. 5(11), and pp 6-8.

[7]. Hasan, R., Khan, M. M., Ashek, and A. & Rumpa, I. J. (2015): Microcontroller Based Home Security System with GSM Technology,Open Journal of Safety Science and Technology, 5, pp 55-62.

[8]. Home Security and Automation (2017): Intelligent Lock and IP Controlled Access, Retrieved on 18th April, 2017 from:https://cpisecurity.com/

[9]. S. O. Anaza (2017), A Review of Intelligent Lock System, American Journal of Engineering Research (AJER)e-ISSN: 2320-0847 p-ISSN : 2320-0936 Volume-6, Issue-6, pp-09-15.

[10]. Pradnya R. Nehete , J. P. Chaudhari , S. R. Pachpande (2016) : Literature Survey on Door Lock Security Systems , International Journal of Computer Applications (0975 – 8887) Volume 153 – No2, November 2016 ,pp. 13-18.

[11]. R.Dhana Lakshmi, P.Leeela Priya, G.Lokanyaa, J.Sharmila (2017): Security System using Raspberry Pi With Door Lock Controller, International Journal of Engineering Science and Computing Volume 7 Issue No.4, pp. 10090-10094.

[12]. Shwetank Mishra , Vivek Kumar Soni (2018) : Smart Door System for Home Security Using Raspberry pi3 , IJIRT | Volume 4 Issue 11 | ISSN: 2349-6002 , pp. 1882-1886.

[13]. Sourav Roy; Md Nasir Uddin; Md Zahirul Haque; Md Jahidul Kabir (2018) : Design and Implementation of the Smart Door Lock System with Face Recognition Method using the Linux Platform Raspberry Pi , International Journal of Computer Science and Network. All Rights Reserve, Volume 7, Issue 6, December 2018, pp. 382-388.

[14]. [Dhiraj Sunehra (2019) : Web Controlled Door Lock System with Email Alert using Raspberry Pi , IOSR Journal of Engineering (IOSRJEN) ISSN (e): 2250-3021, Vol. 09, Issue 3 (March. 2019), ||S (III) || PP 29-38.