



## International Journal of Innovative Research in Computer and Communication Engineering

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# Implementation of RFID Based Campus Management System

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**ABSTRACT:** We are planning to implement the Project for campus management using RFID. We are using UHF/HF RFID tags and UHF/HF RFID reader to detect the authenticate user to get an entry for access control as well as cafeteria. If the user get detect as a authenticate person then message will send to him/her mobile through web service. In cafeteria we are going to place a RFID scanner which is look like a tab. So, the student or staff can be able the select a menu or place the order from the table menu or order data automatically will generate to the central server which will held at canteen counter as well as the user will able to pay the order through the RFID tag but user have to recharge the RFID tag from the canteen manager. This concepts is used for large industries, universities etc.

**KEYWORDS:** RFID TAG, RFID Reader, BLDC motor driver, PIC microcontroller.

### INTRODUCTION

In Student Gate Entry Control, Many users always use the individual traits for identification for example: user name & password etc. It is very hard to store such kind of critical data. To avoid such a kind of data we are using RFID tags and RFID scanner.

For each user there will be RFID tag. The individual user will scan their tags to the scanner. Scanner will detect the tags and it will send to the PIC micro-controller. PICmicro-controller which is nothing but the electronic circuits that can be programmed to carry out a vast range of task. PIC micro-controller will send information to the web service it will check, whether user is authenticated or not. If the user is authenticated then message will retrieve to the user mobile. After successful transaction, The BLDC motor driver will open the gate and user will get the entry.

In Cafeteria management, we can use this system in schools, college canteens as well as in industries and hotels. In collages or inside university campus, the canteen facility is provided. Students, college staff, university staff uses this facility. Similarly food facilities provided in canteen in various companies. In these canteens students or employees pay their bill by cash. In existing system, cash payment is the only option for making the payment this is the case for small canteens. In some large canteens credit card facility is provided but that's very rare. The main drawback of cash payment system is that user always needs to carry cash with him/her. And he/she needs to pay the exact amount otherwise there is problem for the remaining amount. To avoid this problem, we are using RFID tags and RFID scanner. We are placing RFID scanner (as a tab) to each individual table.

So, that the customer or user will able to placed an order as well as pay that order wherever they are seated. All this transaction will be send to the central server which is held at the canteen counter. And user have to recharge their RFID card from the canteen manager.

It is very useful for the hostel students. The manger need not be taking an entry in register. This problem we can avoid in this system. The overall data of students will be saving in WEB server.

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## II.RELATED WORK

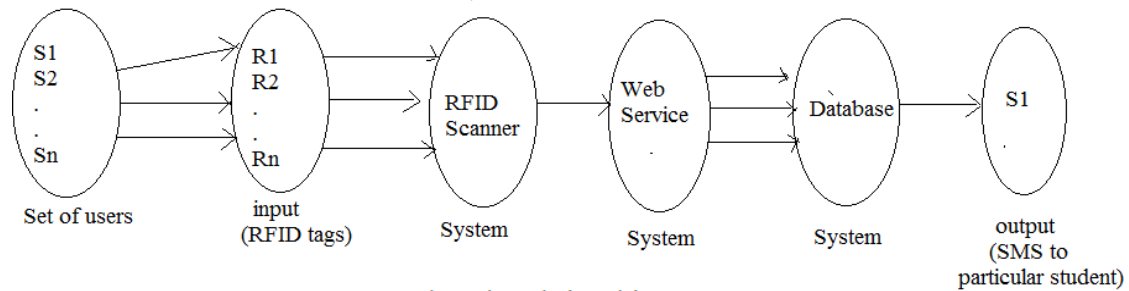


Fig. Mathematical Model

### Mathematical formulation for student gate entry control :

$$P = (S, R, D, W, Db, M)$$

Where,

$S = \{\text{Set of students}\}$

$R = \{\text{Set of inputs in the form of RFID tags.}\}$

$D = \{\text{it is a RFID scanner which retrieves the data through RFID tag}\}$

$W = \{\text{web server which stores the data from RFID scanner}\}$

$Db = \{\text{it is a database which stores the overall data of student}\}$

$M = \{\text{it is set of messages which can be send by web service to the particular student after the entry is made.}\}$

- **Inputs:**

Let I is the set of Inputs.

$I_0 = \text{Student enter through the gate.}$

$I_1 = \text{Student scan the RFID tag to the scanner.}$

- **Output:**

O is the set of Outputs.

$O_0 = \text{Authenticate entry can be store on web server.}$

$O_1 = \text{After Successful transaction, message will be send to the authenticated user.}$

- **Function:**

1. Accept entry from RFID tags to the RFID scanner.

2. Accept input from RFID scanner to the Web server.

- **Success condition:**

After Successful transaction, message will be send to the authenticated user.

### Mathematical formulation of Cafeteria Management :

$$P = (S, R, D, W, Db)$$

Where,

$S = \{\text{Set of students}\}$

$R = \{\text{Set of inputs in the form of RFID tags.}\}$



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D={it is a RFID scanner which retrieves the data through RFID tag}

W={web server which stores the data from RFID scanner}

Db={it is a database which stores the overall data of customer}

- **Inputs:**

Let I is the set of Inputs.

I0= Customer scan the tag to the scanner.

I1= Customer select the menu as well as quantity from keypad .

- **Outputs:**

O0= Authenticate order can be store on web server.

O1= After Successful transaction,customer should pay the bill from his/her account balance.

- **Function:**

Accept entry from RFID tags to the RFID scanner.

Accept input from RFID scanner to the Web server.

- **Success condition:**

After Successful transaction, order is placed & customer should pay his/her bill from his/her account balance.

## III.PSEUDO CODE

### Code for Student Gate Entry System :

- 1 Student must scan their RFID tags to the scanner..
- 2 Check whether it is authenticated or no by the pic microcontroller.
- 3 If(user==authenticate)  
    User will get entry.  
Else  
    Entry will be restricted for the user  
end
- 4 If is authenticated, entry will be successful or vise versa.
- 5 If user is authorized then information will send to the webservice.
- 6 Data will stored on the Database
- 7 End.

### Code for Cafeteria Management :

- 1 Student must scan their RFID tags to the scanner.
- 2 Check whether it is authenticated or no by the pic microcontroller.
- 3 If (user==authenticate)  
    User will able to place the order  
Else  
    User will not able to give the order  
End
- 4 After placing the order automatically bill will generate to their individual accounts.
- 5 Users will able to pay their bill from account.
- 6 end



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## IV.EXPERIMENT

We are developing two modules in this RFID Based Campus Management System one is Student gate entry control and other is cafeteria management system. Both systems are work as described below :

### Student Gate Entry Control :

This system architecture of Student Gate entry Control states that :”Every student will have one identity tag.If student want to entry from the college campus gate.then he/she must have RFID tag which will scan to the RFID reader(UHF/HF reader).This RFID reader will send that information to the PICmicrocontroller.PICmicrocontroller will send the information to the web service.web service will check that data if it is authenticated or not.if it is authenticated then student will get the immediately a message.all this authenticated data will send to the BLDC motor driver.then BLDC motor will transmits the power, the rotator will winds and automatically gate will open”.

### Cafeteria Management System :

This system architecture of Cafeteria Management state that:every student have its individual tag.if any student want to eat something then he/she must scan the rfid tag to the rfid reader. This rfid reader(UHF/HF reader) will send the information to the PICmicrocontroller. PICmicrocontroller will send the information to the webservice .webservice will check wheather the user is authenticated or not.if it is authenticated, then student will select the item and its quantity from typing pad which is attached to the each and every table. After selecting the items placed the order.all payment transaction will transfer to the webservices and user can pay the bill from its account balance.

## V.SIMULATION RESULTS

**Student Gate Entry System:** : If the student is authenticated, the green light will be blink and student will get entry. After the successful entry, message will be send by web service to the student’s mobile number. The entry of the student will be saved into the Web ERP System. If the student is not authenticating, the red light will be blink and entry is restricted for the unauthenticated student. Results are shown below

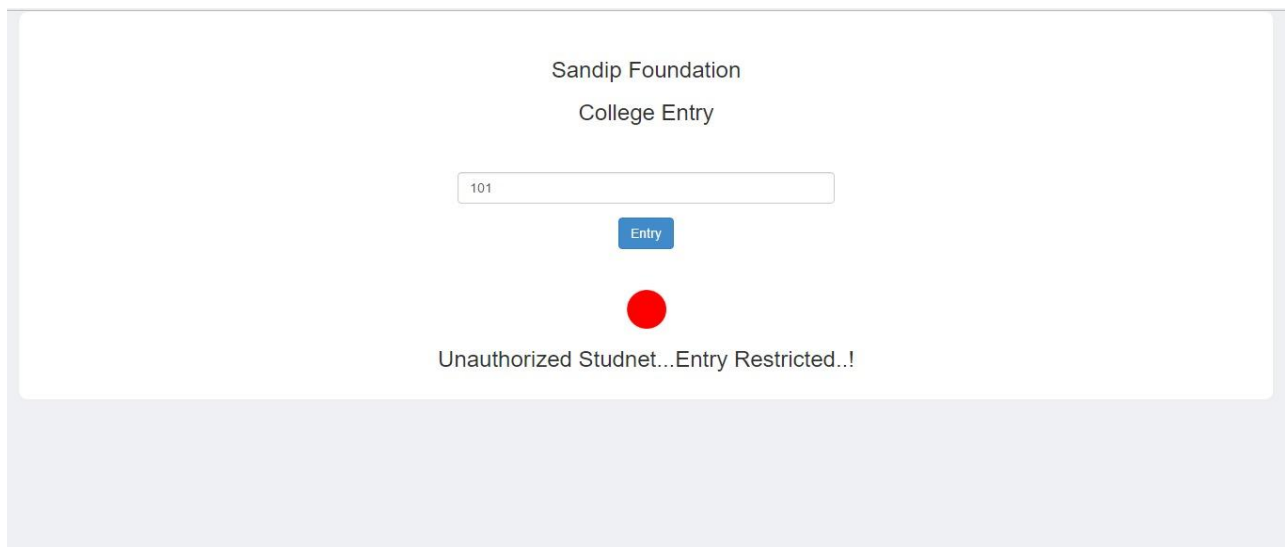


Fig.2 Web Authentication System(Un-Authorized Student)

According to above figure, the student’s RFID Id is unauthenticated. The entry is restricted for that student.



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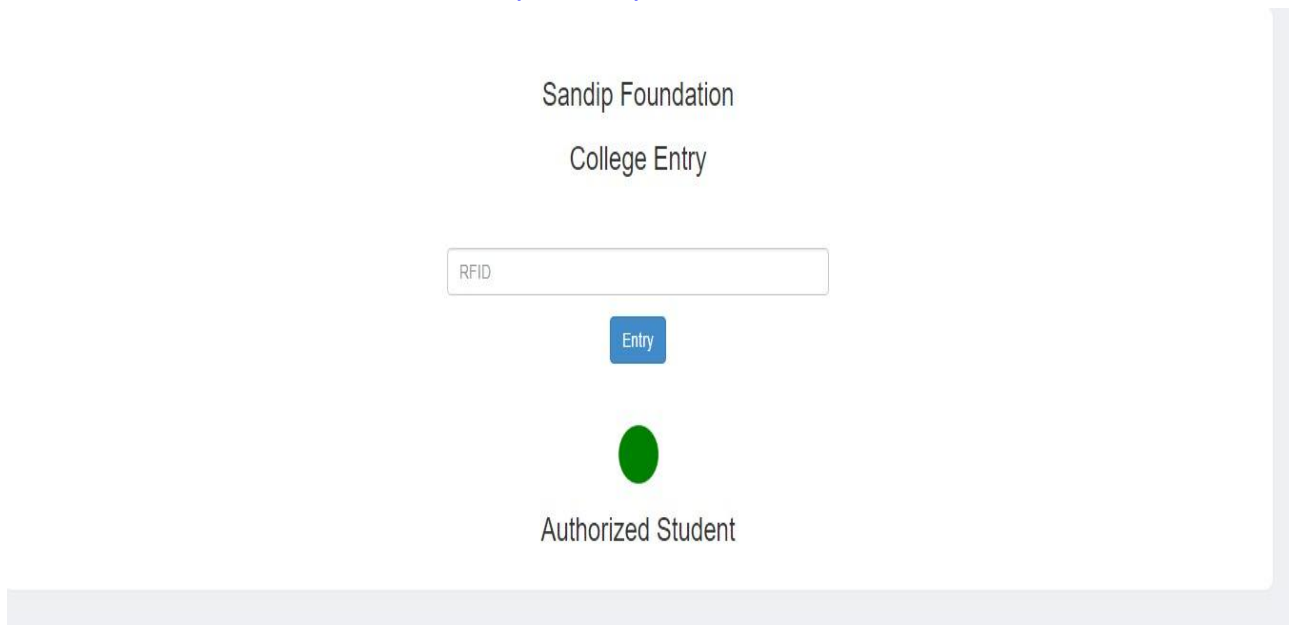


Fig.3 Web Authentication System (Authorized Student)

According to above figure, the student's RFID Id is authenticated. The entry is not restricted for the student and after the successful entry, the entry is made in the Web ERP System as shown below:

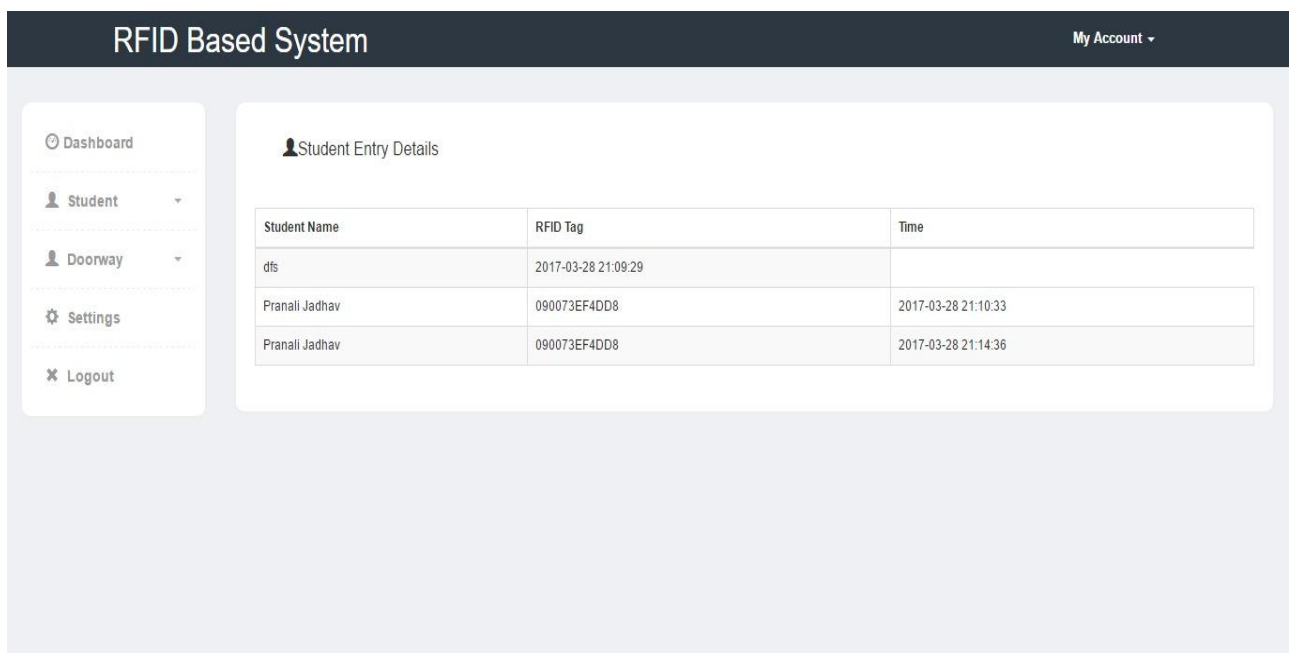


Fig.4 Student Entry System with time and RFID tagID

Authenticate Student will get the entry and the overall data about student will be saved into the Web ERP System



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## Cafeteria Management System :

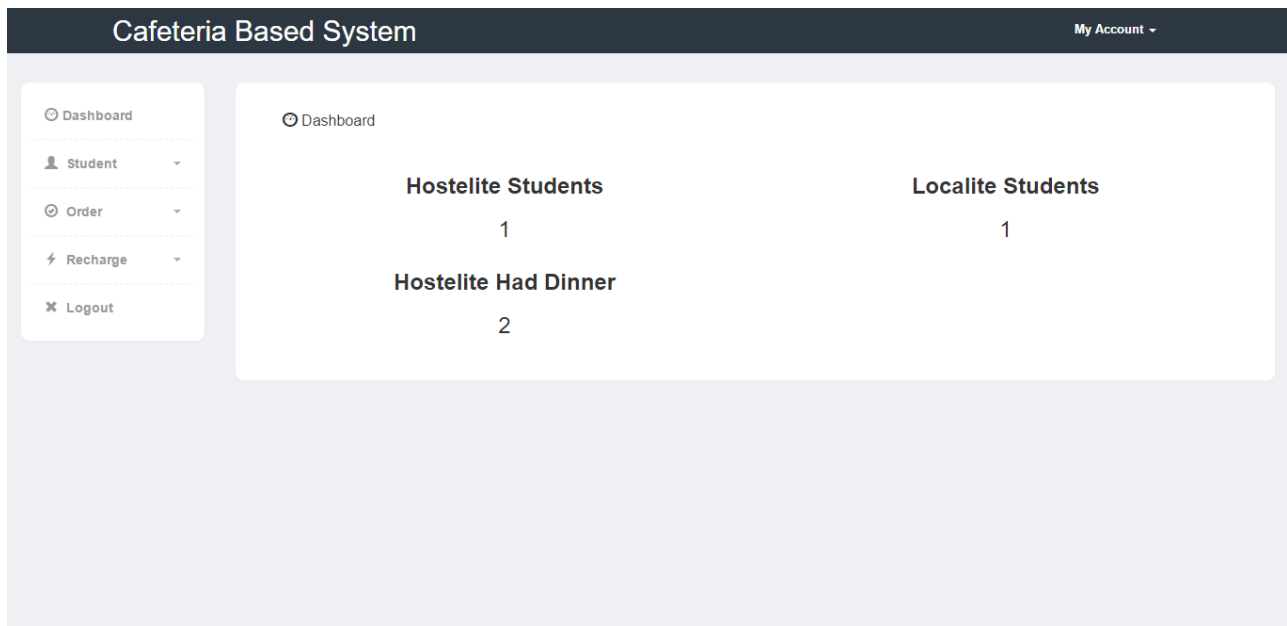


Fig.5 Cafeteria Management System

According to the above figure, it shows there are 2 students, one is a hostelite and the other is a localite, and 2 hostelite students have had their dinner.

The following figure shows overall data about a student, including their RFID tag, department, residence, order menu, total cost, and remaining balance.

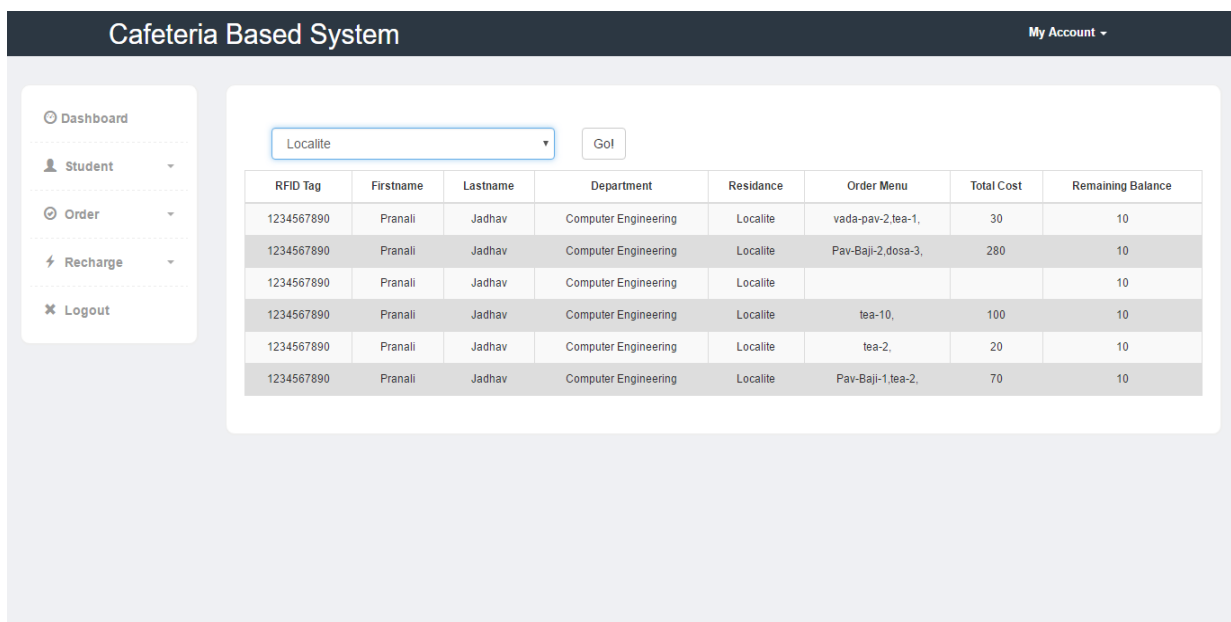


Fig.6 Student Entry System in Cafeteria with their order



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Item	Price
tea	100

Fig.7 order is placed by the student

According to above figure , it shows that user had place their order by drop-down list of foods and select the quantity.

## VI.CONCLUSION AND FUTURE WORK

### Conclusion:

In this system, we are using RFID based campus management system with the help of RFID tags, RFID scanner, BLDC motor driver, PIC microcontroller devices for the better management of campus. By using this project, we can reduce manual efforts. This project provides efficiency and it also reduces cost.

### Future Scope:

1. In future these application is use in all places like large industry , university ,Shopping malls etc

### Work :

1. In additional, we can use NFC instead of using RFID cards.
2. This System can be implemented by using biometric concept which will provide more security.

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