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Smart Card For Various Application In Institution

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***Abstract* — For every different purpose a different card is present and at a time it becomes difficult to handle all these cards especially for the students, who just wish to carry a single card which can serve all the purposes. This paper aims to design a student card system for an institute using smart card technology that can be usable in the attendance, payment, and automation of class. The smart card will be used as a means for identification, automation, and payment. This paper proposed design multipurpose smart card to create identity card, payment transactions and automation of class. The smart card has a bar-code that is unique for every card assigned to the student. The smart card does not save data directly in the smart card but in the server for the account-based system. This design would increase the transaction speed and also keep to secure the transaction process.**

Keywords:
Smart card, Internet of Things (IoT), Smart class, Hardware, and Software, Automation

I. Introduction

A smart card, a type of chip card is a plastic card which is embedded with a computer chip that stores and transacts data. The card data is transferred via a bar- code that is part of a computing system. Smart card enhanced security systems are in use today throughout several key applications, including healthcare, banking, entertainment and transportation. The smart card contains a bar-code that act as a unique identity of the student which can lessen the work of student. The authority of all the smart card is given to the admin who can refill the card when required. This card is useful for the student in places like canteen and stationary shops. When the card is inserted the unique id stored is scanned and accordingly cash is deducted from the student's account. For the purpose of attendance the smart card is scanned and the attendance of the student is directly sent to the server so that teacher don't have to do the paperwork. Same way in case of stationary shop which is in college campus where the cash amount is deducted from the student's account and same way in case of canteen. Thus, the student just needs to carry the smart card. Thus, this card is very useful for a student and makes many of its work easy.

II. Challenges

Instead of carrying a bunch of different cards to an institution, a student can carry a single card that can be used to serve desired purposes like issuing books in the library, transactions in the canteen and stationery, for attendance and smart class. The project involves a card that contains a bar-code which is nothing but a unique card that is assigned to the student and faculty. This project is developed to lessen the work of students. For the purpose of records, faculty have to maintain the registers for attendance, this can be replaced by the use of the smart card. One of the main challenges of the institution is to not waste electricity. Smart cards can be a major cause of saving electricity when used with IoT technology. When making payment in the institution 3rd party app or different card or cash is used which can be covered by the use of a single smart card. The upcoming future is being automated so this kind of project will make our institution look smart and reduce the time and manpower of working.

III. Soluions

Below are some of the solutions that can be taken into consideration for the above mentioned challenges:

1. The smart card can be used to record the attendance of students.
2. The card can be used for transportation purposes, it acts like the bus pass.
3. It also serves for transaction purposes around the campus.
4. The card is also used for automation of the classroom making it a smart classroom and saving energy.

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IV. APPROACH

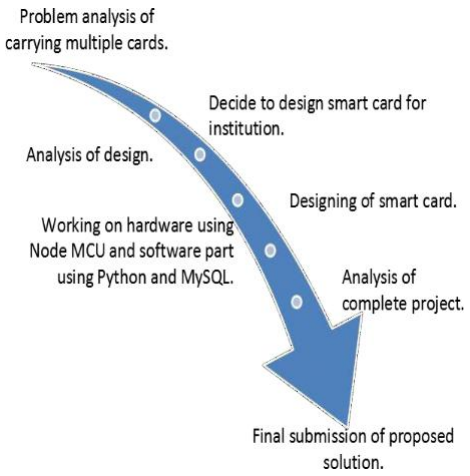

Fig.1. The approach of the project

Fig.1 shows how the designing of the project was approached. It covers up all the major steps that were taken during the project. The proposed system can be implemented in education organizations. Designing a smart card for the institution requires the design of a card itself, what data it should store, what security features to use and the applications that work with the card.

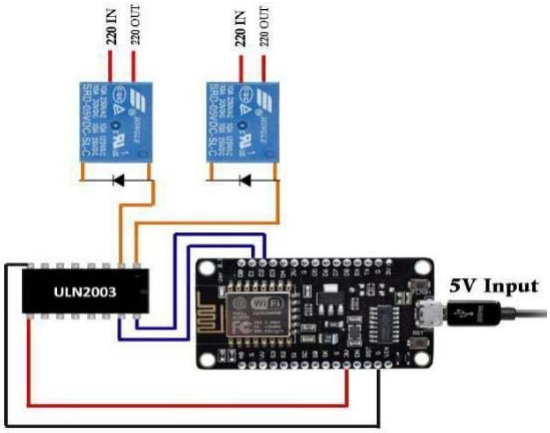

Fig.2. Complete connection of IoT device

Fig.2 shows the complete connection of Node MCU device with the lights and fans and how when a signal is received by the Node MCU the user will be able to access the lights and fans of the classroom. Users with the help of an application created using the android application will scan the smart card which will scan its value and send it to the database to get verified so the access can be granted. The application will be linked with a database where all the information will be stored and also will be mapped with another application inside it for connecting the IoT devices which when have a verified accessor will send the signal to NodeMCU which will turn on the fans and the lights of the classroom.

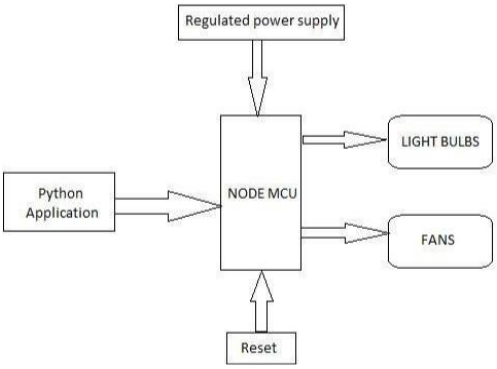

Fig.3.Connection with node MCU

Fig.3 shows the linking of the application to the NodeMCU. It also depicts the connection of the NodeMCU to the lights and bulb and the power supply to the NodeMCU. A link is used to connect the application to the NodeMCU when both the application and the NodeMCU are connected to the same network. NodeMCU uses Wi-Fi for connectivity and the application can be operated using the mobile data or the same Wi-Fi that NodeMCU is connected.

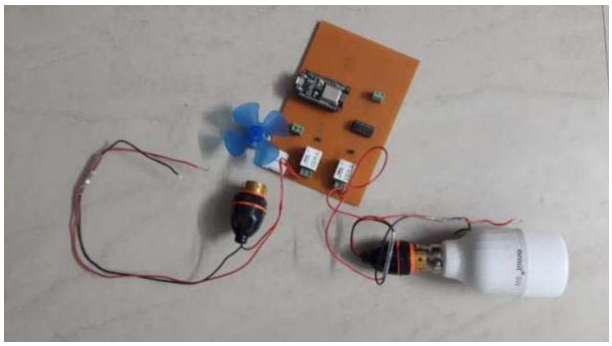

Fig.4. NodeMCU connected to bulb and fan

Fig.4 shows the PCB connection of the IoT device used with the bulb and the fan. Many more bulbs and fans can be connected to the circuit with the help of the relay switch.

The following table shows the list of various components required for designing a smart card automated classroom.

Table.1 List of components

Serial number	Components Name	Quantity
1	Node MCU	1
2	L2003 IC	1
3	Diode-4007	1
4	Relay-6V	3
5	Pin head	1
6	Bulb holder	1
7	DC Motor-3V	1
8	Fan	1
9	5V Adapter	1
10	Connecters	3
11	Jumper wire	40-50

V. WORKING OF THE PROJECT

1. Attendance

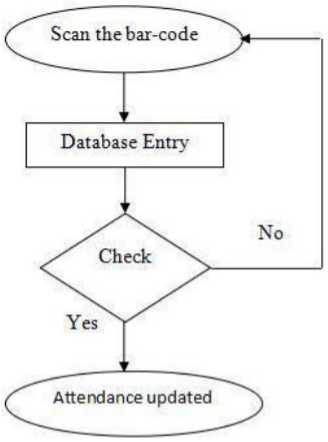

Fig.5. Flowchart of attendance

Fig.5. explains the process of how the attendance of student and teacher are updated using a bar-code scanner. By using the app, the user will scan the bar- code on his smart card. After scanning the card, entry of student or teacher will be filled in Database and after checking its validation, attendance will be updated.

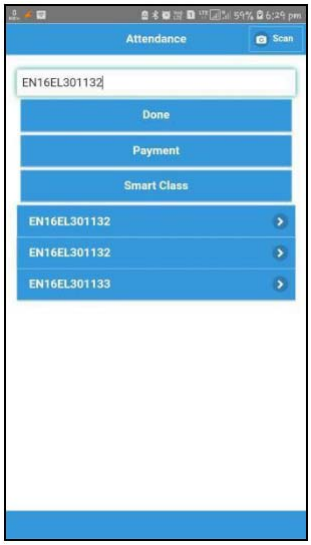

Fig.6 Attendance page in application

The application that is designed has multiple pages in it. Fig.6 shows one of the pages of the application that records the attendance of the student and upload it to the database. The attendance uploaded can also be seen on the app but the date and time of the attendance can only be seen on the database by the admin.

2. Money Transaction

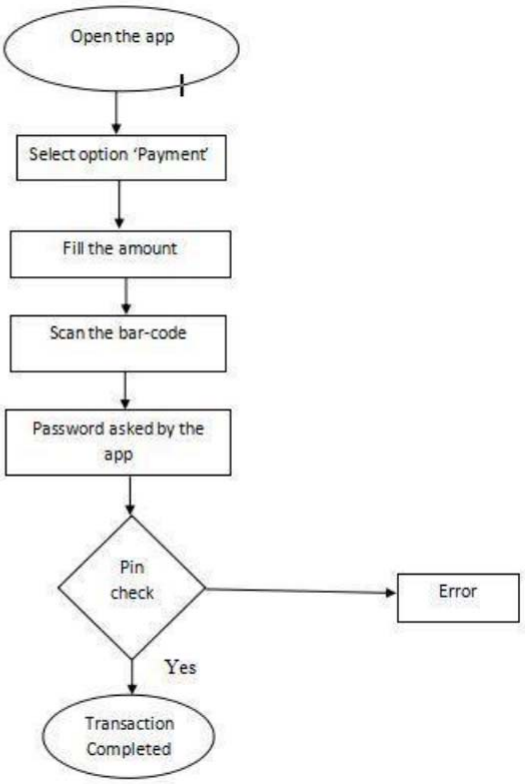

Fig.7. Flowchart of money transaction

Fig 7. explains the process of payment on the premises of a college, for example, in the canteen or paying fine in the library. By selecting the 'Payment' option, the user will see a window asking about the amount of money to be paid and whom to pay. After scanning the bar-code, it will ask the password and after verification, if a valid password is entered then the transaction will take place.

Fig.8 Payment page in the application

The application provides the service of the payment. Fig.8 shows the payment page. For the purpose of the payment, the bar-code of the vendor is to be scanned and the amount is to be entered to make the payment. The transaction will be directly reflected in the app and the database.Fig.7. Flowchart of money transaction.

3. Class Automation

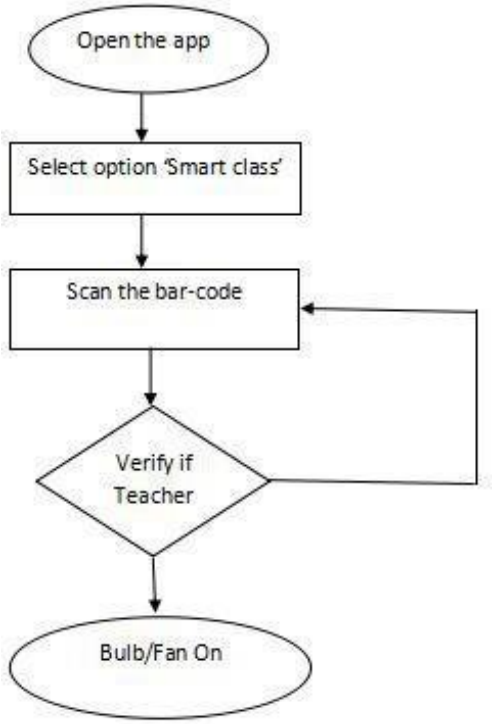

Fig.9. Flowchart of automation

Fig.9 explains the process of how automation takes place in the classroom using a smart card. By selecting the "light" option, the user will be able to access the lights and fans by scanning the bar-code. After verifying the code, if the user designation is teacher or admin, then they can control the lights and fans in the room.

Fig.10 Automation page in the application

Class automation is one service provided by the application. Fig.10 shows the class automation page of the application. Only the teacher has the authority to automate the class. The teacher just has to scan the smart card one and the lights and bulb will be turned on.

VI. Result

Table.2 Comparison between Conventional and Proposed System

Parameters	Conventional System	Proposed System
Attendance	Registers are to be maintained. Faculty is needed to enter the record. Attendance time recording cannot be done.	The database is created. Attendance can be entered by simply tapping. The exact time can be recorded.
Payment	Multiple cards are required for making payment.	A single smart card can be used.
Automation	No conventional system of automation in the institution. Sometimes lights and fans are remained turn on and electricity gets wasted.	The smart card can be used with IoT technology to automate the class. Electricity can be saved up to a great extent.

The benefit of the smart card is indicated in Table 2. From the above table, we can depict that the proposed system has more advantages than the conventional system. So with the use of smart card the disadvantages of the conventional system can be overcome.

VII. 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.

VIII. Authors And Affiliations

Navin Jesani is a student of Medicaps University, Indore who is pursuing B.Tech program in Electronics and Communication Engineering. Currently in his 8th semester of engineering, he is working on a major project, smart card for various applications in institute. He has keen interest on learning new technologies. Also loves to explore new things every day.
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