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Smart Cards Using RFID in Educational Sector

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ABSTRACT
As the population grows, the number of patients in many facilities also increases proportionally. This makes the current manual administration difficult to manage. Automating the campus with RFID-based smart cards makes it easier, faster and accessible to all. It is a card with a chip that gives each enrolled student a unique identity. It serves as proof of identity, for security purposes and also enables various transactions. These cards grant students the right to privacy and give users confidence in the institution. The smart card is scanned using RFID reader and it is easy for students to carry a single card instead of multiple cards and cash. In this paper, we will show how users can access campus controls and services more easily. Data is stored on the server for the institution's account-based system rather than directly on the smart card. This card increases the transaction speed and helps to make the processes more secure.

KEYWORDS
Smart Card, RFID technology, RFID tags, RFID reader, contact-less transactions.

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I. INTRODUCTION

A smart card is a piece of equipment containing an embedded integrated circuit chip (ICC), which can be either a memory chip by itself or a secure micro-controller or other equivalent intelligence with internal memory. The antennas incorporated in the card's body enable communication between the card and the reader as well as powering the card when it is connected to a reader directly or remotely using a contactless radio frequency interface.

Radio Frequency Identification (RFID) technology uses radio waves to passively recognize an object that is tagged and are generally small - sometimes in the size of a rice grain, holding large amounts of data. It is used in commercial and industrial applications, from tracking items along a supply chain to keeping track of items checked out of a library. RFID technology can be used for a shorter range of fewer than 4 inches, so this is quite efficient for smaller tasks like in institutions. This will upgrade the current scenario by abolishing the use of multiple ids and cash withdrawal.

Nowadays, student ID cards are made either from magnetic stripes or from ordinary plastic cards. These cards offer limited space for data storage, or in other words, they do not store information, but serve only as a means of identification. The greater advantage of a smart card over these ordinary ID cards is its storage space, security, reliability and functionality. Smart cards have the advantage of storing comprehensive data sets with the advantage of accuracy and reliability, in other words, we define this smart card as a mobile database. This paper is about the implementation of a student ID card with smart card technology for educational institutions. This will improve the current student ID cards found in many institutions and also eliminate the use of multiple cards and IDs. The powers of the smart card will be given to the administrator who will manage the entire system and replenish the card as needed. The card is considered a unique ID and is useful for students not only in the classroom, but also in the library, cafeteria, office, etc.

II. OBJECTIVE

The aim of this paper is to develop a smart card for every student in the campus using RFID. This card consists of a chip with unique identification sequence which is provided to each student. This smart card provides student identification (attendance), easy on-campus transactions, access to institution's facilities, and more. Data stored in the chip makes it easy for students to access any on-campus facilities provided to themusing this single card. With a smart card, one does not have to carry different id's - for library, canteen, bus pass and so on, or cash as all details and transactions will/can be done through this card. RFID based smart card provide students or individuals with the right of privacy and trustworthiness towards the institution.

III. LITERATURE SURVEY

In the paper "Students Smart Card using RFID"[1] we can see the development of student's smart card using Radio Frequency Identification (RFID) technique to prevent the time delay and the rush during the registration. Here a RFID tag is used to carry the student details and the student needs to show this tag to the RFID reader. The microcontroller in the reader checks for the user authentication. If the user is found, the details of the student will be displayed on display device. This student smart card helps them to avoid moving from one access point to other during their registration and helps them to access them at a single point.

In "Smart ration card using RFID and GSM technique"[2], the development of a smart ration card using Radio Frequency Identification (RFID) technique can be seen to prevent the ration forgery as there are chances that the shopkeeper may sell the material to someone else and take the profit and put some false amount in their records. This paper is similar but used in institutions for easy accessibility.

As we can see in paper "A Survey on RFID Based Vehicle Authentication Using A Smart Card"[3], the use of RFID for the automatic tracking and detection of tagged objects through radio waves. This can be implemented in this system to track a student or the card which seems to be lost so that others do not misuse it.

In Spaces of Interaction by David Benyon, Kristina Höök, and Laurence Nigay. Students can use Radio Frequency Identification (RFID) in their ID cards to make purchases from vending machines in their universities, according to British Computer Society Swinton, 2: 1–7[4]. There is no formal function for these cards; they are mainly good for purchasing items from college shops.

H. Huang, L. Sun, Q. Miao, F. Xiao, R. Wang in April 2020, demonstrated through their article "Smart attendance system based on frequency distribution algorithm with passive RFID tags"[5]in Tsinghua Science and Technology that the use of smart cards will generally increase security, the effectiveness of a cashless society, data consistency, and student card functionality. One industry where smart cards can be utilised is education, but other industries can do the same to increase their utility and usability. However, the disadvantage of this paper is that it only holds a little quantity of data and is less safe; in contrast, smart cards store 100 times as much data as magnetic tape cards.

IV. WORKING

When a smart card with RFID chip/ tag is brought near the reader, an electro-magnetic field is established with the chip powered on. With that,sequence of events occursand they are:

1. Energy is transferred to the card that powers the chip within it.
2. Clock signals are transferred from reader to the card.
3. Data is transferred from reader to card.
4. Data is transferred from card to the reader.

An overview of this system can be seen in a hierarchical model in fig 1.It consists of a central issuing authority called the admin who manages all the details of every student that has registered and the other nodes, which are the facilitiesthat each student can access. The central admin has a central repository which contains every data related to a student. The admin is also responsible for the registration of every student body to the smart card.

[1]"Students Smart Card using RFID" Navaneeth S.1, Megha P. M.2, Sruji N. M.3, Anusha T. R.4, Haritha S.5

[2]"Smart ration card using RFID and GSM technique" Mohit Agarwal; Manish Sharma; Bhupendra Singh; Shantanu

[3]"A Survey on RFID Based Vehicle Authentication Using A Smart Card" Litty Rajan, Alpana Gopi, Divya P R, Surya Rajan

[4]Benyon, David, Höök, Kristina & Nigay, Laurence (2010). Spaces of Interaction. British Computer Society Swinton, 2: 1-7

[5]Miao, F. Xiao, H. Huang, L. Sun and R. Wang, "Smart attendance system based on frequency distribution algorithm with passive RFID tags," in Tsinghua Science and Technology, vol. 25, no. 2, pp. 217-226, April 2020

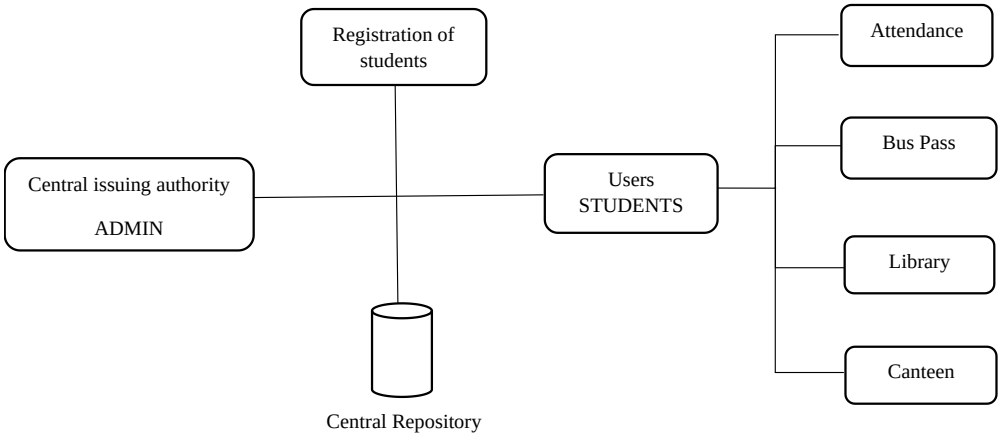

Fig 1: Hierarchical model

The major role of a smart card is played by its unique identification. The entire process can be done using the unique ids given to the chip/ student at the time registration which is later scanned by the RFID reader. This unique id is stored in the database of the chip. The chip's database contains details of all modules i.e., library, canteen, office, bus pass, etc. A simple architecture with the basic modules can be seen in fig 2.

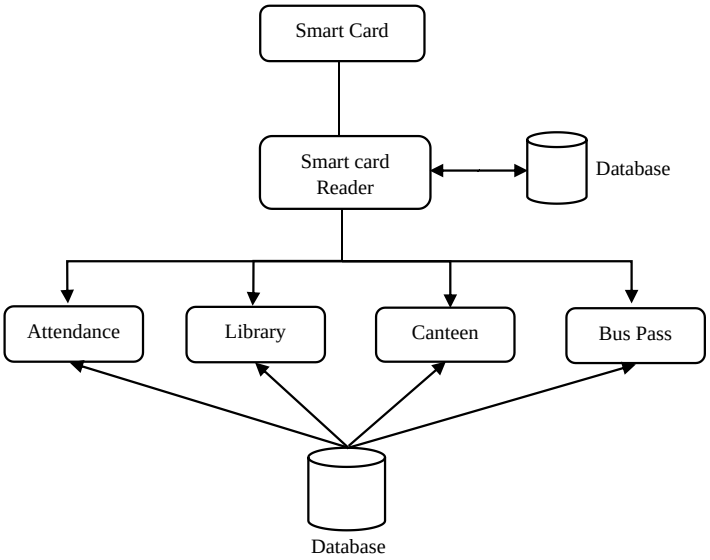

Fig 2: Dataflow in the system

ADVANTAGES

Use of RFID technology in smart cards helps in contact-less transactions considering the current COVID-19 pandemic and easy access.

1. Cost Efficient

RFID cards are manufactured in large numbers and cost of each is less than 1INR. Institutions can easily afford smart cards and assign them to huge number of students cost efficiently.

2. More secure

Data can be inputted into the card's memory only by authorized individual (like an admin) who knows the access keys of the card. This does not permit anyone to simply manipulate any data in the card.

3. Confidentiality

Compared to earlier card-related approaches, they are more secure since they use encryption and authentication technologies.

RFID based smart cards are much secure because any reader cannot just read data from any other card. The reader application will be required to provide passwords for encrypting data in the card. If the encryption keys do not match, the card might be blocked after a number of attempts.

4. Safe to transport

These cards give users the freedom to carry large and required information. They are safe because – if the card is misplaced or stolen, the person with the card must know the pass key to access the stored value.

5. Time-saving

Storing information on smart card saves a lot of time as the chip contains details about the owner in a non-encrypted form and the user doesn't have to explicitly provide details for verification.

6. Access control

Identification badges frequently contain RFID tags in place of the older magnetic stripe cards. To authenticate the holder, these badges merely need to be held close enough to the reader. In addition, tags that can be read from a distance can be attached to vehicles to enable entry into restricted places without the need to stop the vehicle and display a card or enter an access code.

7. Easily accessible

Easy access to facilities and services offered by the institution without the need to carry multiple card and cash for various payments.

COMPARITIVE ANALYSIS OFCONVENTIONAL SYSTEM AND THE PROPOSED SYSTEM

Parameters	Conventional system	Proposed system
Attendance	Registers are to be maintained. Faculty is needed to enter the record.	The database is created Attendance can be entered simply by scanning smart card.
Payment	Multiple cards are required for payment.	Single smart card be used.
Library	Ordinary id is used for authentication.	All details of book taken and returned are recorded automatically.
Canteen	Cash payment	Cashless payment
Bus pass	Paper pass	Smart card scanning

APPLICATIONS

There are several applications where RFID based smart cards can be used, some of them are mentioned below.

1. Healthcare Sectors

Similar ideas are presented in the study "Smart cards in Health Information System (HIS)" [6], but instead of being utilised in educational institutions, here smart cards are employed in the healthcare sectors to store patient information. A problematic aspect is the cost of rebuilding the current infrastructure, and data protection is vital for records pertaining to health.

2. SIM Cards

Smart cards can be used is the development of Subscriber Identity Module (SIM) cards. This helps as a recognisable proof for every user subscribed. These types of smart cards contain specific data of the subscribers making it easier to identify them especiallyduring billing and for other purposes.

3. Transit fare payment cards

Smart banking cards are being used widely by all of us for our day-to-day purposes. These include credit cards, debit cards or stored value cards that offer counterfeit ortamperproof devices. These cards and readers use mutual authentication, preventing fraudulent use.

[6]A. P. Keliris, V. D. Kolias and K. S. Nikita, "Smart cards in healthcare information systems: Benefits and limitations," 13th IEEE International Conference on Bioinformatics and Bioengineering, Chania, Greece

4. Government and corporate identification cards

The government of India issue identity cards to everycitizen in the nation. This card includes every detail about an individual. An personification of similar card is the "Aadhar card" which is issued to every person after they reach a certain age.

CHALLENGES

1. RFID could be costlier

Whether it is software or hardware, RFID requires higher cost equipment which needs to be maintained through the life of the solution. One of the reasons for this is since technology is more secure, it is also more expensive to produce and use.

2. Smart cards are small and light-weighted

Due to its smaller size, it could be lost or forgotten. As they are used for multiple purposes, their loss can cause serious damage and inconvenience to the owner and also leads to loss of important information that is stored in it.

3. High Security level

They are much secure than swipe cards. However, they are not as secure as some that is believed in the general public. This develops a false sense of security and someone might not be as diligent as protecting their card and the details contained in it.

4. Slow Acceptancerate

Slow adoption by the users may become one of the challenges in adopting the smart cards.

5. Risk of Identify Theft

Smart cards are susceptible to hardware hacking, which means that data stored in the card can be manipulated or tainted.

V. CONCLUSION

Smart card is a booming technology and due to high demand for less manual processing, individuals prefer automated control over the systems. The existing system is slow and require interference of human power for most of the processing which consumes more time and effort. This may lead to aggravation, stress and frustration in humans and tend to make more mistakes which is not the scenario needed in the current world. But this can be minimized by using RFID based smart cards which requirescomparatively less human interference for routine maintenance. RFID smart cards make management process much faster and automated as required. It also reduces the need for individuals to carry multiple cards, ids and cash with them most of the time. With that, it provides privacy to the data and trust from the card holders to the card providers with its encryption schemes. Through the applications of the multipurpose smart card, many improvements in the current environment can be made. Education is just one sector for the employment of the smart card, smart cards can be adopted in various sectors and the usage of smart cards will improve functionality, efficiency, and usability.

REFERENCES

[1]. "Students Smart Card using RFID" Navaneeth S.1, Megha P. M.2, Sruji N. M.3, Anusha T. R.4, Haritha S.5
[2]. "Smart ration card using RFID and GSM technique" Mohit Agarwal; Manish Sharma; Bhupendra Singh; Shantanu
[3]. "A Survey on RFID Based Vehicle Authentication Using A Smart Card" Litty Rajan, Alpana Gopi, Divya P R, Surya Rajan
[4]. Benyon, David, Höök, Kristina & Nigay, Laurence (2010). Spaces of Interaction. British Computer Society Swinton, 2: 1-7.
[5]. Q. Miao, F. Xiao, H. Huang, L. Sun and R. Wang, "Smart attendance system based on frequency distribution algorithm with passive RFID tags," in Tsinghua Science and Technology, vol. 25, no. 2, pp. 217-226, April 2020.
[6]. A. P. Keliris, V. D. Kolias and K. S. Nikita, "Smart cards in healthcare information systems: Benefits and limitations," 13th IEEE International Conference on BioInformatics and BioEngineering, Chania, Greece.