Web based E- wallet Canteen Management System using RFID

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Abstract – Nowadays, world is transforming into digital and wireless system through internet. Today internet has become a basic need of people. Manual and paperwork also has been returned by computerized automation. Automation reduces errors and helps in increasing accuracy and efficiency. The purpose of Canteen Management System is to automate the traditional manual system for better utilization in organization. Nowadays people have limited time of break in canteen and waiting in queue to place order and receive food. So with the help of computerized equipment's and web based software valuable data can be stored for a longer period with easy accessing, retrieving and update and manipulation of the same. Canteen Management System using web based software and Radio Frequency Identification (RFID) system can be accessible from anywhere using internet. It gives error free accounting, low development cost, secure, reliable and faster service to manage the system. It also has easy data sharing, collaboration, easy Installation and Maintenance. Web based software has more centralized security than cloud based system. The valuable time of user reduces by facilitating payments via cashless payment. The main advantage of wireless and con-tactless RFID card system is not effective in organic manner. So that canteen person focuses on their other activities rather than focusing on the record keeping. This project replaces existing manual system by effective automotive system to provide good functionality and better services for the user**.**

Key Words: Management System, Cashless, Wireless, web based service, Cashless, SQL database, RFID, Python, Raspberry Pi.

1. INTRODUCTION

In colleges, schools and industry campus canteen facility is provided. Students, college staff and employees use this facility. During lunch break there is a huge crowd in the canteen. Because traditional canteens are based on pen-paper records, cash, manual calculations and manual record keeping of credits. The web based automated and cashless canteen system will be able to overcome the disadvantages of the traditional canteen system. Canteen management system (CMS) is very useful in large industry as they have many canteens and more number of employees. In such a case it is very difficult to store data record and managing operations like update, access, making employment bill, taking visitor's entry record in computer system for longer time. So the system offers benefits of automation like display menu to user, print automatic food coupon, total bill amount, record, update and accessing of data, online payment. It also keeps record of the employee's attendance with a safer way to hold the money. As it is a cashless system so there will not be need to provide change to the customers. This automation can be achieved by using computerized hardware with RFID technology and web based software.

1.1 Objective of Project

The objective of this project is to develop canteen management software to use in large industry for canteen manipulation of data and to provide better services to user. For managing regular inventory operations of the canteen, CMS software is very important which is effectively maintains the accounts of working employees. We have implemented system at administrative end and thus only the administrator has authority to the access. The main purpose of the project is to build an web based software system to reduce the manual work for managing operations like employee registration ,employment information, total bill, account balance and ,attendance, details about the Canteen meal, meal Type. Second purpose is to design hardware system using RFID technology for easy installation, fast operation and attendance. And third purpose of CMS system is, if there are more number of employee in a canteen we can install multiple hardware device in a canteen using Master and slave hardware concept to avoid crowd. So that multiple user can swipe a RFID card at a single time. Employee uses the hardware system in their respective canteen but all data entries are stored into a single SQL database. So that multiple user can swipe RFID card at a one time

1.2 Existing System

Existing system uses traditional canteen management system. It is not an automated system. Traditional canteen uses cash for making the payment. This case is manageable only for small canteens. User always needs to carry the cash. This system waste lot of time of users and canteen personas as well. Canteen person get busy with handling manual accounting, more paper work, dada recording and delivering a service to user. This increases the crowd in canteen. In many canteens, Biometric canteen automation system is also used in canteen for attendance. But this system is more costly, time consuming, less response time and can be effective in organic manner. Nowadays cloud based canteen automation system is used for better utilization in organization and restaurant.

1.3 Proposed System

To give an effective solution for faced by existing manual system problems we have implemented a project called "Web Based E- wallet canteen management system using RFID". RFID card swipe system gives printed coupon bill provides complete information about the cost, time, and date and meal type. Authorized user can only receive a printed coupon. CMS System has postpaid payment modes. All user must have RFID card to receive a service. Cards are registering themselves with the manager and total bill amount is reduced from employee account. Mobile number of user is stored in RFID card. So that card will uniquely identify the customer. If card is lost or damaged, it can be blocked through requesting the administrator. A new card can be registered against the same mobile number. For visitors data Entry Company provide visitor RFID card. Admin can only login the system software. He can access employee's profile, balance, order history, transaction history, for the controllers they can place orders, check their attendance along with the other accessibility. The manager can take food order, attendance, recharge, block and issue cards to people. Secure login is provided to employee. Employee can check details of employee's profile, balance, order history, transaction history and attendance.

2. FEATURES OF PROPOSED SYSTEM

1. CMS system reduces the paper work.
2. Simple recharge of e-wallet.
3. This system saves the time.
4. Entire information of the user stores for longer time.
5. Error free accounting.
6. Services are provided quickly.
7. Authorize user can only receive a service.
8. Post-paid canteen payment methods.
9. Time based auto menu.
10. It allow limited food quantity (For e.g. –an employee cannot have more than 1 lunch)
11. Manage multiple staff canteen with central database.
12. Provide menu and bill with coupon print format.
13. It provides different searching options like Company Canteen, Employee master, Department master, Employee Meal, Meal Type, Report.
14. Generate report.

3. PROPOSED METHOD

The Block representation of project is shown in below figure. It contains several blocks such as RFID reader, RFID card, Power supply, Max 232, Raspberry pi/ Arduino Microcontroller, Green and red light LED, Thermal Printer, LCD Display, SQL Server and Web page.
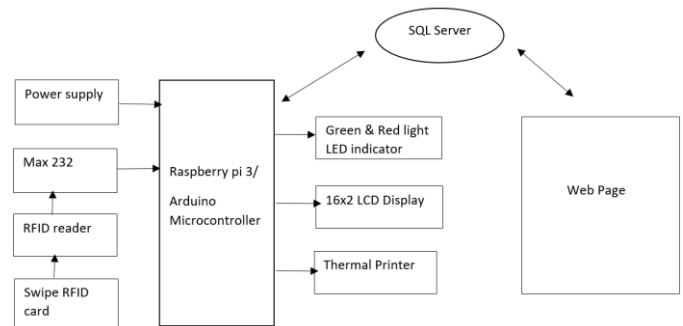

Figure 1: Block diagram of proposed method

1. CMS System is designed using Raspberry pi Controller. RFID reader as input, Thermal Printer and LCD as output are connected to Controller.

2. RFID system plays important role in this project. RFID Stands for Radio Frequency Wave Identification. It has two components are RFID Tag (Card) And Reader. RFID card have unique ID for identification. RFID Reader works on a principle of radio frequency wave. When user scan RFID card to reader it transmits the RF signal. Tag receives the RF signal coming from Reader and gets activated when in the frequency range of tag. Electronic data is stored in the microchip of Tag. Electronic data is unique ID is given to the each person card. Tags have an antenna which send back scatter signal to the Reader. It encodes and amplifies the data and sends it to the reader.

3. Thus, CMS system checks the received data is authorized or not and give green or red light signal. Green light LED is used to indicate authorized user and Red light LED is used to indicate the unauthorized user.

4. LCD Display shows the details about date time, menu and menu type.

5. Thermal printer generate printed coupon of ordered menu. Hence user can directly give coupon to the canteen person.

6. SQL database is used to store the record of company canteen and employee meal. Once the order is placed t, all the data is fetched to the SQL database through API (Application programming software). Admin confirm the order and update the user account. Hence huge data can be stored in SQL database for longer time. So admin can manage the details of company canteen using system software. He can generate report of each detail. The system flow of proposed method is shown in below Figure 2.
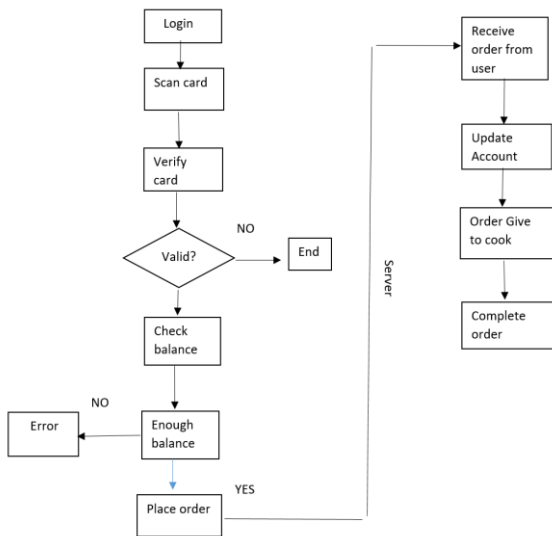
Figure: 2 System flow

4. SYSTEM DEVELOPMENT

4.1 RFID based CMS system

Hardware Requirement

    a.   Raspberry pi 3 model B
    b.   RAM 1GB or above
    c.   32/64 bit system
    d.   1 6X2 LCD Display
    e.   RFID reader and card
    f.   Thermal Printer
    g.   Green and Red light LED

Software Requirement

    a.   Operating System: Raspberry pi OS
    b.   Coding: Python language

Canteen management system hardware is designed as shown in Figure 3.

Figure 3: Screenshot of hardware design.

In Fig. 3 analysis, shows when authorized users scan RFID card LCD display menu, date, time, meal type and employee type and it indicate Green LED signal. Thermal printer generate printed coupon. For unauthorized user it indicates Red light LED signal.

4.2 Web Based Canteen management Software

Front end design is done by HTML, CSS and JavaScript with editor. Java Programming Language is used to develop a code. SQLite is a light weight Database is used for data storage. It is designed using .Net framework. System flow of CMS Software proposed method is shown in Figure 5.
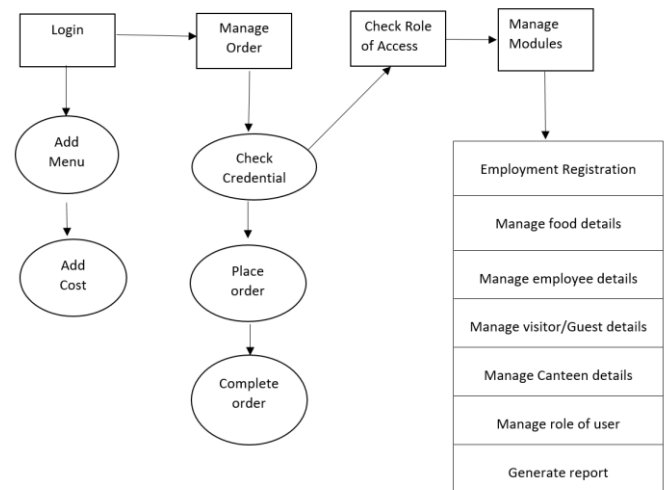
Figure: 5 CMS Software System Flow

It is an automated software open through a web browser that gives us best result with Attractive User interface, improve performance, easy to use and gives customer satisfaction.
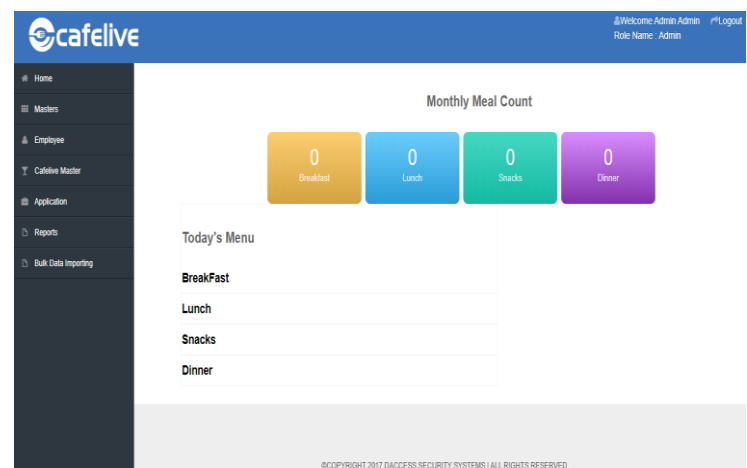

Figure 6: Screenshot of Home Page

In this result analysis Fig. 6 shows, When application is open it shows different category of menu that display on admins computer. It has several menus such as Master, Employee, Cafe live master and report menu.Category of menu is extended in different submenus.

Master submenu and Café live submenu are shown in Figure 4 and 5 respectively.
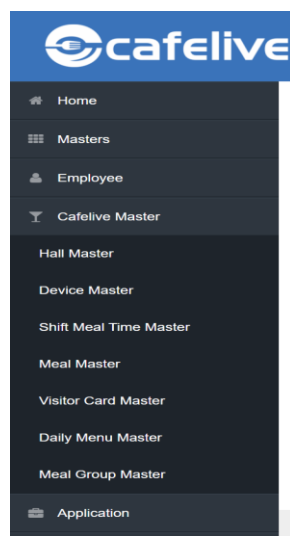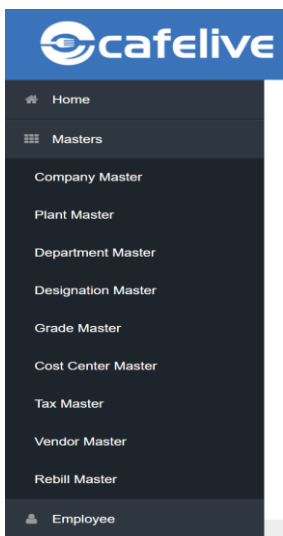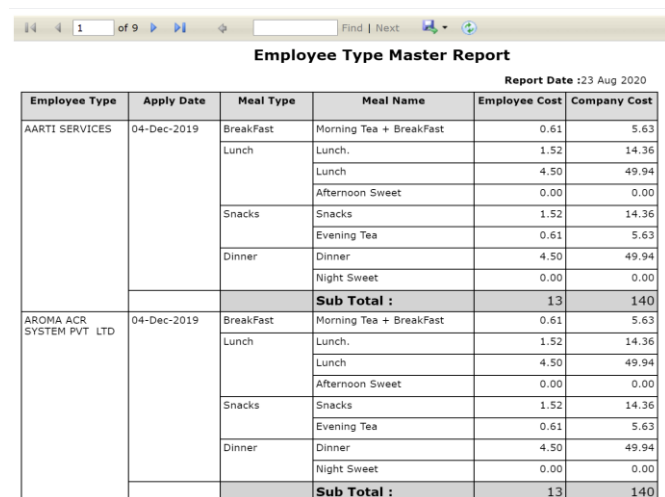
Figure 4: Master submenu   Figure 5: Cafe live submenu

Master menu contains company master, plant master, Department, Designation, Grade, Cost center master, Tax master, Vendor master and Rebill master menu. Different master pages are created to generate separate report of each submenu. Café live menu contains hall master, Shift Meal time, Meal master, Visitor card master, Daily master menu.

Similarly, Employee menu contains Employee master and Employee type submenu. Application menu contains Visitor access card, OT entry and gust entry. Here Gust, Visitor and overtime details are stored in separable form. In report menu there are two options with Master report and Cafe live report menu to generate detailed report. Master report of employee type is shown in figure 6.

Figure 6: Screenshot employee Type Report.

In this result analysis Fig. 6 shows, details of employee type with apply date, Meal type, Meal name and Cost. Hence admin can manage all details about company canteen.
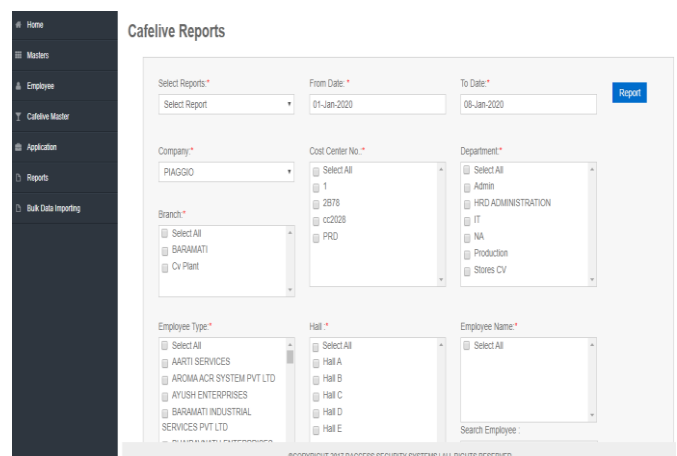

Figure 7: Screenshot of Café Live Report

In this result analysis Fig. 7 shows, Admin can generate Café live report with different options. There are different options with Date, Company, Department, Branch, Employee type, Employee name Meal type and Hall.

5. CONCLUSION

With the proposed software of database space CMS system is ready and fully functional. The administrator is now able to manage and hence run the entire work in a much better, accurate and error free manner. This paper discusses the canteen issue and finally proposes an effective working solution for the same. It further discusses the importance of the payment method using E-Wallet, food ordering and attendance system using RFID technology and automatic managing information of user by using CMS software.

6. FUTURE DEVELOPMENT

This project has a very vast scope in future. The project can be implemented completely on internet. Online food ordering system can be updated in near future as and when requirement for same arises, as it is very flexible in terms of expansion. So that hardware system will not require. It reduces time and effective cost. In this project we can develop mobile application for user. So that through online order system food can be prepared earlier before reach to canteen.

7. ACKNOWLEDGEMENT

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