Implementation of MIFARE And Iot Based Smart Identity Card For Students Mandays

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Abstract- *It was created to lessen the workload for pupils and entails giving each student a card with a chip inside of it, which is essentially a unique identity. Smart cards give people the benefit of increased security and customer confidence. It will be used to support transactions, offer safety, and give verifiable proof. Therefore, the goal of this project is to use smart card technology to build a student card system. Every student's smart card contains an ID and chip that are exclusive to them. Students may easily carry a single card instead of cash since it is scanned with the aid of a MIFARE reader. For account-based systems, the smart card stores data on the server rather than on the card itself. One card may serve as an ID, a store value credit card, a Visa, and a database of personal data, including phone numbers and medical records, all at once, allowing you to carry many cards at once. These days, there are Smart card implementations all over the globe, but they are not linked since each developer uses different data structures and programming languages. We want to develop a multipurpose card system that lets you use a single card to manage several types of technologies. Our solution is based on the idea of putting several uses into a single multifunctional card. This eliminates the need for the individual to carry several cards for different goals. The card may be transferred and used for a variety of purposes. We suggest a MIFARE-enabled smart card that may be used for a number of purposes, such as making payments, casting ballots, participating, and purchasing tickets for transit. It will function as a personal ID as well. Our program helps the institution's faculty and students who live there have their various requirements met.*

Keywords- MIFARE, RFID, Java Server Pages, Servlet, MySql.

I. INTRODUCTION

Smart cards are becoming a common place item in our everyday lives. Because to its great portability and ease of use, it gained popularity. With the exception of college fields, almost every field uses smart cards. The goal of Student Smart Card Projects is to develop a system that will enable people to use smart cards on a regular basis. The purpose of this initiative is to reduce the amount of work that students have to do.

Every student's smart card will have a unique code on it. The student's name, a picture of themselves, and a unique code are the three pieces of information that will be on their smart card. Every document and piece of information pertaining to that particular student will be included in a unique code. Students' Smart Cards will also come with a wallet. To recharge your card, just visit the college office and pay with cash. Alternatively, you may use any website that supports UPI or wallets, such as Google Pay, Paytm, PayPal, or BHIM UPI. This card may be used to pay for any form of college expense, including student mandatory fees, canteen purchases, and mess fees, after it has been recharged.

Administrators and students will feel less pressure thanks to the smart card. A student just has to present his smart card to the administration in order to pay fees or for any other reason; he is not required to carry any paperwork. We want to build a multipurpose card system that lets you use a single card to manage several types of technologies. Our proposal presents the idea of putting several apps onto a multifunctional card. Having a smart card eliminates the need to carry cash or several forms of identification, such as library, canteen, bus ticket, and so on, as all information and transactions can be done with this card. Students and other persons have the right to privacy and credibility with the educational institution because of MIFARE-based smart cards.

II. LITERATURE REVIEW

A smart card is a plastic card that has an integrated computer chip, usually a microprocessor or memory chip, that stores and processes data. Smart cards are often categorized as chip cards. This information is typically saved and processed on the memory or microprocessor chip of the card. It might be linked to value, information, or both. Through a reader that is a component of a computer system, the card data is transacted. Using smart cards enhances the convenience and security of every transaction. They offer storage for user and account identity that is unchangeable.

The administrative framework can only be reached via the creation of the campus smart card framework. This setup programmed since a computerized campus and smart card are requirements. The complexity of consumption patterns and the identification of college instructors and students rises along with the rapid creation of campus information, which puts additional demands on college administration. This shows how the campus Smart Card system is planned overall, including the goal for construction and the technical requirements of the system.

College students consume a variety of things these days, including food, shopping, buying energy and water, using the internet, getting medical advice, and more. This presents the final campus card system design that is put into practice. By employing image ferry equipment to create a cross network one- way transmission channel from the Internet to the LAN, we are able to address the issue of campus card system recharging in the LAN and construct the campus card recharging system on this channel. The system offers a nice user experience and is stable. It is quite innovative and well-known.

Communication and the ability to provide services to the intended end users have both been transformed by technology. Numerous fields have been significantly impacted, including supply chain, logistics, health, aviation, and education. Smartphone MIFARE technology has been extensively deployed in a number of industries recently, including retail sales, agriculture, animal husbandry, transportation, education, and other industries.

Smart card systems have a much reduced maintenance cost than other machine-readable card types, such as barcodes and magnetic stripes, and that they have improved reader and card read lives. In circumstances such as these, smart cards are an affordable option since handling password resets for an organization or corporation may be quite expensive. Manage network system access, store value, and perform other tasks may also be performed using multi-function cards. Around the world, smart cards are now being used for a multitude of everyday activities.

III. METHODOLOGY

MIFARE based systems use MIFARE tag to identifies a user. MIFARE systems consist of two components tag and reader. MIFARE reader reads the tag and stores the information on database.

- It is divided into two sections: the receiving part and the transmitting section. Microcontroller, MIFARE reader, MIFARE tag, wi-fi module, and LCD compose the transmitting part.

- The receiving component includes an app and IoT. The microcontroller receives the tag code when a student presents their tag to the MIFARE reader, and establishes a connection with it.

- Next, an IoT device is linked to the microcontroller by a wireless module. The transmitting part of the microcontroller receives data from the Internet of Things device. Ultimately, the student's data is shown on the LCD.

- One central module, three modules, and five submodules make up the system. Smart card scans, verification, and generation are done by the central module.

- This module has the most authority inside the system and serves as its primary component.

- Monitoring and upkeep of each other module is the responsibility of the administrator.

- Data and documentation for each student are kept in a central repository, which is a central database.

- When students are first accepted to a college, they go through a step called registration. The first module of college registration is for new students.

- Scannable student papers are saved in the central database by administrators. This is also the password created for the library and canteen payments. It is composed using advanced innovation, considering the targeted duration and gadget modalities, after a thorough investigation.

- It is written with consideration for principles of decency, logic, and logical progression; it also ensures original conjecture, reliable implementation, and flexible and open structure.
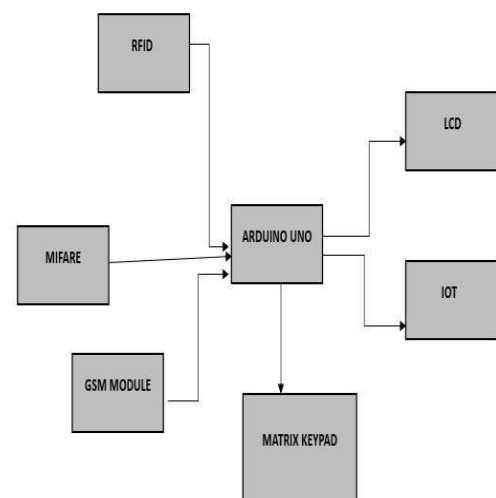

Fig 1 Block Diagram

Website Development

i)Front End Development
- The front-end is built using a combination of technologies such as Hypertext Markup Language (HTML), JavaScript and Cascading Style Sheets (CSS).
- Front-end development is used to design and construct the user experience elements on the web page or app including buttons, menus, pages, links, graphics and more.

a)Java Server Pages (JSP)
- JSP stands for Java Server Pages. It is a server- side technology which is used for creating web applications. It is used to create dynamic web content. JSP consists of both HTML tags and JSP tags.
- JSP tags are used to insert JAVA code into HTML pages. It is an advanced version of Servlet Technology i.e. a web-based technology that helps us to create dynamic and platform-independent web pages. 25
- Java code can be inserted in HTML/ XML pages or both. JSP is first converted into a servlet by the JSP container before processing the client's request.

JSP has various features like JSP Expressions, JSP tags, JSP Expression Language, etc.
- A JSP page is basically a web page with traditional HTML and bits of Java code. The file extension of a JSP page is .jsp rather than .html or .htm, which tells the server that this page requires special handling that will be accomplished by a server extension or a plug-in.
- When a JSP page is called, it will be compiled (by the JSP engine) into a Java servlet. At this point the servlet is handled by the servlet engine, just like any other servlet.
- The servlet engine then loads the servlet class (using a class loader) and executes it to create dynamic HTML to be sent to the browser. The servlet creates any necessary object, and writes any object as a string to an output stream to the browser.
- The main advantage of JSP is that the programmer can insert Java code inside HTML. There are JSP tags to insert Java code. The programmer can write the tag at the end of the Java code. There are different JSP tags which can be used to accomplish various tasks.

- Java™ servlets and Java server pages (JSPs) are Java programs that run on a Java application server and extend the capabilities of the Web server. Java servlets are Java classes that are designed to respond to HTTP requests in the context of a Web application. Figure 3.15 Java Server Page.

b)Servlet
- A servlet is a Java programming language class that is used to extend the capabilities of servers that host applications accessed by means of a request-response programming model.
- Servlets can respond to any type of request, they are commonly used to extend the applications hosted by web servers. For such applications, Java Servlet technology defines HTTP-specific servlet classes.
- Servlets are the Java programs that run on the Java-enabled web server or application server. They are used to handle the request obtained from the web server, process the request, produce the response, and then send a response back to the web server.

ii)Back End Development
The back end refers to parts of a computer application or a program's code that allow it to operate and that cannot be accessed by a user. Most data and operating syntax are stored and accessed in the back end of a computer system.

- The back end is also called the data access layer of software or hardware and includes any functionality that needs to be accessed and navigated to by digital means.
- Front end and back end can also be used to describe situations where the customer has access to one view and employees have access to another. Front end components are customer facing while rights to the back end are exclusively for authenticated users.

My SQL
- MySQL is a very popular open-source relational database management system (RDBMS) developed by Oracle based on structured query language (SQL). MySQL Database is a client/server system that offers wide range of application-programming interfaces (APIs).
  MySQL as an embedded multithreaded library that can be linked into application to get a smaller, faster, easier-to-manage standalone product. MySQL is fast, reliable, scalable, and easy to use.

- MySQL offers a rich and useful set of functions. MySQL's connectivity, speed, and security make it highly suited for accessing databases on the internet.
- A relational database stores data in separate tables rather than putting all the data in one big storeroom. The database structure is organized into physical files optimized for speed. 28
- MySQL is integral to many of the most popular software stacks for building and maintaining everything from customer-facing web applications to powerful, data-driven B2B services.
- Its open-source nature, stability, and rich feature set, paired with ongoing development and support from Oracle, have meant that internet-critical organizations.
- Databases like MySQL contain records in multiple, separate, and highly codified tables, as opposed to a single all-encompassing repository, or collections of semi- or unstructured documents.

V. RESULTS

The integrated functions and results of hardware module and website is shown below
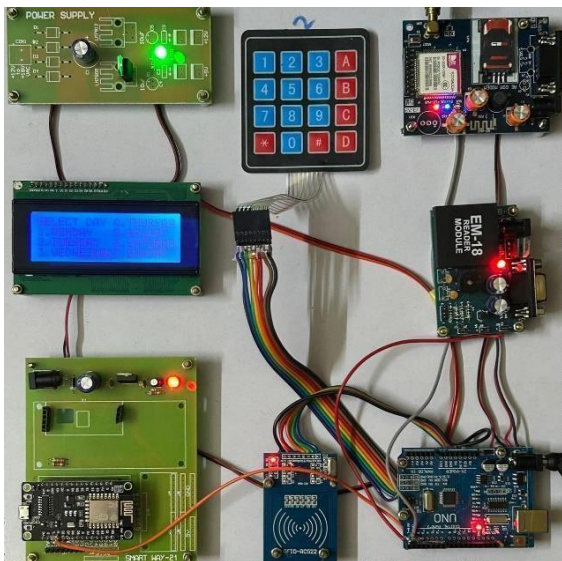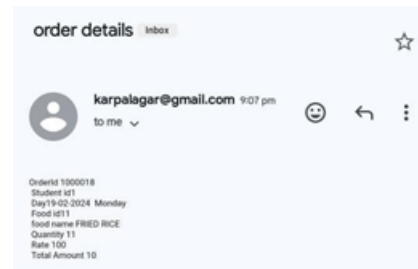

Fig 2 Hardware Results

Fig 3,4 Website

Fig 5 Email

VII. CONCLUSION

Modern educational institutions throughout the globe are always looking for innovative security solutions to shield employees and students from dangers that are always growing and changing. Due to these factors, educational institutions are gradually using smart ID cards, a security technology that is also being used by well-known enterprises. This technology has been in use for years at other establishments where security and safety are top priorities, such hospitals and airports. The increasing use of MIFARE technology in educational contexts may be attributed to its advantages. MIFARE-equipped student ID cards use electromagnetic fields to automatically recognize and follow a student's movements. The student ID cards' chip has a small amount of memory and computing power. It gets power from a MIFARE reader that is close by and sends out radio signals within a certain radius. Three parts make up MIFARE systems: scanning antenna, transceiver, and transponder. Educational institutions monitor student ID cards using MIFARE-equipped ID cards and MIFARE antennas placed across the campus. All of the antennae and MIFARE readers are connected to a power source via a thoughtfully designed grid of connections for communication and electricity. All of the data from the MIFARE readers that are attached to it is received, stored, and processed by a central computer. The educational institution may use this computer to handle the data for administrative and security reasons since it is connected to the student information system. It is compatible with the authentication and encryption standards, among other security features. For educational institutions looking to boost academic achievement, expedite administrative tasks, and increase campus security, MIFARE is a useful technical breakthrough. School security teams can track the locations and times of

student presence on campus thanks to MIFARE technology. MIFARE- enabled student IDs automate the whole process, there is no need to manually monitor student attendance. MIFARE enabled student IDs are robust, they also save money. Smart Identity Card for Students utilizing MIFARE and the Internet of Things was proven, and outcomes were attained.

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