

Touch Based Digital Food Ordering System On Android Using Genetic Algorithm

Prof. Deeplakshmi Zingade¹, Amar Pawar², Mrunal Jadhav³, Neha Rane⁴, Bhavana Andhale⁵

Department of Computer Engineering
1,2,3,4,5 AISSMS IOIT

Abstract- Today technology is ruling our lives in almost every field. It has totally changed the traditional methods of doing daily activities, thus making life easier and effective. But it is not much evident in the food sector specifically in food ordering and serving areas in hotels, restaurants, cafes, etc. Today also most of the hotels in India use the traditional pen and paper approach for food ordering and serving which waste time and energy resulting in customer dissatisfaction and losses for the restaurants. To resolve this problem a touch based digital smart system is proposed for managing automatically the overall food ordering and serving procedure. This work aims to give fine dining experience to the customer. This paper describes the development of digital smart system using wireless technology for communication with centralized database for record and an android application for placing order with no more waiting for waiter. The goal is to save time of customers by providing facilities like digital food ordering, instant e-billing which will result in customer satisfaction and ultimately profit the restaurant. In case the user wants to make his own food virtually, it can be done through drag and drop options for the items. This automated system saves time, reduce human errors, reduce manpower and gives customer satisfaction, thus beneficial for both restaurant and customer.

Keywords- Digital Dining; machine-driven food ordering system; mobile application; Wi-Fi, Dynamic info.

I. INTRODUCTION

People's standard of living has been increased and fully changed due to technology. It has totally changed the traditional methods of doing daily activities, thus making life easier and effective. But it is not much evident in the food sector specifically in food ordering and serving areas in hotels, restaurants, cafes, etc. Even today also the restaurants use the common manual process of using waiter waiting to take order with pen and paper. In this traditional pen and paper approach the waiter writes down the order according to the customers which then is given to kitchen chefs, keeps records of it and then makes bill. This process is simple and common but may result in human errors. The waiter may mistake in noting the customer orders or may provide late order taking and late food serving which may result in customer's dissatisfaction and

restaurant losses. To solve these drawbacks in manual process an automated touch based digital smart system is proposed in this paper to manage the overall food ordering and serving process. The following section explains the development of digital smart system using wireless technology for communication with centralized database for record and an android application for placing order with no more waiting for waiter. The goal is to save time of customers by providing facilities like digital food ordering, instant e-billing thus beneficial for both restaurant and customer. This work aims to give fine dining experience to the customer. This system provides efficiency and accuracy with cost effectiveness for restaurants.

II. RELATED WORK

PEN AND PAPER BASED TRADITIONAL SYSTEM

One of the wide used food ordering schemes is the traditional paper primarily based system. During this system all records are keep on paper. The most disadvantage of this technique is papers will get easily lost. There's additionally wastage of cash, time and paper. Paper-based systems don't give any type of dynamicity. Even a small modification needs the complete menu-card to be re- written. Since massive force is needed, this technique is error-prone and is time intense from a customer's point of view.

PERSONAL DIGITAL ASISTANTS

When new technologies and approaches were being introduced to change the food ordering method variety of wireless systems like WOS, i-menu and FIWOS were developed. All these systems were PERSONAL DIGITAL ASISTANT- based. The feature of PDA systems was that customers or waiters key in ordering process. There was simple communication between the PDA's and server because of wireless technology.

But this technique also had many drawbacks. PDA-based system increased the restaurants expenditures as several PDA's were needed during peak hours. PDA systems also didn't give any real time feedback from customers. Menu cards within the

PDA's were unattractive and uninformative because it didn't support pictures.

MULTI TOUCH TECHNOLOGY

Multi touch technology is improvement to the present touch technology wherever users are allowed to manage and perform operations at the same time on the electronic visual displays using multiple fingers or gesture inputs massive displays like from the tabletop and the wall-screen are deemed to be necessities once managing multiple users sharing an equivalent display for information visual image purposes. It's reported that the social interaction is very improved among users employing a shared display and input. However the multi-touchable restaurant management systems even have certain limitations. Touch screen available in the market are of electrical phenomenon, resistive or SAW (Surface Acoustic Wave) sorts that are terribly pricey. Limitations of electrical phenomenon touch screen aren't operative ready with stylus till it's of conductive material. Another disadvantage of electrical phenomenon touch screen is that it is expensive, offers less durability thus short life is another disadvantage. The drawbacks of resistive touch screens embody its inability to support multi-touch gestures, its poor visibility in daylight and its lesser durability. A disadvantage of SAW is that the technology can't be sealed; it may be adversely affected by surface contaminants and water, creating it unsuitable for several industrial or business applications. Because of the means the technology works. It may also be prone to data noise, are often suffering from massive amounts of dirt, mud within the atmosphere.

KIOSK SYSTEM

KIOSK consists of a screen that contains the menu list. It is more advanced system which contains the textual information and images about the menu items along with prices. KIOSK screen is installed at the restaurants cash counter. Customer when visits the restaurant he has to check the menu list on the KIOSK screen. He then selects his items to be ordered. Payment is done through the KIOSK screen by payment option. His ordered list with the order number is sent to the chef in the kitchen. When the order is ready the order number is announced on the screen at the cash counter. The customer receives his order. This system has limitations too. If the restaurant is in its peak time [7] then this system ends up in forming a big queue for the KIOSK screen. It leads to inconvenience and waste of time among the customers. However, this system is good for restaurants having moderate number of customers.

COMPUTER BASED FOOD ORDERING

In this computer based food ordering system [5], when customer enters the restaurant, he has to tell the order to the cashier and make the payment. The cashier makes a bill with order number written on the bill. Then the customer has to wait at his table. The cashier sends order to the kitchen. When the order is ready, the waiter serves food to the customer at his table. This system has same limitations as above. If a number of customers increase in the restaurant then it is difficult for the cashier to take the orders from each customer and send to the kitchen.

To overcome the above problems an automated touch based digital smart system is proposed to manage the overall food ordering and serving process. The goal is to save time of customers by providing facilities like digital food ordering, instant billing which will result in customer satisfaction and ultimately profit the restaurant. This automated system saves time, reduce human errors, reduce manpower and gives customer satisfaction, thus beneficial for both restaurant and customer. It gives a fine dining experience to the customer. This system provides efficiency and accuracy with cost effectiveness for restaurants

III. PROPOSED SYSTEM

To overcome the restrictions of above system, we tend to plan this digital dining system which supports android technology. It is a wireless food ordering system using android devices. Android devices have gained huge popularity and have revolutionized the utilization of mobile technology in the automation of routine task in wireless surroundings. Android is a Linux based OS for mobile devices like smart-phones and tablets. Considering the promising way forward for android market, it's useful and worth to write applications for android that concentrate on lots of people.

The Objectives of our planned system are:

- To mix Wireless technology and android OS to modify food ordering method.
- To provide the features of creating their own food by dragging and dropping of items.
- To provide recommendations to the user for ordering the food.
- To reduce the issues in standard system by atomizing the operating of a restaurant.
- To make provisions for getting feed-back from the customers and provide the restaurant a way of review of their service.

SYSTEM ARCHITECTURE

The system design of Digital dining in restaurants is shown in Fig 1. The design covers the 3 main spaces of restaurant: the Serving area, the kitchen, and also the Cashier counter. Conceptually this technique is made using four main components:

- The android application on tablets at the tables to form orders.
- The server application on the restaurant-owner's laptop/tablet to customize menu and keep track of client records.
- The central information for restaurant-owner to store updated menu data and order details.
- Wireless property between the 3 main areas of restaurant.

This design is restricted solely to the restaurant section.

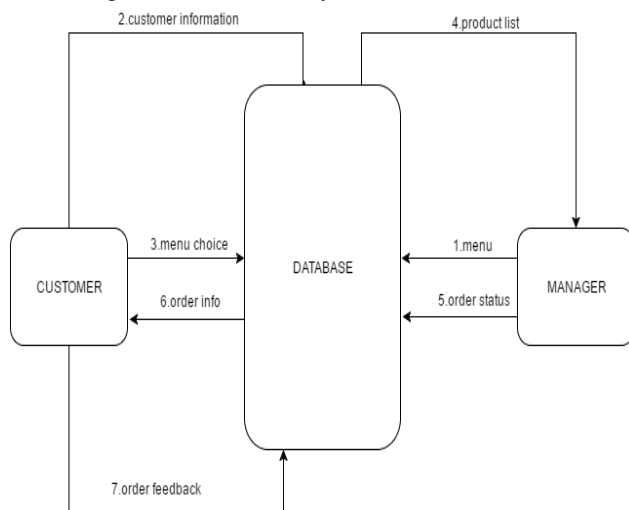


Fig System Architecture

A. Customer Module

The customer module is an android based application that provides a user friendly graphical user interface.

With the help of this module the customer can order the meal. This module contains the details of the food to be ordered which includes price of the menu, ingredients and a visual display of the food items.

Special dishes (e.g. the Chef's Choice) if any could be changed and modified easily at any time by the admin/manager and displayed. Any personalization required by the customer in the food item can easily be implemented under this module. The customer module is run on a tablet and the application to be run on it is made in Android Studio using Java programming. The customer module is connected to the server module through a wireless fidelity network.

B. Server Module

Server module is a web based module which is handled by the admin (restaurant manager) for managing the database and controlling the entire system. Here the entire details of the item ordered by the customer, time of ordering, bill amount, bill status etc. is maintained. Also the admin can anytime add and modify menus (e.g. Today's Special), their prices and advertise specific food item including special discount and combo offers. Server Module is being implemented in XAMPP server where database management is done in SQL and programming is done using PHP.

C. Kitchen Module

Kitchen module is a graphical user interface which would be used by the chef. This module will display the food item to be prepared by the chef and the orders will be in first come first serve basis. Kitchen module also provides a feedback on order completion and this information will be notified to the admin as well as the customer.

SOFTWARE DESCRIPTION

A. Android SDK

Android software development is the process by which new applications are created for the Android operating system. Applications are typically developed in java programming language exploitation the android SDK, however different development environments also are available

A software development kit that enables developers to create applications for the Android platform. The android software system development kit includes sample projects with source code, development tools, AN person, and needed libraries to create android applications.

B. XAMPP

XAMPP is an integrated web server developed by 'Apache friends' consisting of mainly Apache, MySQL, PHP and Perl programming language. Officially formally XAMPP's designers intended it to be used as a development kit to permit web designers to check their code on their machines without the necessity to access net. 'X' implies that it is a cross platform server. It supports Windows, Linux as well as Mac Operating System. Apache server will be used as a web server and MySQL will be used for database handling.

IV. ALGORITHMS

Genetic Algorithm

The idea of genetic algorithms is a search technique usually utilized in technology to search out advanced, non-obvious solutions to algorithmic optimisation and search issues. Genetic algorithms are classified as global search heuristics, and can be used in some ways, significantly in generating helpful AI agents in pc games.

for many years, games and the field of scientific theory have provided competitive, dynamic, usually unpredictable environments that create ideal test beds for procedure intelligence theories, architectures, and algorithms. Natural evolution can be modelled as a game, during which the rewards for AN organism that plays a good game of life are the propagation of its genetic material to its successors and its continued survival.[2] In natural evolution, however well an individual performs depends on its competitors and collaborators, similarly because the environment. additional simply represented, genetic algorithms are a simulation in which a population of abstract representations (called chromosomes or the genotype of the ordering, once their biological counterparts) of candidate solutions (called people, creatures, or phenotypes) to AN optimisation drawback.

Candidates are evaluated and crossbred in an attempt to come up with high quality solutions that area unit extraordinarily time overwhelming and will not be obvious to an individual's software engineer. associate organic process part is initialised with a population of arbitrarily generated entities (or human nominal instances of high quality). the method is divided into completely different generations. In every generation, the fitness of each individual within the population is evaluated, and multiple people area unit stochastically elect from the present population (based on their fitness), and changed (recombined and presumably arbitrarily mutated) to make a replacement population. The new population is then employed in consequent iteration of the algorithmic rule. The algorithmic rule terminates once either a most range of generations has been created, or a satisfactory fitness level has been reached for the population. If the algorithmic rule has terminated because of a most range of generations, a satisfactory won't essentially are obtained.

$GA(n, \chi, \mu)$

// Initialize generation 0:

$k := 0;$

$P_k :=$ a product from suggestion list;

// Evaluate P_k :

Compute products purchased(i) for each $i \in P_k$;

Do

{

// Create generation $k + 1$:

// 1. Copy: Select $(1 - \chi) \times n$ members of P_k and insert into P_{k+1} ;

// 2. Crossover: Select $\chi \times n$ members of P_k ; pair them up; produce offspring; insert the offspring into P_{k+1} ;

// 3. Mutate: Select $\mu \times n$ members of P_{k+1} ; invert a randomly-selected bit in each;

// Evaluate P_{k+1} : Compute suggestion(i) for each $i \in P_{k+1}$;

// Increment: $k := k + 1$;

}

Round Robin Scheduling

Round robin is that the programming algorithmic program utilized by the processor throughout execution of the method . round robin is meant specifically for time sharing systems . it's the same as initial come back initial serve scheduling formula but the preemption is that the additional functionality to change between the processes . a small unit of time also called time slice or quantum is set/defined . The ready queue works like circular queue .All processes during this algorithm are kept within the circular queue also referred to as prepared queue. every New method is added to the tail of the ready/circular queue .By using this algorithm , CPU makes sure, time slices are assigned to every process in equal parts and in circular order , dealing with all process without any priority

- Round Robin is the pre-emptive process scheduling algorithm.
- Each process is provided a fix time to execute, it is called a quantum.
- Once a process is executed for a given time period, it is pre-empted and other process executes for a given time period.
- Context switching is used to save states of pre-empted processes
- Wait time of each process is as follows –

V. RESULT ANALYSIS

Figure 2. shows a graph of features of the system vs. rating scale for the 3 different methods in Restaurant sector namely, the PDA System, KIOSK system, Computer Based Food Ordering and the Touch Based Digital Smart System. The user interface of Touch Based Digital Smart System is more attractive than the PDA and KIOSK systems. Comparing the processing speed of these three systems we find that speed of Touch Based Digital Smart System is good. Hence Touch Based Digital Smart System is the cheapest automation solution for the restaurant owners

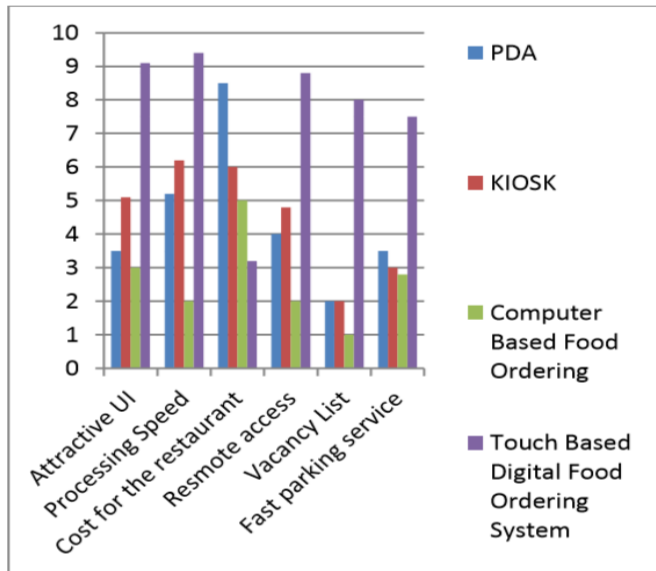


Fig 2. Comparison of Various Automated Food Ordering Techniques in Restaurant sector

VI. CONCLUSION

This project will consist of an automated food ordering system with touch screen panel on every table. The customers sitting on the table will order the food with the help of the touch screen panel and the order will be placed by the customer. As soon as the order gets confirmed it will be sent to the kitchen of the hotel and all this information will get displayed on kitchen side with the help of wireless RF transmitter at the customer table side and wireless RF receiver at the kitchen side. The orders will be sent directly to the kitchen without waiting for a waiter to take the order. The user can play games till the order is being placed on the table. The billing will be done at the same time and amount will be displayed on the customers touch screen panel. The customer can pay the bill by cash or by credit/debit card.

This system is interactive, effective, convenient and thus meant for enhancing the performance for customer satisfaction. This system can be further extended by registering

and linking multiple restaurants to enhance the dining experience of the customer.

APPLICATIONS

1. Used in hotels and restaurants
2. Pizza hut
3. Dominos
4. Food ordering system

FUTURE SCOPE

In future more functionalities like lodge management, event management in all overall management of the restaurant by using this digital smart system same can be implemented. It can also be implemented to order online from outside the restaurant by making such an application that can be used by the customers to place orders from their homes

ACKNOWLEDGMENT

We would like to thank Miss. D. S. Zingade for the valuable guidance she provided for completing this paper and the feedback she provided improved the scope of this paper.

REFERENCES

- [1] Kusuma Shalini, N.Sukumar, M.Tech, Telangana, India, ELECTRONIC MENU CARD FOR RESTAURANTS, on 2 OCT 2014
- [2] Bhaskar Kumar Mishra, Bhawani Singh Choudhary, Tanmay Bakshi, Touch Based Digital Ordering System on Android using GSM and Bluetooth for Restaurants on 2015
- [3] Tan-Hsu Tan, Ching-Su Chang, and Yung-Fu Chen, Developing an Intelligent e-Restaurant With a Menu Recommender for Customer-Centric Service, Sep 2015.
- [4] Varsha Chavan, Priya Jadhav, Snehal Korade and Priyanka Teli, Implementing Customizable Online Food Ordering System Using Web Based Application, on 4, April 2015.
- [5] Kirti Bhandge, Tejas Shinde, Dheeraj Ingale, Neeraj Solanki, Reshma Totare, A Proposed System for Touchpad Based Food Ordering System Using Android Application, on Jan. - Mar. 2015
- [6] Richa Garg* , Saurabh mittal GGITC, Ambala GGGI, Ambala India :Optimization by Genetic Algorithm, Volume 4, Issue 4, April 2014
- [7] Sukumar Babu , Neelima Priyanka Sunil Kumar . Efficient Round Robin CPU Scheduling Algorithm, Volume 4, Issue 9 (November 2012), PP. 36-42