



DIGITAL STUDENT ID CARD USING RFID TECHNOLOGY (DIGITAL INSTITUTE)

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Abstract

This project is an IoT-based solution designed to replace traditional ID cards for students and faculty members in educational institutions. The system will utilize sensors and microcontrollers to capture and transmit each user's unique identifier, such as a biometric signature or NFC tag, RFID to a cloud-based platform.

The platform will then verify the user's identity and provide access to various functions for both students and faculty members, as well as college management functions for administrators. The system will provide a more secure and convenient way to verify identities, reducing the risk of identity theft and fraud.

By using this IoT-based system, users will no longer need to carry a physical ID card, and the data collected will be encrypted and securely stored in the cloud. Additionally, the system can be easily integrated with existing campus security systems, providing a comprehensive security solution for the institution.

Overall, this project aims to leverage IoT technology to enhance security, convenience, and efficiency in the verification of identities within educational institutions.

Keywords—NFC-Near Field Communication, RFID-Radio Frequency identification, IoT- Internet of Things.

INTRODUCTION

In today's rapidly advancing technological world, the adoption of Information Technologies (IT) is changing the way we do business. Mobile devices, such as smart phones, have become ubiquitous and are constantly

evolving to make our lives easier and more convenient. One of the latest developments in smart devices is Radio frequency identifier (RFID), which allows data transmission over short distances. RFID has a wide range of applications, including ticketing, access control, and mobile payments. It can also be used to bootstrap different types of connections, such as Bluetooth or Wi fi.

Traditionally, student identification has relied solely on plastic cards, which can be easily copied and are prone to loss or theft. This method has faced various hurdles, such as complex and time-consuming processes for attendance and grade reporting, difficulty in accessing resources and booking library cards, and security concerns. However, with the emergence of secure and standards-based contactless smart card technology, this is changing.

This project proposes an IoT-based identification card system using RFID technology to replace traditional plastic student cards. With RFID-enabled smart phones, students can use their devices or RFID cards for validation in lectures, access to resources, and entry to specific premises. This system also allows for easy access to subject and college information, attendance records, and degree reports, which can be accessed from the convenience of their mobile devices.

The system comprises an Android application in future that reads the RFID tag card, saves the unique ID of the student, and allows access to the student's information web application is also developed to store student information on the server, ensuring easy access to student data and allowing for efficient administration.

In conclusion, the IoT-based identification card system using RFID technology offers an innovative and secure solution to traditional plastic cards, providing convenient access to student information and resources. From a secure database stored on a server managed by the administration of students. The RFID tag card can also be changed to emulate a student card with RFID chip, allowing for easy access to university facilities.

BACKGROUND STUDY

1. "Design of an RFID-Based Students Attendance Management System" by **Abdulrahman Alzahrani et al.** (2019): This study presents an RFID-based attendance management system for students in higher education. The proposed system uses RFID technology to track the presence of students in the classroom, and the data is stored in a database.
2. "Smart Student ID Card uses RFID Technology" by **Zaid Ali Jasim and Haneen Z. Najah** (2019): This paper proposes a smart student ID card using RFID technology. The card is equipped with an RFID tag, and it is used to track the attendance of students in the classroom. The system is also designed to provide access control to different areas within the university.
3. "A study on the security and privacy of RFID systems in Internet of Things" (2021): This paper explores the potential security and privacy risks associated with RFID systems in the context of the Internet of Things (IoT). The authors propose a set of guidelines for designing secure and privacy-preserving RFID systems in IoT environments.
4. "Enhancing RFID-based access control systems with continuous authentication" (2020): This study proposes a continuous authentication mechanism for RFID-based access control systems. The authors use machine learning techniques to analyze the signals generated by RFID tags and detect anomalies that may

indicate unauthorized access attempts.

5. "A survey on RFID-based localization techniques for indoor positioning systems" (2019): This survey paper provides an overview of the various RFID-based localization techniques used in indoor positioning systems. The authors review the strengths and weaknesses of different approaches and highlight some of the open research challenges in this area.
6. Design and implementation of a low-cost RFID-based attendance system for higher education institutions" (2020): This paper presents the design and implementation of a low-cost RFID-based attendance system for higher education institutions. The authors describe the hardware and software components of the system and evaluate its performance in a real-world setting.
7. "RFID-enabled smart shelf for inventory management in retail stores" (2019): This study proposes a smart shelf system that uses RFID technology for inventory management in retail stores. The authors describe the design and implementation of the system and evaluate its effectiveness in reducing stock outs and overstocking.

RFID TECHNOLOGY

Radio Frequency Identification (RFID) technology is widely used in various applications, such as supply chain management, inventory control, and access control.

RFID-based systems provide advantages over traditional methods by offering automatic identification, non-line-of-sight communication, and real-time tracking of tagged objects. As a result, RFID technology has become increasingly popular in the last decade, with various research studies being conducted to improve its performance and address its limitations.

RFID technology has been extensively researched and applied in several fields, including healthcare, transportation, and manufacturing. For example, in health care, RFID-based systems have been proposed for patient tracking, asset management, and medication administration. In transportation, RFID technology has been used for to collection, vehicle identification, and parking management. In manufacturing, RFID-based systems have been applied for production control, supply chain management, and quality control.

Furthermore, various research studies have focused on enhancing the performance of RFID systems, such as increasing their read range, improving their accuracy, and reducing their cost. Some of the proposed solutions include using multiple antennas, designing efficient algorithms for tag identification, and developing low cost tags using printable electronics.

Overall, RFID technology has shown great potential in various applications, and IEEE papers have played a significant role in advancing its development and improving its performance.



Fig1.RFIDCard

METHODOLOGY

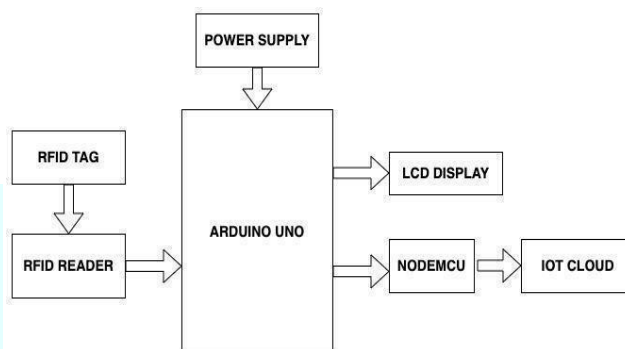


Fig2.System architecture of RFID card scans information

The proposed system involves the use of RFID technology for student identification and data management. Each student will be given an RFID card that contains pre-encoded information such as their name, student ID number, and contact details.

To check in, the students imply needs to scan their RFID card at the terminal, which is equipped with an Arduino microcontroller and an RFID reader. The terminal will then read the information stored on the card and display some of the student's information on an attached LCD screen.

Furthermore, the system will store all check-in data in an Excel spreadsheet, allowing for easy tracking of student attendance and participation. This will be especially useful for teachers and professors who need to keep accurate records of student attendance for grading and evaluation purposes. The use of RFID technology in this system provide safest and efficient way to manage student data and attendance, while also reducing the potential for errors and inaccuracies that can arise with manual data entry. Overall, the system will help streamline the administrative tasks involved in managing student attendance and participation, Allowing teachers and professors to focus more on the in core responsibilities of teaching and mentoring students.

RESULTS AND DISCUSSIONS

Radio Frequency Identification (RFID) refers to a wireless system comprised of two components: tags and readers. The reader is a device that has one or more antennas that emit radio waves and receive signals back from the RFID tag.

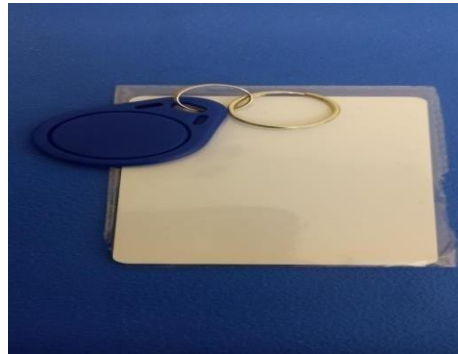


Fig.3.RFIDTag

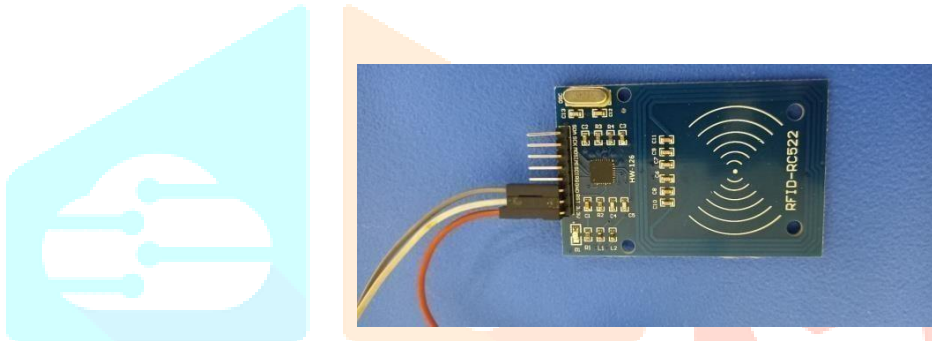


Fig4.TagReader

The reader is a device that has one or more antennas that emit radio waves and receive signals back from the RFID tag. Tags, which use radio waves to communicate their identity and other information to near by readers, can be passive or active. Passive RFID tags are powered by there a der and do not have a battery.



Fig5.AurdinonanoIt will process the data in the RFID tag for information

CONCLUSION

In conclusion, the use of RFID cards in educational institutions has numerous advantages, such as simplifying attendance tracking, library book borrowing, and access control. By incorporating an Arduino-based terminal, we can easily scan and retrieve information encoded in the RFID card, which can be used to display relevant information about students in an Excel sheet. This system not only saves time but also reduces errors associated with manual data entry. Therefore, the integration of RFID technology with Arduino-based terminals has the potential to enhance the efficiency and accuracy of various operations in educational institutions.

FUTURESCOPE

The proposed RFID-based solution appears to be interesting and useful, with potential for further enhancements such as using student cards for NFC based payment within and outside the campus, integrating attendance management, and installing smart posters for various services. However, the system can be further optimized by replacing the internal wireless network with RFID technology to enable better tracking and monitoring of the students' movements within the campus. This can result in a more efficient and effective educational system.

REFERENCES

1. "RFID Technology in Health care: A Review" by Li Yang et al., 2021. This paper reviews the application of RFID technology in health care and its benefits in patient safety, medication management, and asset tracking.
2. "Design and Implementation of an RFID-Based Attendance Management System for Higher Education" by M. Salman et al., 2020. This paper presents the design and implementation of an RFID-based attendance management system for higher education institutions.
3. "A Comparative Study of RFID-Based Indoor Localization Techniques" by H. G hasemzadeh et al., 2019. This paper presents a comparative study of various RFID-based indoor localization techniques and their performance
4. "A Comparative Study of RFID-Based Indoor Localization Techniques" by H. Ghasemzadeh et al., 2019. This paper presents a comparative study of various RFID-based indoor localization techniques and their performance
5. "RFID-Based Monitoring System for Smart Home Environment" by M. H. Khan et al., 2021. This paper proposes an RFID-based monitoring system for smart homes that can detect the presence and location of objects and individuals.
6. "RFID-Based Patient Monitoring System for Smart Hospitals" by R. C. Sharma et al., 2020. This paper presents an RFID-based patient monitoring system for smart hospitals that can track patient movement, vital signs, and medication administration.

7. "A Framework for RFID-Based Logistics Management in E-Commerce" by K. L. Lim et al., 2020. This paper proposes a framework for RFID-based logistics management in e-commerce that can improve supply chain efficiency and customer satisfaction

7 An RFID reference attendance system is a type of electronic attendance tracking system that uses radio frequency identification (RFID) technology to record attendance data. The system uses RFID tags that are assigned to each student or employee, and RFID readers that are placed in classrooms or other designated areas.

8 When a student to employee enters a designated area, the RFID reader detects their tag and records the it attendance automatically. The system can provide real- time attendance data and generate attendance reports for administrators. It can also be integrated with other systems such as school or company databases for more comprehensive tracking and analysis.

9 Besides attendance tracking, RFID reference systems can be used for other applications like access- control, asset-tracking, inventory-management, and more. In summary, RFID reference attendance systems provide an efficientand reliable solution for organizations that are looking to Stream line attendance tracking for increasedproductivity and academic success.

10 An RFID reference attendance system ensures accurate attendance tracking and eliminates the possibility of manual errors that existing traditional attendance systems. This technology assists with automating many administrative processes, making it easier for administrators to manage attendance in real-time and generates attendance reports quickly.

11 When a student or employee with an RFID tag enters the range of an RFID reader, the reader detects the unique ID tag, and automatically records attendance in the system. The system can also be configured to send notifications in real- time to designated stakeholders like parents or supervisors.

12 An RFID reference attendance system is a type of electronic attendance tracking system that utilizes RFID technology for data capture and monitoring. The system works by having RFID tags assigned to students or employees, which are then detected by RFID readers that are strategically placed in different are also facility, classroom, or location.