

CORMS: AN AUTOMATED RESTAURENT MANAGEMENT SYSTEM

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Abstract - Customer Oriented Restaurant Management System (CORMS) is a web application and an android version to restaurant management. It has all the features of the rapid involving science and its different attributes. Through a strategic design and customer orientation, CORMS technology is integrated and has been created to optimize the work force and streamline restaurant work flow. It can run on a tablet, and is both scalable and modular to meet the needs of any establishment. CORMS is an effort to bring technology into the dining menu of customers. CORMS offer robust features that not only help your restaurant to update the menu any time but also improve the overall dining experience. The tablet menu is to provide a user-friendly interface by offering smooth navigation and browsing through digital menu thus providing a delightful experience. The customers can order the food, through that tablet interface. Our project aims to not only improve the business of restaurants but also to incorporate the essence of science in dining menu. Our future-ready restaurant management software is designed to keep track of everything that goes inside the restaurant, and everything is permission based to avoid theft.

Key Words: CORMS; Restaurant Management System; android; digital

1. INTRODUCTION

Visiting a restaurant traditionally involves selecting a meal from a paper based menu and being waited on by the restaurant's waiter staffs. A busy restaurant or inattentive staff can leave customers waiting to have their orders taken, to refill their drinks or to receive their bill for a long time. If the restaurant is busy the customer is left there, where he occupy a table longer than they need. Any unnecessary waiting can reduce customer satisfaction and reliability and ultimately result in lost business. To reduce customer wait, prior management of time must be ensured. Sufficient staffs should be present during peak hours and that they are properly trained to provide excellent customer service. These staffing issues can lead to substantial costs for the business. Paper based menus are

problematic. The restaurant may have a large number of menu items which can make the menu appear overwhelming to go through it. As a result, customers may not see all the items they would have been interested in. When changes to the menu are required, such as price adjustments or quantity change or item updates, the costs and environmental concerns associated with reprinting and all need to be considered. Menu changes are often left to accumulate until enough are required to justify the costs of reprinting. Changes may be required frequently and a paper menu would quickly become outdate. Waiting until a reprint is done before implementing the changes in the restaurant may not be a sound business practice. Manually updating the menus instead of reprinting can lead to inconsistencies and this can give a bad impression to the customers. This may make the restaurant appear cheap and low quality. The project is designed and is building a restaurant management system that provides an interactive tablet based menu which replaces the paper menu entirely and removes much of the need to be waited on by the restaurant's waiter staff. This tablet based menu app also provides additional features designed to enhance the customer's overall experience. In the management side, it allows the restaurant's management to quickly make changes to the menu and provide a larger view of the restaurant at any given time. The restaurant menu and management system consists of the menu app, the management app, the web based site, the server and a database. Other apps, intended to be used by the restaurant's kitchen and wait staff were not developed for this project.

2. MOTIVATION AND TECHNICAL RELAVANCE

The mobile market is growing in each year replacing the demand for traditional desktop applications. This makes software development for mobile devices an interesting and attractive industry to work in. The primary motivation for this project stems from the desire to learn and gain experience in android apps and web sites development as well as an interest in the design and development of distributed systems. The paper based menu system is very tiresome and need lots to wait by the

customers to get noticeable by a waiter in a busy restaurant. And hence such a system will surely be a blessing for both customer and restaurant owners, which motivated us to work on our project more.

3. RELATED WORKS

The world has contracted with technology. Technology had affected the restaurants with greater impact. RFID technology, digital menus, service robots and others are some examples of advanced technology are coming to the future restaurants. However, the restaurant service process has to stay customer-centred and it will mainly include human service also in the future

Customizable Wireless Food Ordering System with Real-Time Customer Feedback [1] is discussing, the design and implementation of a customizable wireless food ordering system with the help of a real-time customer feedback for a restaurant (CWOS-RTF). The CWOS-RTF enables restaurant owners to set-up the system in wireless environment and update menu presentations easily. Smart phone has been integrated in the CWOS-RTF. Instead of using PDA's to interface with customers, they leverage smart phones to provide necessary interfaces for customer to view and order menu. With private login system, customers can view and make order and receive updates in real-time and collect receipts right from the smart phone itself. It allows restaurant owners to manage orders from customers instantaneously whenever he or she logged in into the system. The existence of wireless technology and the emergence of mobile devices enable a simple yet powerful infrastructure for business application. Some early efforts have been made to utilize both technologies in food ordering system implementations. However, the food ordering systems that have been proposed earlier exhibit limitations, primarily in cost effectiveness, allowing customizations and supporting real-time feedback to customer's implementation to facilitate real-time communication between restaurant owners and customers. A preliminary testing suggested that the CWOS-RTF has the potential to eliminate the limitations of existing food ordering systems.

The objectives of the proposed system are:

- To automate food ordering system at Restaurants so that it can eliminate or at least minimize the current problems in conventional system.
- To utilize wireless communication and smart phone technology in implementing the automated system.
- To facilitate more intuitive interfaces and customization for the restaurant owner to update the menu content on the customer devices.

- To enable real-time feedback between the restaurant owner and customers on the order status.

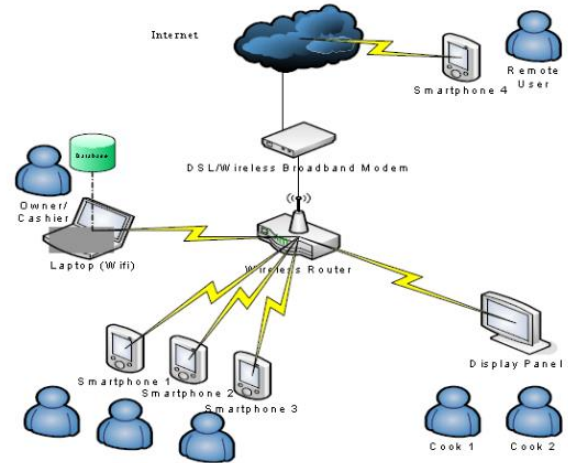


Fig I: Architectural diagram of CWOS-RTF with internet access

The CWOS-RTF is built on four main components:

- The mobile application on the smart phones for customers to make order.
- The web based application and server on the laptop for restaurant owner to keep track and respond to received customer's orders, and customize menu information.
- The database for restaurant owner to store order details, and updated menu information.
- The wireless infrastructure to support networked communications. This system can be extended as running CWOS-RTF on more restaurants and customers to report on their acceptance. Although current interface (New Order List) can be used by the staff in the kitchen, the system can be further enhanced by adding inventory management module for the kitchen staff. Besides this, a module for remote delivery can be added for bigger customer coverage. Finally, the system can be extended to register and link multiple restaurants for more food and beverage varieties to the customers.

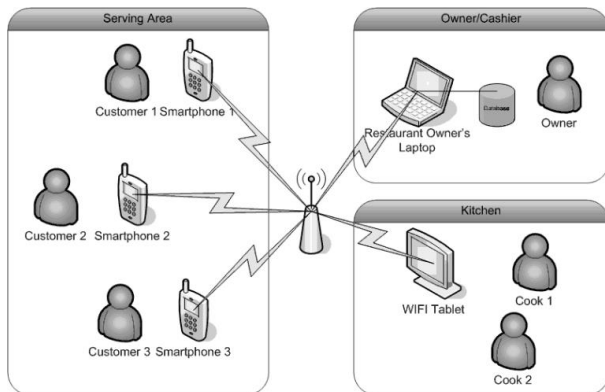


Fig II: Architectural diagram of CWOS-RTF without internet access

Typically in a restaurant food order process involves several steps for ordering the food where firstly customer starting from browsing the paper based menu and then inform to the waiter for ordering items. Usually the process requires that the customer has to be seated before starting. An alternative method for the customers is described through Implementation Customizable Ordering Food Ordering System Using Web Based Application [2] “A Food Pre-Order System using Web Based Application” in which customer can be able to create the order before they approach the restaurant using Smart phone. When the customer approaches the restaurant, the saved order can be confirmed by touching the Smart phone. The list of selected pre-ordered items shall be shown on the kitchen screen, and when confirmed, order slip shall be printed for further order processing. The solution provides easy and convenient way to select pre-order transaction form customers. The Objectives of this system is:

- To combine Wireless technology and Android OS to automate food ordering process.
- To minimize the imperfection in conventional system by reducing the working of a restaurant.
- To make provisions for obtaining feed-back from the customers and provide the restaurant a means of review of their service.
- To utilize wireless communication and smart phone technology in implementing the automated system.
- To make more user interfaces friendly and customization for the restaurant owner to update the menu content on the customer devices.
- To enable real-time feedback between the restaurant owner and customers on the order status.

Conceptually this system is built using following components:

- The android application is used to make orders from tablet.
- The restaurant-owners laptop/tablet will keep track of customer records and also customize menu using server application.
- The central database is used for restaurant-owner to store updated menu information and order details.
- Three main areas of restaurant are connected using wireless technology.
- The Android application is used to find out the location in restaurant according to its latitude and longitude.

The technologies which are used to implement the system are:

1. Visual Studio 2010 for developing web application.
2. Android version 2.2 or more for Tablets is required.
3. SQL 2008 is a light weight Database which is going to be used for database access from the tablet.

The existence of wireless technology and the emergence of mobile devices enable a simple yet powerful infrastructure for business application like restaurant management system. Technology can be deployed efficiently to manage all the day-to-day tasks in restaurants. By using a new software-oriented approach we can eliminate a number of counters leading to a savings in space as well as staff for a restaurant. This new approach is a one-time investment as we do not have to pay salaries to a very large staff. The new system Wireless Customizable Food Recommendation System Using APRIORI and KMEANS Algorithm [3] is useful at places where it is difficult to find employees and where labour rates are sky-rocketing as the day passes. Moreover in the present day environment where numbers are a measure of progress, there is a need for tools to analyse patterns which can be exploited for designing new sales strategies.

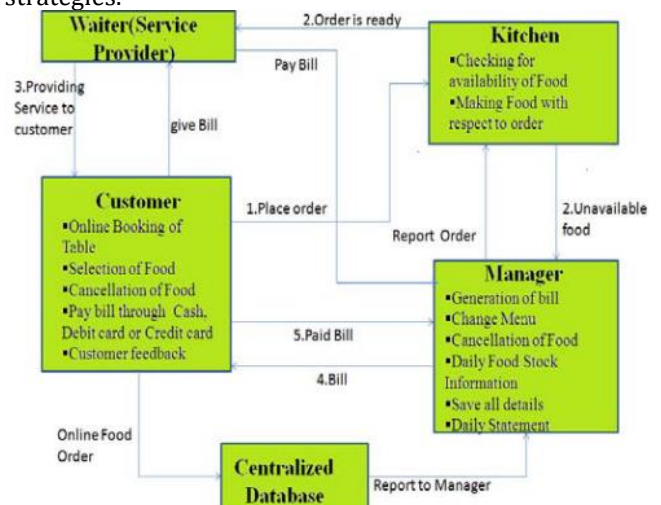


Fig III: Architectural Diagram of Customizable Ordering Food Ordering System

The "Wireless customizable food recommendation system using Apriori and K-means algorithm." is a system where we are using Apriori and k-means algorithms for analysis. The Apriori algorithm forms the core of the recommendation system, prompting customers to try popular dishes. The purpose of using k-means is to classify the customers according to their expenditure. Therefore, the proposed system provides automation along with analysis. The proposed system provides automation for Kitchen order ticket (KOT), billing and Customer Relation Management (CRM) as will be seen in the later sections of the paper.

Summary of system functionalities

A. Tablet on table

- There will be a tablet on each table.
- This will allow the customers to browse the food items as many times as they wish.
- Customer can view the suggestions for a particular menu item generated by the system.
- Customer can enter his/her details during bill payment. This helps the Restaurant owner to analyse the service and can notify the customer regarding different offers through messages or emails.
- Suggestions for Customer
- The Restaurant owner can post various combinations of menu items on tablet. This will help the customer to place the best order.

B. Attractive Presentation

- The Menu is organized in an attractive way.
- There are images of every food item which will make the view of customers more clearly about how the food will look like after delivery.
- There is an attractive use of various themes and colour schemes.

C. Modifiable Menu

- The menu can be modified by the Admin manager.
- Admin manager can add, update, delete menu items.

Algorithm K MEANS

- 1) Clusters the data into k groups where k is predefined.
- 2) Select k points at random as cluster centres.
- 3) Assign objects to their closest cluster centre according to the Euclidean distance function.
- 4) Calculate the centroid or mean of all objects in each cluster.

- 5) Repeat steps 2, 3 and 4 until the same points are assigned to each cluster in consecutive rounds.

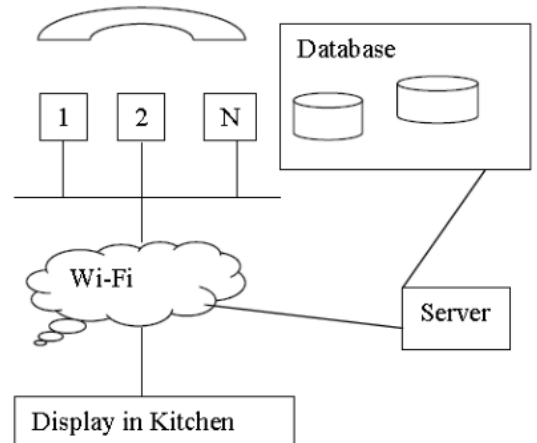


Fig IV: Architectural Diagram of Wireless Customizable Food Recommendation System Using WLAN and RFID Technology Traditional restaurants only provide passive service where waiter can only deal with customers order by asking customers need and then waits for answer. However, a high quality service system should be customer-centred, i.e, customer’s identity and therefore his/her favourite meals and expenditure records in past days can be immediately recognized by service system so as to provide customer-centric services. To achieve this goal, by Development and Implementation of an E-Restaurant for Customer-Centric Service [5], this study integrates RFID and wireless local area network (WLAN) technologies to implement an e-restaurant for customer centric service, which enables waiters to immediately identify each customer via his/her own RFID-based membership card and then actively provides customized services. The user interface of the proposed system is built with Visual C 2005 and embedded Visual C++, and the database is built on Microsoft SQL Server 2005 for server management and statistic reporting. WLAN and RFID are used to transmit the real-time information of each dining table A high quality service system should be customer-centred, i.e., customers identity and therefore his/her favourite meals and expenditure records in past days can be immediately recognized by service system so as to provide customer-centric services. To achieve this goal, we integrate RFID and wireless local area network (WLAN) technologies to implement an e-restaurant for customer-centric service, which enables waiters to immediately identify each customer via his/her own RFID-based membership card and then actively provide customized services. Also, customers can use the RFID-based membership card to pay the bill instead of using cash. Moreover, to facilitate waiters dining table service, this research develops portable service unit on personal digital assistant (PDA). By means of the PDA-based service

unit customers order can be instantly transmitted via WLAN to the kitchen for meal preparation. Also, the expenditure information can be sent to the counter for pre-processing of bill. The restaurant managers can access to the database for mastering the business status any time and making appropriate redeployment for food materials.

4. PROPOSED SYSTEM

CORMS is an integrated system that helps customers to select their favourite with a personal touch that is ,which helps the restaurant to make a personal data file about customer is referred ,And these data is used in the future to refer the same customer to repeat his visit and to use the data once analysed and make the best choice of food. It is a network based central control system that can be used in restaurant, resorts, etc. The network uses three participants, where customers and kitchen manager becomes the client participant and the manager become the server participant in the TCP/IP network system. It is a tab oriented application that replaces menu list and waiters which includes new update for restaurant management. Each table comes with a tab where customer makes the cart and sends the information to both main control system (receptionist or manager) and kitchen manager, And finally the whole data is updated and uploaded to the main server of the central database which makes the restaurant to manage the current business of the restaurant data The implementation includes client-server networking, TCP/IP protocols, wireless communication without internet, Database etc. The different modules associated within are

1. User Registration Module : Through this module the user creates a simple account, in which billing details, order details is saved and is used for future recommendation.

2. User Ordering Module: This module handles ordering of food, which will have an interface, includes dish recommendation, dish comment, top dish list, dish diet list, dish cancellation, etc. The ordered dish status is automatically added to a web server and sends to both kitchen manager and Manager

3. Kitchen Module: In this module, the chiefs will get the order details from the customer, where he will display the current status of cooking; it will also display the current table of the customer.

4. Manager Module: Manager Module will do a current updation of customer’s food, billing, where he connects the data to the server. Manager manages the order cancellations of the customer and helps the chef to cook according to that.

Advantages of proposed system:

The following are the advantages of CORMS

- Software with real time customer interaction.

- It can replace both waiter and paper based menu.
- Customers feel free to express their opinion about food.
- Restaurant owners will be able to get a chance to improve through the feedback of customers.
- Time saving process is that the cook and all other staffs works in fixed time limit.
- Up-to-date information about the ordered dish can be made available to customer.
- Dish cancellation can be done with in a specific time.
- Diet based life style can be followed with such a system.
- Restaurants become friendlier to customer.

The figure shows the architectural diagram of CORMS. It shows how each module is related to each other. Each module is connected to a database where every data is stored. The central server controls the overall working of the system. The details about the food ordering, food comments etc. are stored in the database. The user register themselves in the user registration module with their name ,contact details food diet details etc. and order their food . The ordering is a part of ordering module where the application compares the previous history and food recommended according to user’s profile. Next step is to prepare the food according to customers wish. For this the data entered by the user is send to the chef via a central server and he prepares the food. All the details about cooking is visible to the customer. The customer may cancel some dishes and the details of cancellation are updated in the server, further send to the cook. At last these details are send to the manager section to bill the expense and a hard copy is delivered to the customer at the same time soft copy is provided via a tablet application .This comes under the manager module.

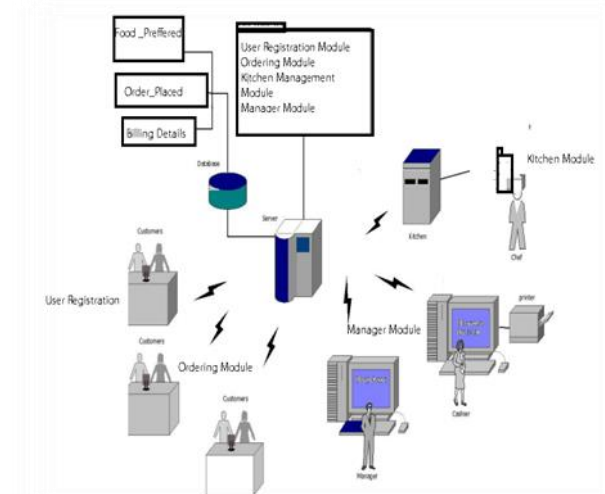


Fig V: Architectural Diagram of CORMS

5. SYSTEM REQUIREMENTS & SPECIFICATION

Here we are including the software's and hardware's used for developing the project and implementing the project.

A. Software Requirements

1. Android SDK (Software Development Kit)
2. JDK (Java Development Kit)
3. Android Studio
4. Expression Web 4.0
5. WAMP Server

B. Hardware Requirements

Android Tablet

- Version : Minimum 2
- Storage : 2 GB
- CPU : 1 MB

PC with Windows OS

- Storage : 2 GB
- CPU : 1 MB
- Android SDK is used to create an android platform in the system. JDK is the Java
- Supporting package.

ADT plug in or AVD managers are using to create emulator within the IDE.

C. Technologies Utilized

In this section we are including the technologies and software used for our project development phase.

1. Android Platform

Android is an operation system based on the Linux with Java programming interface. It provides tools, example a compiler, debugger and a device emulator as well as its on Java Virtual Machine (Dalvik Virtual Machine- DVM). Android is officially guided by the Open Handset Alliance but in reality Google leads the project. Android supports 2-D and 3-D graphics using the Open GL libraries and supports data storage in a SQLite database. Every Android applications runs in its own process and under its own user id which is generated automatically by the Android system during deployment. Therefore the application is isolated from other running applications and misbehaving applications cannot easily harm other Android applications. The Android SDK provides the tools and API's necessary to begin developing applications on the Android platform using Java programming language.

2. GitHub

GitHub is a web-based hosting service for software development projects that uses the Git revision control system. GitHub offers paid plans for private repositories, and free accounts for open source projects. As of May 2011, GitHub was most popular open source code repository site. The site provides social networking functionality such as feeds, followers and the network graph to display how developers work on their versions of a repository. GitHub also operates a paste bin style site called Gist, wikis for individual repositories, and web pages that can be edited through a Git repository.

6. SYSTEM IMPLEMENTATION

The system is implemented in two phases. The first phase of implementation includes the development of the web application, which is the interface for restaurant manager and staffs. The web page is developed using Php and Mysql is the database used here for processing the data.

Through this interface, the restaurant manager, kitchen manager, admin can login through his account and do the neediest to the customers. The various services offered to the customer by the reception manager includes reservation of table for the customer, making of bill for each customer, updating the list of food item, maintaining the user profile etc.. The admin has the power to update the food table, which stores the food related data and the user table, which stores the user data. He can also update the offer list. All these data is updated to the central server. The kitchen manager is responsible for preparing the food items that the customer order through the tab interface and he also update and return the time of progress of food to the customers.

The second phase of implementation includes the development of the tab interface, which is purely android version of the restaurant management system CORMS. This tab interface is through which the user creates his personnel account, orders his food by making his cart, displays his food etc. during the creation of the personnel account, the user can add his personal details regarding his age, address, diseases he/she have and so on. So using these details CORMS present the customer his recommendation list, which contains the food items good for his health or something according to the customer's age group.

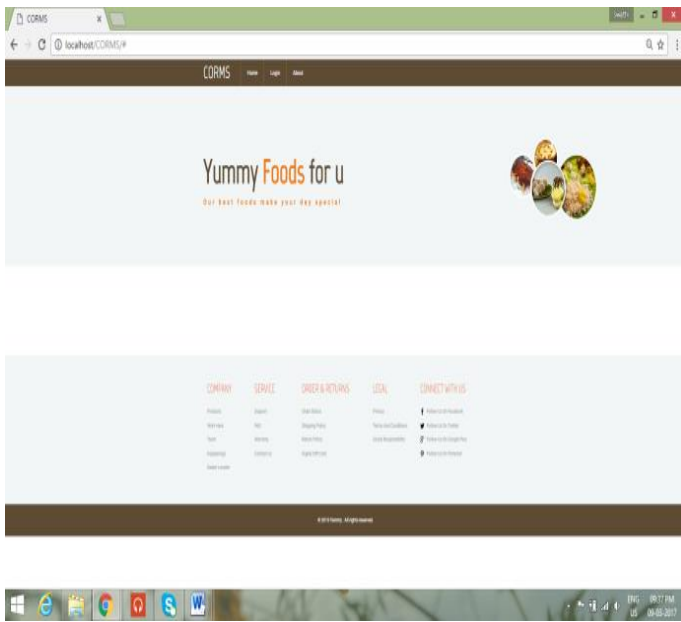


Fig VI: Screenshot of Home page of CORMS

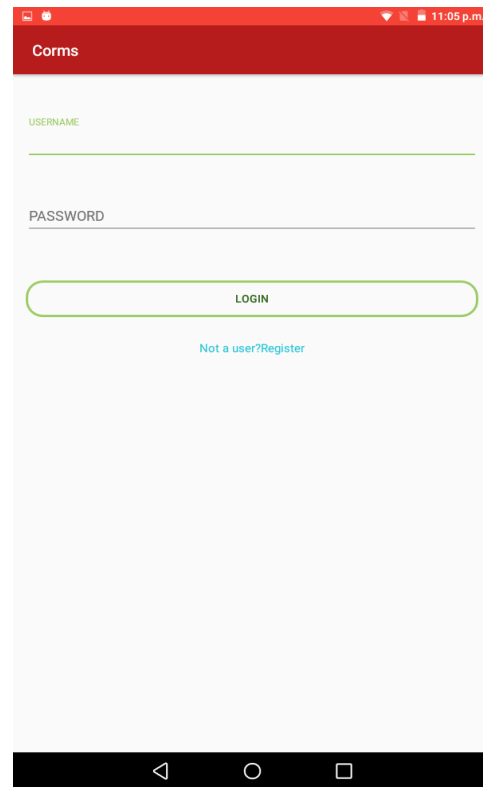


Fig VIII: Screenshot of Login page of CORMS App

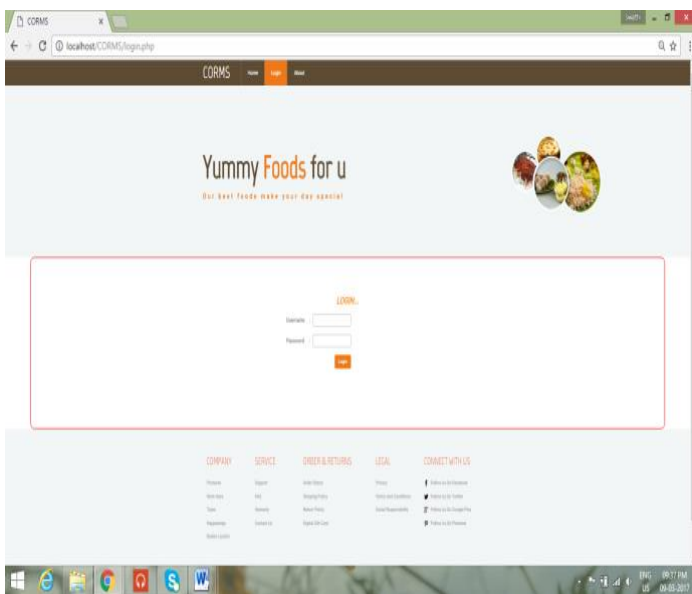


Fig VII: Screenshot of Login page of CORMS



Fig IX: Screenshot of Menu List of CORMS App

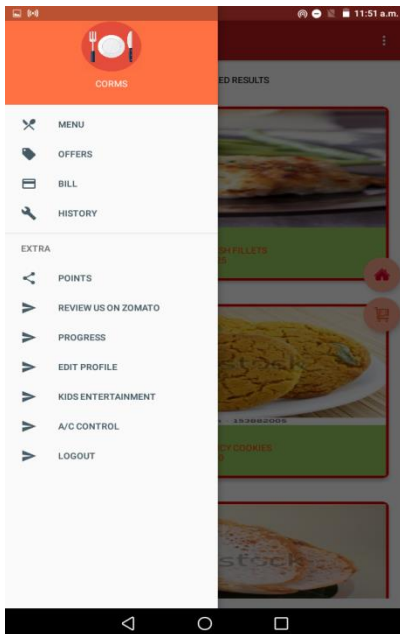


Fig X: Screenshot of Navigation bar of CORMS App

7. CONCLUSION

The urge for the digital restaurant management systems is increasing day by date. 'Customer Oriented Restaurant Management System' named as CORMS is a perfect solution for this. Through this the ease of access and flexibility of the day to day works in the restaurant is made

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simpler. The features such as dish recommendation and rating make this software user friendly. Both the management side and worker site can manage the data easily using such a system. It is very good and reliable system which can be incorporated to the chain of hotels so can easily maintained and addressed.

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