RFID based Smart Card for Campus Automation

Sreelekshmi S
Department of CSE
Mangalam College of Engineering, Kottayam

T S Shabanam
Department of CSE
Mangalam College of Engineering, Kottayam

Preethi Presannan Nair
Department of CSE
Mangalam College of Engineering, Kottayam

Neema George
Department of CSE
Mangalam College of Engineering, Kottayam

Sajana Saji
Department of CSE
Mangalam College of Engineeering, Kottayam

***Abstract*--It is developed to ease the work of students, it involves a card containing a chip which is nothing but a unique identity that is given to each student. Smart card have the advantage to individuals with right of security and provide client trust. It will be utilized as a means of recognizable proof, provide safety and helps in transactions. Smart cards have potential benefit to people with the right of privacy and give the users confidence in trustworthiness of organization. So through this project we aim to design a student card system using smart card technology. The card can be used as a means of identification , automation, and payment. The smart card has a chip and id that is unique for every student . It is scanned with the help of RFID reader therefore it makes easy for students to carry a single card rather than cash. We have also tried to identify the ways in which the users are facilitated in accessing the controls and services in the campus. The smart card does not save data directly in the smart card but in the server for account based system. This design world increase the transaction speed and also keeps the process more secure.**

Keywords—Smart card, Internet of Things (IoT), Smart class, RFID , RFID Reader.

I. INTRODUCTION

A smart card is a device that includes an embedded integrated circuit chip(ICC) that can be either a secure micro controller or equivalent intelligence with internal memory or a memory chip alone. The card connects to a reader with direct or with a remote contact-less radio frequency interface. In current scenario student cards are either made of magnetic strip or of ordinary plastic cards. These card have only limited space for data storage or in other words we say these cards do not store information rather they are just used as the means of identification. The wider advantage of a smart card over these ordinary id lies in its space, security, reliability and functionality. Smart cards have the benefit of storing comprehensive records with the advantage of accuracy and reliability in other words we define this smart card as a mobile database. Through this paper we aim to implement a student card using smart card technology for educational institutions. This will enhance the current student id's that are seen in many institutes and also abolish the the use of multiple cards and id.The authority of smart card is given to the admin who manages the overall system and also refills the card when required. The card is considered to be a unique id and useful to students not only in classroom but in library, canteen, office etc.

II. RELATED WORKS

A smart card is structure designed using plastic card of standard size with integrated circuits inserted in it. In a word, "a smart card is a card consolidating at least one coordinated circuits inside its thickness. Smart cards are additionally regularly called chip cards or incorporated circuit (IC) cards". In its most straight forward structure meaning of smart card is a plastic card of standard size which consists of a coordinated circuit or chip that enables card to store or potentially process information. As indicated in the paper "A Review on IoT based Smart Card System for Students," the architecture has automated attendance records using a smart card with bar code. Here only attendance is marked and when compared to a chip bar code has only limited storage facility. No database is required only detection takes place here . Here the bar code is the unique identify of each student.

When it comes to [2] "Prototyping of Class-Attendance System Using Mifare 1K Smart Card". The design of this system is revolving around Raspberry Pi minicomputer and it act as the main controller of the system. Here Mifare 1K Contact less smart card act as the student id here and it is tapped on the NFC card reader during which a connection is established and information is exchanged between the host computer and the card reader. In this process the information like name and student id are fetched from the card. MIFARE is one of the NXP Semiconductor products that popularly used in contact less smart card[2]. The disadvantage of this system is that Raspberry Pi 3 does not have a built-in monitor or screen to display the output. Therefore, an additional screen is needed in order to display and also there is a small possibility of data loss.

As seen in [3] in general the implementation of smart cards will improve security, efficiency of cashless society, data consistency and functionality of the student card. Education is just one sector where smart cards can be adopted other sectors can also take on the adoption to improve their functionality and usability. But the drawback of this paper is

that it store only limited amount of information and less secure, other hand smart cards stores 100 times more data than magnetic tape cards.

The contribution of the paper[4] is a secure smart card reader system which serves as a middle system security.It improves the security of smart card transactions both contact and contact less. In this system the process of verification and initial validation of the card is done.The main drawback of the proposed method is that the system does not have a module to control SAM, and the protection is still vulnerable to hacking activities.

In IoT based Smart Monitoring System using RFID [5] the advantage is that the system uses RFID tags and is easy to handle and very convenient for any organization. It is time saving and user-friendly. But here only identification is performed the data is stored for few days and will be lost soon. It do not poses any multipurpose utility.

As mentioned in paper "Smart cards in Health Information System (HIS)" [6], the paper depicts same concept but the area of usage is different instead of educational institution here smart cards are used in Health care sectors to store the patient details. The plus point is that the Health data is consistent, its availability and management. But the cost of replacing the existing infrastructure is a bit risky factor and also data security plays a crucial role in health related documents. In paper [7] Students can purchase products through vending machines in their colleges by using RFID in their id card. These cards are useful only for purchasing items from college stores and there is no any kind of official utility.

III. PROPOSED SYSTEM

The Internet of things (IoT) describes the network of physical objects—"things" or Objects that are embedded with sensors, software, and other technologies for the purpose of connecting and exchanging data with other devices and systems over the Internet.

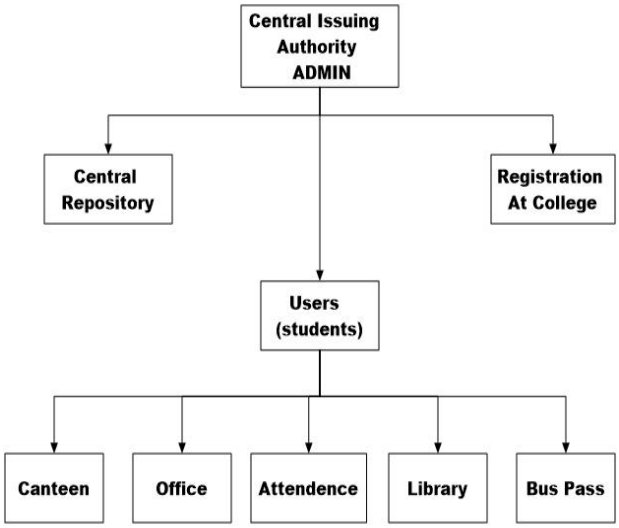

Fig 1. Overview of proposed system

In current situation the college management is a tedious task and it is also paper based . It requires extra effort an time to make records externally into the system and also causes errors. All managerial activities require a 3rd authority to authenticate legally. But by using this proposed system automatically data is fetched, manipulated and recorded. This increases the ease of functions. The proposed model has a hierarchical structure which is shown as a figure above.The root node is the admin who manages every details of the students as well as all other nodes. The leaf nodes represent the end points where the services are offered to the students.

IV. MODULES

There are five modules for the system they are:

1. Admin
2. Office
3. Student
4. Library
5. Canteen

V. SYSTEM ARCHITECTURE

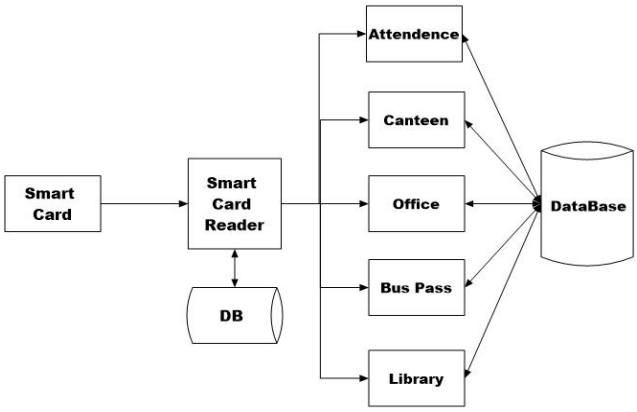

Fig 2. Architecture of proposed system

The figure above shows the architecture of smart card system. The central role of smart card is unique identification which is done using the unique id which is scanned using RFID reader hence according to the unique id the details are restored from the database. The database contain all the details related to all the modules and are interconnected. The database stores values in four tables. They are attendance, office payments, bus pass and canteen, library. For web page creation we use HTML and for the database creation and manipulations we use SQL queries and to link both these we use python.

VI. DFD DIAGRAMS

LEVEL 0

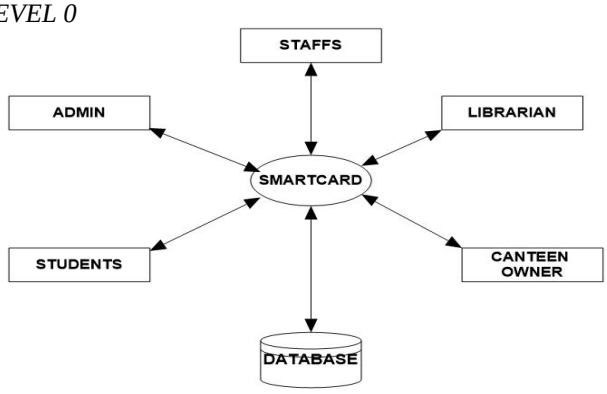

Fig 3. Level 0 DFD

LEVEL 1 ADMIN

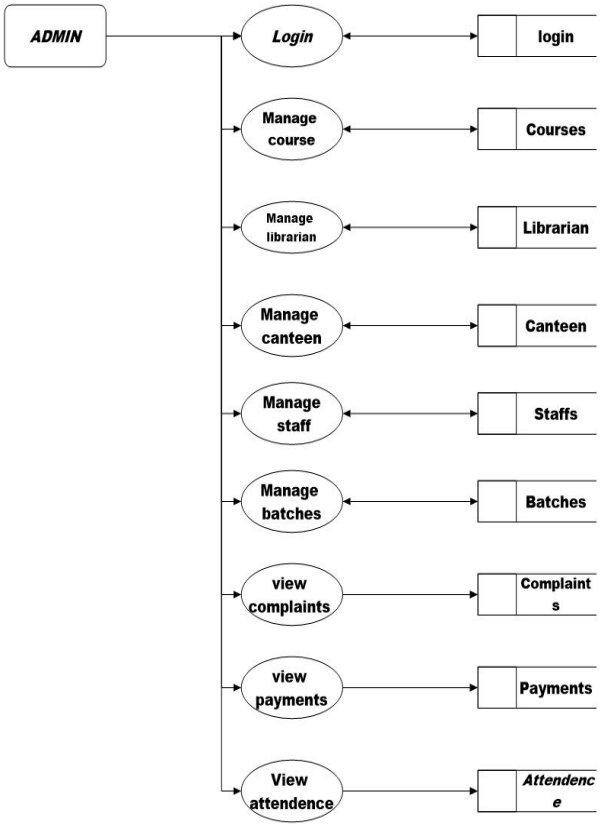

Fig 4. Level 1 Admin DFD

VII. PERFORMANCE ANALYSIS

The RFID is a new technology that is widely used and deployed for object tracking and monitoring, contact less payment etc. In the below table we perform the comparison between conventional and the proposed smart card system using RFID .

Table 1

Parameters	**Conventional system**	**Proposed system**
Attendance	Registers are to be maintained. Faculty is needed to enter the record Time recording is not possible.	The database is created Attendance can be entered simply by scanning smart card. Exact time is recorded
Payment	Multiple cards are required for payment making	Single smart card be used
Library	Ordinary id is used for authentication	Smarted can be used and all details of book taken and returned are recorded automatically
Canteen	Cash payment	Cashless payment
Bus pass	Paper pass	Smart card scanning

VIII. CONCLUSION

The smart card is a booming technology. The implementation of smart cards will improve security in general, efficiency caused by a cashless environment, data consistency and functionality of student card. Through the applications of the versatile smart card, many improvements in the existing environment can be made. Education is just one sector for the implementation of the smart card, smart cards can be adopted in various sectors and on taking upon the usage of smart cards it will improve their functionality, efficiency, and usability.

IX. REFERENCES

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