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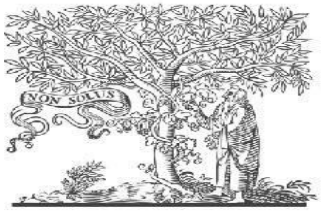

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Title **RFID AND FINGERPRINT BASED SECURITY ACCESS CONTROL SYSTEM WITH EMAIL ALERTS**

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RFID AND FINGERPRINT BASED SECURITY ACCESS CONTROL SYSTEM WITH EMAIL ALERTS .

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ABSTRACT: Human identification is a field very significant and which has undergone rapid changes with time. An important and very reliable human identification method is fingerprint identification. Fingerprint of every person is unique. So this helps in identifying a person or in technology. This system consists of IOT technology for sending the alert mail. The proposed system makes a use of finger print module for authentication process. Here we are using both RFID and fingerprint technology to access the security system. The status of the project will display on LCD display. The main controlling device of the whole system is a Microcontroller. Fingerprint module, RFID reader, Buzzer and LCD display are interfaced to it. The Microcontroller reads the input from the finger print module and RFID reader; it accesses the security system only if the authenticated RFID TAG and fingerprint both matches, but if neither one matches, it does not access the system. Both are matches this system will access the security system. If something doesn't match it won't access the system. If the system detects unauthorized tag or finger print; it will activate buzzer for alerts and sending the mail to the register Eimproving security of a system. Finger print of a person is read by a special type of sensor. The project aims at designing an intelligent security system based on fingerprint and RFID -MAIL though Wi-Fi and display the project status on LCD display. There are two push buttons for storing and erasing fingerprints respectively. To perform this intelligent task, Microcontroller is loaded with an intelligent program written using embedded 'C' language.

Keywords *– RFID, LCD, IOT technology*

1. INTRODUCTION

In recent years, radio frequency identification technology has moved from obscurity intomainstream applications that help speed the handling of manufactured goods and mate-rials. RFID enables identification from a distance, and

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unlike earlier bar-code technology,itdoessowithoutrequiringalineofsight.RFID tags(seeFig.1.1)supportalargersetof unique IDs than bar codes and can incorporate additional data such as manufacturer,product type, and even measure environmental factors such as temperature.Furthermore, RFID systems can discern many different tags located in the same general areawithout human assistance. In contrast, consider a supermarket checkout counter, whereyou must orient each bar-coded item toward a reader before scanning it. So why has ittaken over 50 years for this technology to become mainstream?The primary reason iscost. For electronic identification technologies to compete with the rock-bottom pricingof printed symbols, they must either be equally low-cost or provide enough added valuefor an organization to recover the cost elsewhere.RFID isn't as cheap as traditionallabeling technologies, but it does offer added value and is now at a critical price pointthat could enable its large-scale adoption for managing consumer retail goods.Here Iintroduce the principles of RFID, discuss its primary technologies and applications, andreviewthechallengesorganizationswillfaceindeploying thistechnology.

Fig.1: Example figure

Human identification is a field very significant and which has undergone rapid changes with time. An important and very reliable human identification method is fingerprint identification. Fingerprint of every person is unique. So this helps in identifying a person or in improving security of a system. Finger print of a person is read by a special type of sensor. The project aims at designing an intelligent security system based on fingerprint and RFID technology. This system consists of IOT technology for sending the alert mail. The proposed system makes a use of finger print module for authentication process. Here we are using both RFID and fingerprint technology to access the security system. The status of the project will display on LCD display. The main controlling device of the whole system is a Microcontroller. Fingerprint module, RFID reader, Buzzer and LCD display are interfaced to it. The Microcontroller reads the input from the finger print module and RFID reader; It accesses the security system only if the authenticated RFID TAG and fingerprint both matches, but if neither one matches, it does not access the system. both are matches this system will access the security system. If something doesn't match it won't access the system. If the system detects unauthorized tag or finger print; it will activate buzzer for alerts and sending the mail to the register E-MAIL though wi-fi and display the project status on LCD display. There are two push buttons for storing and erasing fingerprints respectively. To perform this intelligent task, Microcontroller is loaded with an intelligent program written using embedded 'C' language.

2. LITERATURE REVIEW

The Electronic Passport and the Future of Govt. Issued RFID based Identification:

Passports and other identification documents may be enhanced using recent advancements in technology. Various national and international bodies are pursuing machine-readable approaches with biometric information. In particular, the international civil aviation organization (ICAO) has adopted standards whereby passports can store biometric identifiers. Countries that participate in the visa waiver program (VWP) began issuing electronic passports in 2006. However, the selection of technologies remains questionable due to privacy and security concerns. This paper examines policy regarding these electronic approaches and developments toward electronic data storage and transmission. Radio-frequency identification (RFID) devices for electronic passports and other existing identity documents are discussed.

Passport Validation Scheme using Radio Frequency Identification:

Biometric passports issued nowadays have an embedded RFID chip that carries digitally signed biometric information. This RIFD chip is integrated into the cover of a passport, called a biometric passport. Electronic passports as it is sometimes called, represents a bold initiative in the deployment of two new technologies: RIFD and biometrics such as face, fingerprints, palm prints and iris. The electronic passport is the privacy and security risks that arise by embedding RFID technology. The goal of the adoption of the biometric passport is not only to expedite processing at border crossings, but also to increase security. Policymakers have put their faith in the technological promise of biometric identification because absolute identification could eliminate mismatched computer records and stolen identities.

The study of recent technologies used in E-passport system:

In last few years' terrorist and illegal attacks across many country borders has increased which led to security and strict passport verification process. This turned down legitimate travelers. Many countries are in process of implementing electronic passports to travelers for travelling, automating passport verification process and increasing border security. The e-passport deploys two popular technologies: Radio frequency Identification (RFID) and Biometrics. Personal credentials and bearers biometric data is stored on RFID chip which is used in verification process by border security officers. The next generation of e-passports will implement more advanced cryptographic mechanisms, collectively known as Extended Access Control, and in particular a protocol referred to as Chip Authentication that protects an e-passport against cloning and transferability attacks. The Extended Access Control suite of protocols has found minor attention in the literature until now. The paper analyses the study of various technologies used in Epassport design. A cryptographic security analysis of the epassport using face fingerprint, palm print and iris biometric that are intended to provide improved security in protecting biometric information of the e-passport bearer. Together, RFID and biometric technologies promise to reduce fraud, ease identity checks, and enhance security. At the same time, these

technologies raise new risks. We explore the privacy and security implications of this worldwide implementing next-generation authentication technology: e-passport. We describe privacy and security issues that apply to e-passports, and then analyze these issues in the context of the International Civil Aviation Organization (ICAO) standard for e-passports.

RFID Technology Principles, Advantages, Limitations & Its Applications:

This paper gives an overview of the current state of radio frequency identification (RFID) technology. Aside from a brief introduction to the principles of the technology, major current and envisaged fields of application, as well as advantages, and limitations of use are discussed. Radio frequency identification (RFID) is a generic term that is used to describe a system that transmits the identity (in the form of a unique serial number) of an object or person wirelessly, using radio waves. It's grouped under the broad category of automatic identification technologies. RFID is increasingly used with biometric technologies for security. In this paper Basic Principles of RFID technology along with its types are discussed.

The Electronic Passport and Future Government Issued RFID-Based Identification:

Passports and other identification documents may be enhanced using recent advancements in technology. Various national and international bodies are pursuing machine-readable approaches with biometric information. In particular, the International Civil Aviation Organization (ICAO) has adopted standards whereby passports can store biometric identifiers. Countries that participate in the Visa Waiver Program (VWP) began issuing electronic passports in 2006. However, the selection of technologies remains questionable due to privacy and security concerns. This paper examines policy regarding these electronic approaches and developments toward electronic data storage and transmission. Radio-frequency identification (RFID) devices for electronic passports and other existing identity documents are discussed.

3. METHODOLOGY

The diagram of **RFID and Finger print Scanner Based Access Controlling with E-mail alerts** explains the interfacing section of each component with micro controller.

- In our project input are RFID and fingerprint module.
- Control buttons are used to store and format the module . (erasing the old data and storing the new data).
- Output module are buzzer, LCD screen and next ESP Wi-Fi module.

Interfacing of components:

- ✓ Fingerprint module interfaced at A0 AND A1 WITH PIC MC .
- ✓ 2.Control buttons interfaced at D0 and D1 with PIC MC .
- ✓ PIN NO. B2 –B7 PIC MC interfaced with LCD screen .

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- ✓ PIN NO .B0 interfaces RFID and PIC MC.
- ✓ 5.PIN NO. B1 interfaces ESP8266 with PIC MC .
- ✓ 6.BUZZER interfaced at D3 PIN .

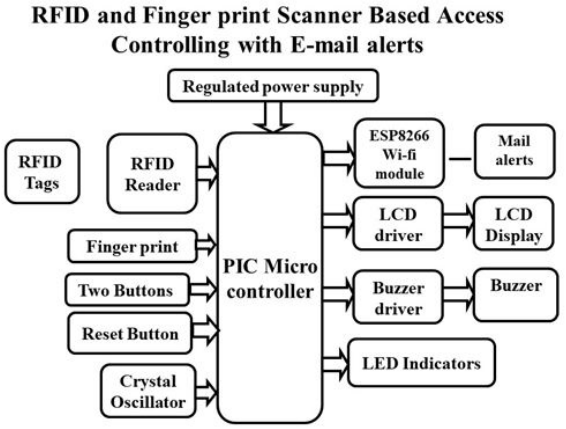

Fig.2: Block diagram

Microcontrollers:

Circumstances that we find ourselves in today in the field of microcontrollers had their beginnings in the development of technology of integrated circuits. This development has made it possible to store hundreds of thousands of transistors into one chip. Further increasing of the volume of the package resulted in creation of integrated circuits. These integrated circuits contained both processor and peripherals. That is how the first chip containing a microcomputer, or what would later be known as a microcontroller came about. Microprocessors and microcontrollers are widely used in embedded systems products. Microcontroller is a programmable device. A microcontroller has a CPU in addition to a fixed amount of RAM, ROM, I/O ports and a timer embedded all on a single chip. The fixed amount of on-chip ROM, RAM and number of I/O ports in microcontrollers makes them ideal for many applications in which cost and space are critical.

Fig.3: Microcontroller

Power supply:

Power supply is a supply of electrical power. A device or system that supplies electrical or other types of energy to an output load or group of loads is called a power supply unit or PSU. A power supply may include a power distribution system as well as primary or secondary sources of energy such as

- Conversion of one form of electrical power to another desired form and voltage, typically involving converting AC line voltage to a well-regulated lower-voltage DC for electronic devices. Low voltage, low power DC power supply units are commonly integrated with the devices they supply, such as computers and household electronics.
- Batteries.
- Chemical fuel cells and other forms of energy storage systems.
- Solar power.
- Generators or alternators.

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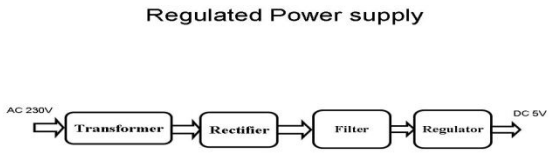

Fig.4: Power supply

LED:

A light-emitting diode (LED) is a semiconductor light source. LEDs are used as indicator lamps in many devices, and are increasingly used for lighting. Introduced as a practical electronic component in 1962, early LEDs emitted low-intensity red light, but modern versions are available across the visible, ultraviolet and infrared wavelengths, with very high brightness. The internal structure and parts of a led are shown in figures 14 and 15 respectively.

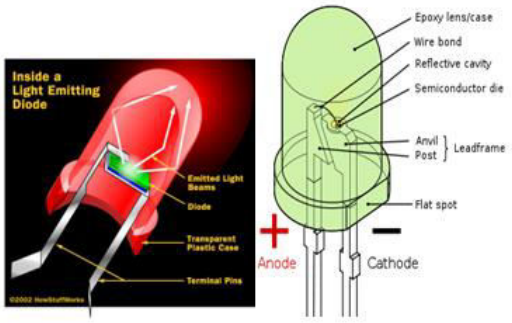

Fig.5: LED

RFID MODULE

RADIO FREQUENCY IDENTIFICATION uses a semiconductor (micro-chip) in a tag or label to transmit stored data when the tag or label is exposed to radio waves of the correct frequency.

- **The Elements of an RFID System**

RFID systems fundamentally consist of four elements:

1. The RFID tags.
2. The RFID readers
3. The antennas and choice of radio characteristics,
4. The computer network (if any) that is used to connect the readers.

- **RFID Tags:**

The tag is the basic building block of RFID. Each tag consists of an antenna and a small silicon chip that contains a radio receiver, a radio modulator for sending a response back to the reader, control logic, some amount of memory, and a power system. The power system can be completely powered by the incoming RF signal, in which case the tag is known as a passive tag. Alternatively, the tag's power system can have a battery, in which case the tag is known as an active tag.

Fig 6. RFID tag reader

The primary advantages of active tags are their reading range and reliability. With the proper

antenna on the reader and the tag, a 915MHz tag can be read from a distance of 100 feet or more.

Passive tags, on the other hand, can be much smaller and cheaper than active ones because they don't have batteries. Another advantage is their longer shelf life: Whereas an active tag's batteries may last only a few years, a passive tag could in principle be read many decades after the chip was manufactured

Between the active and the passive tags are the semi-passive tags. These tags have a battery, like active tags, but still use the reader's power to transmit a message back to the RFID reader using a technique known as backscatter. These tags thus have the read reliability of an active tag but the read range of a passive tag. They also have a longer shelf life than a tag that is fully active.

Tags come in all shapes and sizes. The vast majority of RFID tags that have been deployed are promiscuous. Not only are these tags cheaper, but the systems also are much easier to manage. Systems that employ passwords or encryption codes require that the codes be distributed in advance and properly controlled. This is an exceedingly difficult management problem.

The simplest RFID chips contain only a serial number—think of this as a 64- bit or 96-bit block of read-only storage. Chips can also have sensors, an example of which is an air pressure sensor to monitor the inflation of a tire. The chips might store the results of the sensor in a piece of read-write memory or simply report the sensor's reading to the RFID reader. Chips can also have a self-destruct, or "kill" feature. This is a special code that, when received by the chip, causes the chip to no longer respond to commands. For financial applications,\ the full capabilities of smart cards have been combined with the wireless protocols and passive powering used in RFID. The result is a class of high-capability RFID tags also called contact less smart cards.

Finger print module:

This identification device has been commercialized from the late 19th century. The device is the most popular among all the identification devices because of its ease in acquisition, and also the number of sources that are available for its data collection. It has found its vast use in law enforcement and immigration purposes. A capacitive scanning technique was used as its working basics. More work on making automatic digital inked fingerprints, compression of the image and so on is still being done.

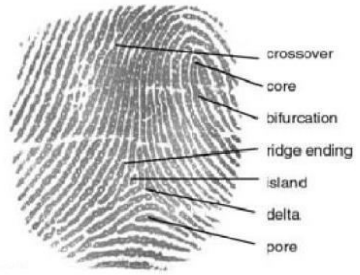

Fig.7: Finger print

5. EXPERIMENTAL RESULTS

The project "RFID and Finger print Scanner Based Access Controlling with E-mail alerts" was designed a security access system using RFID, FINGER PRINT and IOT technologies. Microcontroller will

continuously monitor the data from RFID reader and Finger Print module. Microcontroller will access the security system only when the authenticated RFID TAG and fingerprint are detected. When the microcontroller detects the unauthorized fingerprint or RFID tag; it will activate the buzzer for alerts and sending the mail to the registered email through wi-fi simultaneously the message will display on LCD.

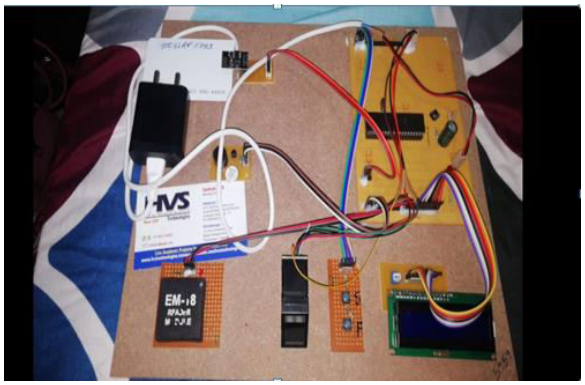

Fig.8: Output

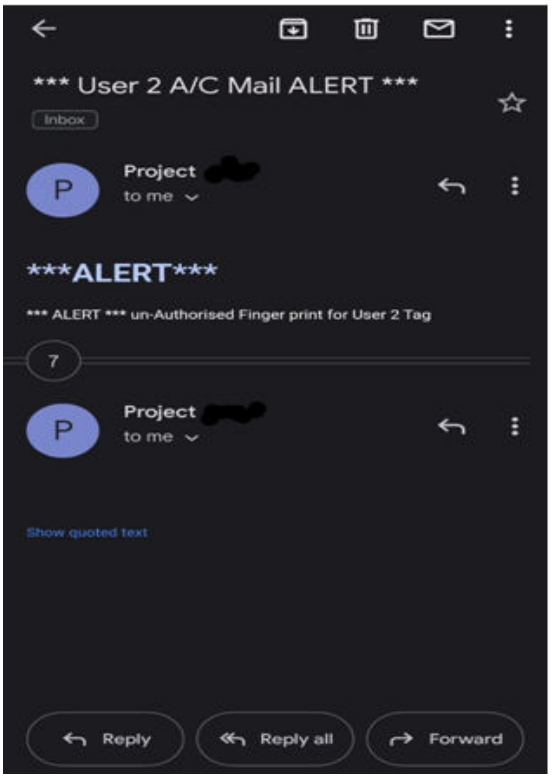

Fig.9: Email alert

6. CONCLUSION

Integrating features of all the hardware components used have been developed in it. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. Secondly, using highly advanced IC's with the help of growing technology, the project has been successfully implemented. Thus the project has been successfully designed and tested.

7. FUTURE SCOPE

- The project can be extended using GSM modem. GSM module sends the alert message to the respective authorities when unauthorized card or fingerprint is detected by the system.

- We can add camera module for sending the captured image to the respective email.

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