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Android Based Canteen Automation Using WIFI

Kalyani Dahake[1], A. D. Bhoi[2]

[1]Electronic and Telecommunication Department, G. H. Raisoni Institute of Engineering and Technology, Wagholi-Pune, India

[2]Professor, Electronic and Telecommunication Department, G. H. Raisoni Institute of Engineering and Technology, Wagholi-Pune, India

Abstract: ***In 21st century, business trends are changing and it is moving to digital age. People prefers digital services over their traditional counterparts such as digital banking, digital shopping, over traditional ones. Even digital services offers huge benefits to businesses such as automation in processes, increasing speed and quality of service, costs saving, better customer experience, centralize and fault-free management. In this system digital restaurant management system is proposed which offers huge benefits over traditional restaurant system. Basically we are going to implement automated restaurant management system which will help customers to place an order using tablets or mobile phones, once order is ready it will be served and bill will be generated by the system. The wireless application on mobile devices provide a means of convenience, improving efficiency and accuracy for restaurants by saving time, reducing human errors and real-time customer feedback. This initiative will help school/college/university campuses to go digital. The implementation of this system will be done using android application for Tablets and it helpful for restaurants management system.***

Keywords: Restaurant automation, Tablet Pc, Windows application, Touch Screen Smart Phone, Android application, Wi-Fi, Android mobile, Dynamic database

1. Introduction

Online business, also known as e-business or electronic commerce, refers to transaction and the activities that been performed by customers and seller over the internet. The process is quite similar with normal business, but the difference the online business is facilitated by the web-based technologies. Electronic markets have the advantages to get more profit compared to the traditional way since the peoples nowadays are more interested to do shopping online rather than going to the shop. By doing online business, the product can be marketed everywhere and it will reduce the operation cost. The examples of online business that are eBooks, food ordering, flight ticket, hotel booking and others.

Online food ordering systems are one of the most popular online businesses products. Various type of food can now shop through the internet such as fast food, bakery, vitamins and others. Customers able to view and select their favourite's food from the list add to cart, choose the delivery types, make payment and the order is complete. However, most of the existing online food ordering systems still does not have the notification and delivery services features which are important for customer satisfaction.

The aim of this system is to atomize the restaurant management system for restaurant with a selection of food, order food with small item summary with bill, alert that capable to notify on the status of order and give flexibility in delivery options to the customer.

2. Literature Review

A. Paper-Based System

The paper based system is one of the most extensively used systems worldwide. In this system paper is used for taking order, billing order and all records are stored on paper. However, this system is trouble with various problems. Some of the problems are listed as below:

- This system is papers can get easily lost or damaged.
- There is also wastage of time and paper.
- Even a small change requires the re-print of entire menu-card, also large amount of human efforts are required and human error occurs when taking order.
- This system is not work properly because it has some error and from a customer's point of view it is time consuming [2].

B. RF Based Food Ordering System

These existing system based on RFID or ZigBee protocol. In this system there is no concept of wireless router. Communication between two device i.e. master and slave unit done by 433MHZ frequency. Order is placed by slave unit using up down keys transfer towards master unit. The master unit sends acknowledgment to slave unit. For touch screen application used GLCD (Graphics Liquid Crystal Display).

The limitation of this system is having low speed of operation, can't give tag to each item in the list, the performance of the system decreases as number of node increases (Slave Unit), minimum distance covered between master and slave unit and menu not editable set as an default in this system. This system not given any customer satisfaction as well as business achievement in societies.

C. Computer Accommodated Industry System

The emergence of computers pioneered the automation of the food ordering system. After taking the order, waiter should enter that order in system where PC was set up. The respective orders taken were then displayed at a screen in the kitchen. The kitchen staff prepared the dishes accordingly and on completion notified the waiter who collected and delivered the dishes to the respective tables. The system was also informing the waiter about the availability of a dish. If a certain dish was not available then waiter was able to ask for changes or even cancel a customer's order. After serving the order, bill was generated at the cash counter as per customer order. The management had full authority to access all details of the customer which are fed into the system [2].

With the enhancement in the computer and communication technology, various systems were launched in market for the purpose of automation of the food ordering system. Some of the existing systems are mentioned below:

D. Personal Digital Assistants Based System

With new technologies and approaches being introduced to automate the food ordering process, a number of wireless systems like I-menu, FIWOS, WOS were developed. All these systems were PDA- based. The feature of PDA systems was that customers or waiters key in ordering process. Communication between the PDA‟s and server became feasible and simple due to wireless technology. But this system also had several drawbacks. PDA-based systems surpluses the restaurant expenditures as many PDA‟s were required during peak hours. PDA systems also did not provide any real time feedback from customers. Menu cards in the PDA‟s were unattractive and uninformative as it did not support images [3].

E) Limitations in PDA based Food Ordering Systems

Even though the PDA based system provided a better option to conventional food ordering system they possess some limitations:

- A number of PDAs are to be prepared to serve the number of customers during peak hours. Thus increasing the restaurant expenditures [4].
- PDAs do not provide provision to order from workplace. Thus the customer has to be physically present in restaurant to place order [4].
- It lacks real time feedback between restaurant owner and customers [4].
- Pose health problems as the PDAs are to be shared with public customers. If any customer is suffering from infectious disease like flu, then the other customers using the same PDA are exposed to similar health hazards [4].
- The user interface consist only textual information. UI has become unattractive and uninformative due to lack of images [4].

3. Proposed Work

To overcome the limitations of above systems, we propose this restaurant automation system based on android technology. It is a wireless restaurant management system with feature take order, send order, billing and other using android devices. Android devices, in the past few years, have reached the pinnacle of popularity and have revolutionized the use of mobile technology in the automation of routine task in wireless environment. Android is an open-source, Linux based operating system for mobile devices such as smart-phones and tablets. Location based services using android operating system motivated by the use of android mobile operating system in health and other applications, System present the use of android devices in business applications, namely the restaurant management system in restaurants. The promising future of android market makes the concept of writing applications for android beneficial and worthwhile.

The objectives of our proposed system are:

- To combine wireless technology and android mobile operating system to automate restaurant management system.
- The system provides end user satisfaction during waiting period, such advance feature net surfing, gamming and glamorous environment.
- The system will help to reduce the cost of labour. Reduction in labour will also lead to a considerable monetary saving.
- Allow the restaurant to operate faster (faster seating, faster order preparation, faster turnaround on food).
- Reduce employee error, thereby increasing customer happiness. This also reduces waste as when the wrong item is ordered, the food must be discarded.
- 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.

a) System Architecture

The system architecture of Touch and Order in restaurants is shown in figure 1. The architecture attempts at a full coverage of the three main modules of restaurant: the Serving area, the Kitchen, and the Admin cashier counter [5]. The main components of this system are:

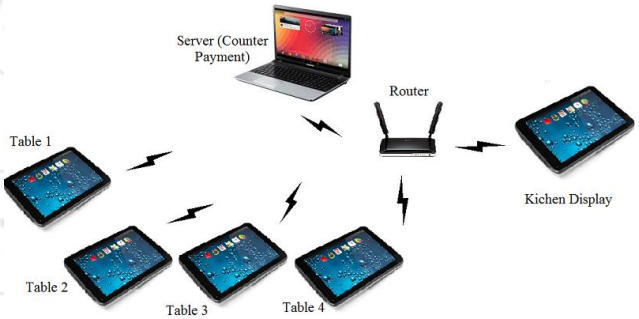

Figure 1: System Architecture

b) System Design Work Flow

The restaurant manager will have authority to log into the system and update the menu as per the availability of the dishes. The manager will also advertise the various offers of the day. After arrival of customer in restaurant, select the item from menu tablet then this order is sent to the system over wireless network. The restaurant manager or owner and the kitchen staff will receive the ordered lists from the customer tablet or system. The restaurant owner can update the order status into the system. The customer can also view the order status and he has privilege to change the order. The whole application will already be installed and kept open on the tablets on the tables. Customer who is outside the restaurant will book table in restaurant or he will give order from his smart phone.

The turn-off or shutdown option of the application will remain disabled for the customers i.e. the customers can not be able to turn off the application and do any other work like gamming, net suffering, listen music and other on the tablets in waiting period. After having the food, customer can make payment by online or by cash and enter feedback regarding to that restaurant system facility and services. Customer contact number will be saved in database for sending massage about next offers.

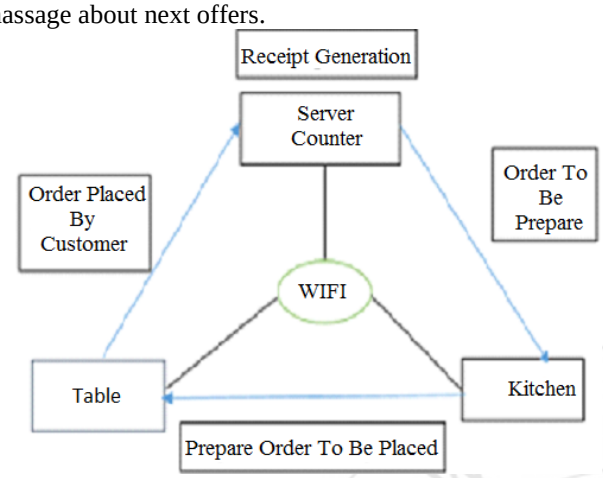

Figure 2: System Flow

This project consists of 3 main modules as follows:

I. User Tablet(Module 1)

- Tablet is especially made for the use of normal users coming in the restaurant.
- These tablets will consist of the whole menu of the restaurant. The items in the menu are non-editable for these types of the tablets.
- The item selected by touch screen tablet, after finalize order submit towards admin section or unit.
- Customer from any layer of the society should be able to handle and operate all the functions easily.

II. Manager's Tablet(Module 2)

- These desktops are especially for the use of the restaurant manager.
- The manager should be able to control the function of whole restaurant from a single desktop/tablet.
- He can access any tablet and should be able to make changes to the menu and update, add new item in the menu categories.
- Also he can change price of particular item or disable particular item which is not available at that particular time.

III. Kitchen Display(Module 3)

- These are present at the kitchen near chef so that he should be able to see what a particular has ordered.
- All the ordered items are displayed on the screen giving the table number below.
- They should be sufficiently large to be seen by chef at a reasonable distance.
- Chef should be able to notify when a particular item is ready. The technologies which are used to implement the system are:
- Android version (Smart Phone) and android version 2.2 – 6.0 for tablets is required.

The software which are used to develop application such as:

- Front end used HTML, CSS, and JavaScript with editor [2].
- Java SE 6 Programming Language id used to develop the software [2].
- Eclipse Indigo is used as a Rapid Application Development Tool (RAD) or as an Integrated Development Environment (IDE) for coding the software [2].
- JSP/SERVLET is used for Remote Database Access from the main system of the restaurant [2].
- SQLite is a light weight Database which is going to be used for database access [2].

c) System Development

It is a Digital Android based technique that gives us best result with real time feedback to customer, Attractive User interface, improve performance, easy to use and gives customer satisfaction.

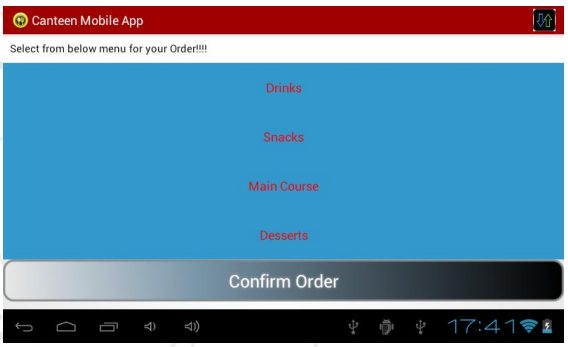

Figure 3: Screenshot of Different Category

In this result analysis Fig. 3 shows, When application is open it shows different category of menu that display on customer tablet.

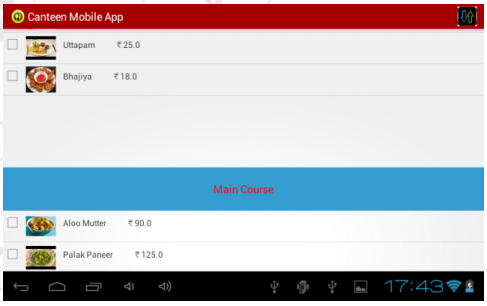

Figure 4: Screenshot of Submenus

Category of menu expandable in different submenus. Submenus contains clickable selected box image of item with name of item and price of item.

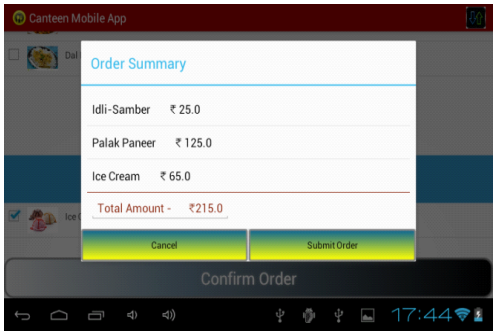

Figure 5: Order Summary

After finalize the items from submenu list Fig. 5 shows order summary with total number of item with name and price that displays on popup modal. On popup modal shows total amount count of selected item.

Customer have a two options cancel order that order it would be canceled and second option is submit order, that order will proceed to admin cash counter server as well as kitchen display.

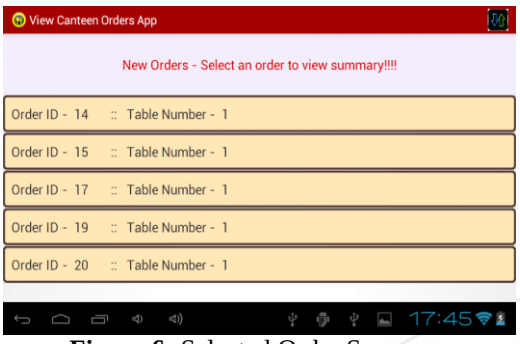

Figure 6: Selected Order Summary

Fig. 6 shows selected order summary display on kitchen tablet or android device. It summarized as Order Id with table number.

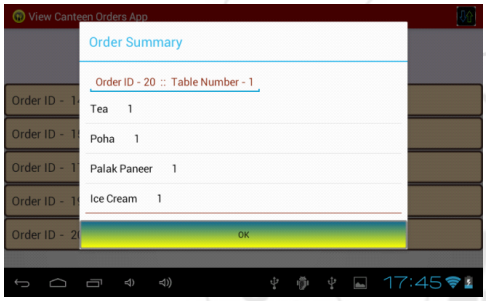

Figure 7: Order Summary in Details

When kitchen servant select particular order, it shows order summary in details with order id, table number, item with quantity. When order is making then it's time to proceed checkout. Checkout process with billing that would be done by admin or server site.

d) Result

It is a digital android based technique that gives us best result with fastest speed of operation as compare to implemented system. Memory requirement is also less, small amount of 3.8MB is required for android app. The use open source technology such as Android, Java, MySQL Html, and JavaScript reduces overall system cost. This system gives real time feedback to customer, attractive user interface, easy to use and gives business growth satisfaction.

4. Conclusion and Future Work

By implementing this system, it atomize the restaurant management system gives real time customer feedback. This system is convenient, user friendly, effective and easy thereby improving the performance of restaurants. It will also provide quality of service and customer satisfaction. Overall conclusion is that, this is a tremendous restaurant automation system for the restaurant sector, made by combining the Android and Wireless technology. This system will give the hassles service to restaurant manager and customer.

4.1 Future Work

In future, work can be done on providing provision to accept different types of payments like credit cards, debit cards, tips, etc. The system can be further extended to register and link multiple restaurants to enhance the dining experience of customers [5].

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