An Efficient Digital Ordering System for Restaurant

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Abstract: When customers enter the restaurant, customers often must wait for the waiter when it comes to ordering food. In the conventional method, if the restaurant is too crowded, they will be exhausted, anxious about the service. This system perfects the solution, "An Efficient Digital Ordering System for Restaurant" provides cost & time efficiency benefits easy for management and the customer. Each table contains the QR Code stand where customer needs to scan the QR Code using their mobile phones and they can view the menu. In manger side we have created web application which is connected to the router to manage whole functionalities of the restaurant. The system works on an intranet environment which provides additional security. With our restaurant ordering system, it helps us adapt the digital era and restaurant activities more effectively and efficiently.

Keywords: Restaurant Management, Dynamic Database, QR code, Android and iOS phones, Digital Ordering.

1. Introduction

In today's world data handling and processing by computer aided tools is increasing day by day. The rapid growth of wireless telecommunication and the network lead industries that are gaining more customers every-day. Providing fast services to the customers within less time and managing whole functionalities of the restaurants is the aim of the computerized system. In the restaurant sector, modern wireless device such Personal Digital Assistant (PDA) has been adopted into the restaurant system to replace the conventional way of taking orders using pen and paper. However, the PDA based food ordering system has known limitations such as the requirement of training of attendants, need of having attendants to operate, the inefficiency during the peak hours and the multi-touchable restaurant management system has limitations such as the touch screens used are mostly of capacitive type or resistive type which are costly.

Restaurants are one of the favorite premises, with no regards to the actual reason for visiting restaurants. There are many reasons leading to the feeling of dissatisfaction in the customers including being entertained late, when the restaurant is unable to provide fast services in terms of taking order by the waiter and meal serving, by making the advancement in the technologies of communication the issue of being delayed in providing the service could be solved. In accordance, this study initiates an integrated and networked system, where the focus is on its ability to solve the above described limitations, this system helps restaurants to get optimized and control over the restaurants. Hence, by introducing a web page and an intranet-based system containing menu which helps restaurants to do all the functionalities more accurately and in faster way. This reduces manual work and efficiency of the restaurant.

In definition, an integrated system is developed to assist restaurant management from enabling customers to immediately make orders on their own selves to their stepping out of the system. This will make to the customer's full content and satisfaction. The main goal is to maintain the restaurant's function in an effective and accurate manner and also reducing manual errors. This system helps to maintain customer details and day-to-day total sale of day records in system.

2. Literature review

A. Traditional paper-based system

In the restaurant's, the traditional menu cards are paper based. Waiters normally use paper & pen to write the order of customers. The records are stored on paper. There is wastage of time, money, and paper. As they have used paper-based menu cards, if they wish to make any changes in that menu card, they must print and get the updated menu card as the earlier was of no use. As it will require re-printing of all the menu cards. And for the restaurant management, it isn't rational to re-print the menu card for minor updating. There is no power to dynamically make any changes in the menu card. From the customer's point of view, this system is time consuming. The customer doesn't get a good service as he needs to call the waiter several times till he notices, and this leads to dissatisfaction for the customer. As you have not entertained correctly, this creates confusion between the customer and the waiter as he notes down the order and could serve the customer with the wrong dish or another customer's dish.

B. Introduction of digitization in restaurant industry

1) Personal Digital Assistants (PDA)

In the restaurant sector, Modern wireless device such as Personal Digital Assistant (PDA) has been adopted into restaurant system to replace the conventional way of taking orders using pen and paper. However, the PDA-based food ordering system has known limitations such as the requirement

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392

of training of attendants, the need of having attendants to operate, the inefficiency during peak hours and small screen size and the Multi-touchable restaurant Management System has limitations such as touch screens which are costly. But in this sector hospitality is more important.

2) Point-of-Sale System (POS):

A point of sale system is a combination of hardware and software designed to streamline your business operation in the case of restaurant industry, at the point of order. If you implemented correctly, a POS system can help to track the expenditure of everything like from food costs and profit margins to labor costs and your most loyal customers.

The introduction of basic proposed system and consequent developments are mentioned here:

Mayur D. Jakhete et al. [1] proposed that Today's era is said to be the world of technology. Many of the restaurant hospitality has taken an initiative to experience evolving restaurant technologies such as PDA, wireless lans, several android applications, expensive multi-touch screens etc. to enhance dining experience. Here in this paper, we have mentioned some of the limitation for the conventional paper-based technology like PDA food ordering system has also proposed the cheaper touch-based restaurant management system using android phones or tablet as a solution. The system comprises of a Smartphone/tablet at the customer table which is an Android application where all the menu details are mention. In this, the customer tablet and the kitchen display screen are connected with each other through Wi-Fi. The orders which have been placed by the customer will be moved to the kitchen module section. Here, the android application is user friendly which is cost efficient and improves consistency for restaurants by reducing human errors and provides customer feedback feature in it. [1]

Parag Bhingre et al. [2] proposed that Technology's influence on the restaurant industry over the years has caused traditional dining experience to steadily evolve. In existing systems, patrons can only order food online. By using this research work, we direct to design and execute an Android Application where customer can place an order and do the reservation for the desired table he wants. Additionally, as per choice of diet conscious customers, they can customize their menu. Android platform being one of the most widely used operating systems has been chosen to build this application. [2]

Sushmita Sarkar et al. [3] proposed that the growing number of restaurants and population of restaurant-goers have emphasized the need to enhance the working of hospitality industry. This paperwork directs at exceeding the quality of services of the restaurant industry in term of conventional technologies. Elaborated research on the summation and the use of several restaurant hospitality industries have shown that many of the wireless android application, webpage, POS technologies have already been in terms of food ordering system. The system used here is serviceability for the database where all the valid information is carried from the centralized

database. The device such as tablet/mobile phones on the customer table contains all the restaurant's menu details and it is an Android application. All the components of the system such as customer tablet, kitchen's monitor, and the cashier's desktop are connected through wi-fi. The application overcomes all the limitations of the earlier food ordering system, it is much cheaper and a onetime process while enabling. [3]

Ashutosh Bhargave et al. [4] proposed that the web services technology is widely used to integrate heterogeneous systems and develop new applications. The application of integration of hotel management systems by web services technology is presented. The automated food ordering system in restaurants accommodates many of the restaurant hospitality industry technologies such as PDA based food ordering system, wireless android applications, touch based food ordering system, POS technologies etc. This integration solution can add or expand hotel software system in any size of hotel chains environment. [4]

Shweta Shashikant Tanpure et al. [5] proposed that some of the early efforts have been made to combine and utilize both technologies in advancement of hospitality industry. The research work here directs to digitize food ordering system in restaurants and also exceeds the dining experience. In this paper, we have mentioned and discussed about the execution of digital ordering system with customer feedback (AOS-RTF) services for the restaurant. This system implements wireless data access to servers. Customer's phone contains an android application where all the menu details will be given. The place order details of the customer will be updated in the database and meanwhile sent to the kitchen's monitor and the cashier's desktop. The manager can easily update all the restaurant menu. The application provides quality of services of the system, exceeds cost and time efficiency reduces errors and has also customer feedback feature in it. It overcomes all the drawbacks of the existing food ordering systems and is much more efficient technology. [5]

Soon Nyean Cheong el at. [6] proposed that various efforts have been taken by restaurants to initiate restaurant industry technologies to enhance dining experience. Here in this paper, we have noted some of the drawbacks of the existing paper-based technologies and proposed automated food ordering technologies. The software contains an attractive interface of the menu where customer can place an order itself. The placed orders of the customers will be updated to the database and sent to the manager's desktop and the kitchen's monitor. This system could be used to dynamically operate all the functionalities of the system from updation of the menu to the billing portion. The system was built using Adobe Flash ActionScript 3, PHP scripting and MySQL database on top of Zend Framework. [6]

Mohd Helmy Abd Wahab et al. [7] proposed that the paper presents the development of smart order system in restaurant. The development of the system is concerned to integrate and

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393

give network system rather than the standalone system which indicates the use of networking capabilities can give useful data communication in addition to better the management in restaurant. The system development life cycle is followed by the development of the system strictly. Normally, the system is divided into 2 main components which is hardware design that are not elaborate here and system development which is main goals of the paper. The results indicate that the system works fine with the data communication works as planned. [7]

Arman Ahmed et al. [8] proposed that the application helps the restaurant to do all functionalities more accurately and faster way. Food Ordering System reduces manual works and improve efficiency of restaurant. They have been to many restaurants, to understand their process of maintaining database and the level of efficiency they have in their system and drawbacks of their existing systems. After visiting many such centers and stores they thought of developing an application which will overcome the drawbacks of the existing systems. [8]

Paresh. R. Bora et at. [9], proposed that the rampant growth of mobile and wireless technology is making a large impact in our lives. Nowadays people are hoping for an application that satisfies their demands even more comprehensibly. Many restaurants industries are expecting for any mobile application that enhances the ordering experience as well as that increase the profit. This paper presents an easy and more suitable way of communicating to feel a wireless food ordering system. [9]

Resham Shinde et al. [10] proposed that the increase in the number of restaurants and population of restaurant-goers, a need to enhance the working of hospitality industry is felt. In this paper, we have discussed the enhancement of the restaurant hospitality industry where technologies have emerged rapidly such as PDA, wireless based ordering system, touch based technology etc. The customer can itself place an order where all the menu is given and later it gets updated to the database and sent to the manager where it prints a KOT for the staff. These components are connected through WIFI. The system provides high efficiency services, reduces manual errors and is rational one-time investment for the restaurants. [10]

3. Proposed work

In last few years many restaurants have opted for various types of services for optimizing the work of a restaurant which has increased the competition in the hospitality industry. With an upsurge in Information and Communication Technology, many industries use web as a medium of exchanging the information. A wireless application could be designed and implemented in any medium or large scale restaurant to overcome the problems faced by the restaurants. This an web page appears by scanning QR Code which has user-friendly interface having dynamic menu card and can place order through login by Google API and the server sends the customer's request to the manager's desktop and then it is further forwarded via KOT to the kitchen staff or by an chef's interface. After having meal, the bill details are on the customer's screen and manager's desktop, the customer could pay through any payment mode.

This system improves efficiency and accuracy for restaurants by saving time, reducing manual errors and provides customer feedback for better improvement. The drawbacks in earlier food ordering systems is successfully overcomes by this system and is less expensive as it requires a onetime investment for gadgets. The work described is possible to have a digital restaurant ordering system for handling the issues occurred in a restaurant.

The Objectives of our proposed system are:

The main objective of our proposed system is to ensure the customer satisfaction by accelerating the service, ordering process and management system. Implementing this system gives a cost-efficient opportunity to give customers a personalized service experience from dining to ordering and making provisions for obtaining feedback from the customers and provide the review of their service and food served to the restaurant. This project aims to apply an electronic format, handling the substitute of a customer's order, process of transferring order to the kitchen for preparation till the end of the meal.

This system allows the restaurant to make it smart restaurant system and function it in an effective and accurate manner by using following factors:

- Increasing customer's comfortability.
- Increasing efficiency and improving services provided to the customers.
- Reduce manual errors made by waiters.
- Encourage restaurateur to use modern technology system.
- To automate food ordering system at restaurant that can eliminate or minimize the current problems in conventional system.
- Providing and complete integrated system to help optimize service and management.

A. System architecture

In this paper, we have below mentioned an architecture which describes the complete understanding about how does it work.

Firstly, the customer will get connected to the intranet. Here, Customer can scan the QR Code by using mobile QR scanner or an online QR scanner. After scanning, the browser needs to send HTTP request to the server and the server responds to the customer's request and the browser displays the menu card. After that, we are using APIs such as Google API, Facebook etc. to login for the external services. The reason we have done here because customer's details are a great way to prompt with the customer's by giving them rewards, offers and discounts the next time they dine in.

After login, the customer's session starts. The customer selects the desired food from the webpage (menu card) to place an order. The activities which will be done by the customer will be carried by the cache memory where all the order status activities can be viewed. It will pass to the manager's desktop.

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394

The manager reports the order to the kitchen by using two provisions. Either by using the printed KOT (Kitchen Order Ticket) where the order detail of the particular order will be mentioned or the chef's desktop, which will be connected to the local server. In this, two sides of display for the waiter and for kitchen staff will be visible. If the food gets ready, the buzzer gets green. Here, the manager will regularly update on the first come first server basis so that it proves to the customer's satisfaction.

After having the food, customer requests for the bill which will go the database where it will check the complete order and will display on the manager's desktop as well. The bill is generated on customer's mobile phone and the direct response of bill is displayed to the customer and then the manager prints the bill. The payment can be done by any mode transaction, either by giving the cash to the waiter or using online mode such as Google pay, PhonePe etc. The moment customer pays the bill, the session gets end for that customer and cookies will be saved.
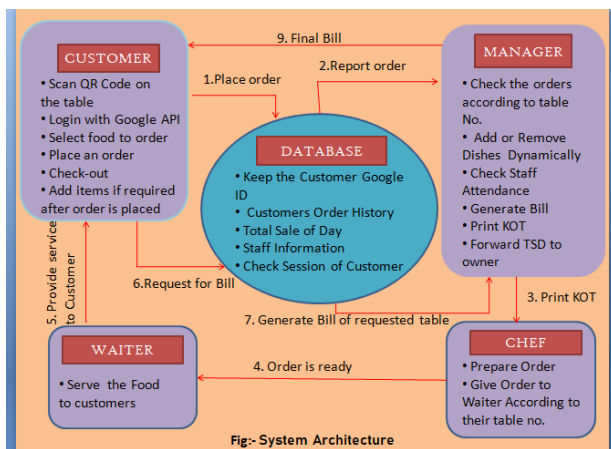

Fig. 1. System architecture

B. System design

This project consists of three modules as follows:

1) *Customer Module (Module 1)*
   - Customer scans the QR Code on the table and an attractive interface of the different platters in different sections (i.e. Appetizers, Breads, Main-Course, Dessert, Beverages, etc.) will be available for them in the menu.
   - Customers can search a particular food item according to name, category, etc.
   - There are images of every food item which will make the view of the customer more clear about how the food will look along with the respective price.
   - The description of the dishes will give a brief idea of how the food tastes, color, estimated cooking time, they could also add their favorites desire.
   - Customers sign-in/register themselves through their Google API Login for confirmation of their order by entering valid credentials, this ensures correct

placement of orders through visual confirmation which increases accuracy.
   - If the customer wishes to replace the ordered food, remove the ordered food or to add new dish they could be able to do it efficiently by adding or removing it from the cart.
   - The Customers can enter the feedback regarding restaurant system, services and food served and. This will be displayed to the manager's desktop, this helps manager to analyze the service and make necessary changes if needed.
   - Customers will be enabled within an INTRANET connectivity where they can enjoy free wi-fi.

2) *Manager Module (Module 2)*
   - The manager controls the functioning of the whole restaurant from the manager's desktop.
   - The manager has the authority to make changes in the menu hence, the menu is dynamically designed.
   - The manager can do periodic updates by changing the prices of the particular item, adding or removing particular item as per availability or designing their own customized menu.
   - The manager will receive the ordered lists and bill details from the customers with their respective table no's. The ordered list will be sent to the kitchen chef via KOT for food preparation.
   - The manager could send the details of Total sale of the day to the owner and check the inventories/supplies available and purchases to be made in the restaurant this helps to optimize the working speed.
   - The best-selling dishes and Today's specialty platters is mentioned /pinned in the menu by the manger so the customers could take a better view of selection of order.
   - Any offers available for a specific duration by the restaurant can easily be conveyed to the customers through mails or messages.
   - The restaurant staff attendance must be maintained by the manager so, staff attendance feature has been added to this module to evaluate the staff's performance and regularity.

3) *Chef Module (Module 3)*
   - Kitchen Chef will check the KOT received from the manager's desktop with has the ordered list with their respective table no's which will give him the idea of quantity, required taste, etc.
   - The displays are set up in the kitchen near chef so that he is able to view the orders requested from the customers and table no's will also displayed punctually on the chef's interface.
   - The display will allow the chef to update the estimated time of completion of each order once he starts preparing it.
   - Chef will distribute the order among his kitchen staff for preparation of the food.

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395

- Chef could notify and close an order when a particular item is ready.

Fig. 2. System design

C. Advantages

Our project has this facility where customer just needs to scan the QR code and later they can order food of their favorite cuisine quite easily. The system will totally work on intranet and that's the only reason no outside customer can malpractice. In general, system have come separately when it comes to food ordering and billing, but this system provides all the features from ordering food to billing under one platform. We have developed our project with respect to both hotel management as well as customers. And most important thing is that our project has been developed on the most efficient and secured language i.e. Django.

4. Conclusion

In this paper, we present an Efficient Digital Ordering System for Restaurant which uses QR Code stand in every customer's table where the customer will be making food orders from the table via their phones. This system is convenient, effective and easy thereby improving the performance of restaurant's staff and providing customer satisfaction. This system would serve to the needs of a variety of customers, attract potential customers and ultimately improve a restaurant's business. It maintains customer's database and improve the food ordering services in Restaurants.

References

[1] Mayur D. Jakhete, Piyush C. Mankar, "Implementation of Smart Restaurant with e-menu Card", International Journal of Computer Applications, Volume 119, No. 21, June 2015.
[2] Priya Jadhav, Priyanka Teli, Snehal Korade, Varsha Chavan, "Implementing Digital Restaurants and Inter-Restaurant Navigation Using Smart Phones", International Journal of Computer Science and Mobile Computing, Vol. 4 Issue 2, February 2015.
[3] Parag Bhingre, Taruni Boddu, Aboli Chandak, Dhiraj Devkar, Prof. Shiv Prasad Patil, "Digital Dining System using Android", International Journal of Engineering Research and General Science, Volume 3, Issue 2, March-April 2015.
[4] Sushmita Sarkar, Resham Shinde, Priyanka Thakare, Neha Dhomne, Ketki Bhakare, "Integration of Touch Technology in Restaurants using Android", International Journal of Computer Science and Mobile Computing, Vol. 3, Issue. 2, February 2014.
[5] Ashutosh Bhargave, Niranjan Jadhav, Apurva Joshi, Prachi Oke, Prof. Mr. S. R Lahane, "Digital Ordering System for Restaurant using Android", in International Journal of Scientific and Research Publications, Volume 3, Issue 4, April 2013.
[6] Shweta Shashikant Tanpure, Priyanka R. Shidankar, Madhura M. Joshi, "Automated Food Ordering System with Real-Time Customer Feedback", International Journal of Advanced Research in Computer Science and Software Engineering, Volume 3, Issue 2, February 2013.
[7] V. Swapna, M. Firdouse Ali Khan, "Design and Implementation of Ordering System for Restaurants", in International Journal of Engineering Research & Technology, Vol. 1, Issue 10, December 2012.
[8] Soon Nyean Cheong, Wei Wing Chiew, Wen Jiun Yap, "Design and Development of Multi-Touchable E-Restaurant Management System", in 2010 International Conference on Science and Social Research (CSSR 2010), December 5-7, 2010, Kuala Lumpur, Malaysia.
[9] M.H.A. Wahab, H.A. Kadir, N. Ahmad, A.A. Mutalib and M.F.M. Mohsin, "Implementation of network-based smart order system", International symposium on Information Technology, 2010.
[10] Mohd Helmy Abd Wahab, Herdawatie Abdul Kadir, Nadiah Ahmad, Ariffin Abdul Mutalib, Mohd Farhan Mohd Mohsin, "Implementation of Network-based Smart Order System", University Tun Hussein Onn Malaysia {Helmy} 2008.