Cloud and Real Time SmartRestro System

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ABSTRACT

In this paper, we are introducing an interactive and efficient system which brings automation in tradition restaurant system in terms of table booking, menu selection, ordering and billing. This system is implemented via KIOSK (Interactive embedded system) and android architecture. KIOSK provides convenient approach for food selection, food ordering and payment system through user friendly graphics touch screen interface. Android based application provide table booking function irrespective of the consumer's geographical location.

Keyword : - *Restaurant Automation System, Android based Restaurant system, KIOSK.*

1. INTRODUCTION

We are introducing automation in restaurant system as there is increase in availability of IoT(Internet of Things), high performance mobile handsets and cloud technology. Almost everywhere restaurants are important factor for social lifestyle as well as economy. Hence it is important to bring automation which replaces traditional hectic pen and paper system in restaurant business. Restaurant automation is done through KIOSK, a standalone machine and an android devices supporting communication. This system is responsible for removing all human errors in the functionalities provided by restaurants and also proposes less time consuming efficient way for daily operations of restaurants. System consists of various functions like Restaurant locator, table booking, online menu access, online food ordering, billing management as well as nutritional information regarding food items. Table booking as well as Restaurant location are provided via android based applications in which application user can locate restaurants and book tables as per his convenience. Restaurant menu can be accessed online using android application as well as KIOSK system , it also reflects changes in food items committed by manager in real time. In food ordering system, customer can order food items by accessing menu card and order confirmation is done at manager's panel and forwarded to cooks panel. Billing management system takes care of all transactions of restaurants and store data in restaurants database automatically. Payment gateways for customers are provided by billing management system of restaurant.

2. FUTURE SCOPE

One of the lucrative businesses is restaurant, the growth of global restaurant industries is 6.2% valued at 2,737 billion dollars and according to economists   it will be grown at value of 3,805 billion dollars by 2019. Hence restaurant seems very profitable and any automation in restaurant management will lead to higher profits.

3. LITERATURE SURVEY

Automation plays a very important role in every field of human life. This paper contains the proposal of a fully automated menu ordering system in which the paper based menu is replaced by a user friendly Touch screen based menu card. [1]. Furthermore, it was indicated that the information on the menu and the innovative technology in restaurant have positive impact on customer satisfaction. Nevertheless, service from waiting staff did not have significant impact to customer satisfaction. [2]. The proposed paper tries to analyze the various existing systems and

determine the drawbacks of each to overcome them in the proposed system. This system improves efficiency and accuracy for restaurants by saving time, eliminating human errors, getting customers feedback.[3]. Labour rates are increasing every now and then and it is difficult to find employees in the middle of the highway, hence to solve this problem we plan to design a "Self Served Fast Food System."[4]. In this paper we explore the notion of a secure kiosk, a trusted computing platform built using off-the-shelf components. We demonstrate how kiosks serve as convenient primitives when designing secure computing protocols, as they allow for a very prescribed set of assumptions to be made about a system.[5]. Implementing this system gives a cost-efficient opportunity to give your customers a personalized service experience where they are in control choosing what they want, when they want it – from dining to ordering to payment and feedback.[6]. This self service fast food restaurant will be equipped with a user friendly touch screen, and software for completing the process at the backend. For this system there will be a system administrator who will have the rights to enter the menu with their current prevailing prices. He/she can enter anytime in the system by a secured system password to change the menu contents by adding or deleting an item or changing its price. The model used to develop this system is Incremental Model. The languages used are PHP on the front end and MySQL in the backend. Furthermore this system will be embedded on a Raspberry Pi, which is a SoC (System on a Chip) device which would be integrated with a touch screen device to constitute a kiosk.[7].

4. OVERVIEW OF RESTAURANT ORDERING SYSTEM

4.1. System Design

The design of the smart restaurant system is split into three main phases. Customer has to go through these phases in order to accomplish the automation .Three phases are as follows:

*a) Phase 1***:** Deals with restaurant location and table booking .This is the initial phase of the restaurant management system and this phase is especially designed for android application user.

b) Phase 2: Deals with interactive menu access and ordering system which are performed either through android application or through KIOSK. This is usually a initial phase for the customers who are using KIOSK based restaurant automation system .

c) Phase 3: It deals with Billing management system. This phase occurs generally after customers done with its orders and finished eating. Payment gateways are provided to the customers in order to pay their bills and all these transaction information is stored in restaurant database system.

4.2. System Architecture

The Architecture of restaurant management system as shown in Fig. 1. The Architecture consists of an android device and a standalone interactive embedded system known as KIOSK for users to access the system. It is somewhat similar to client –server architecture where the manager/admin manipulates the database and sends data to cook panel whereas the client/customer accesses the services. System comprises of local database at restaurant site and the same database available globally through WEB services and CLOUD. The Android Devices has access to cloud Web Server of restaurant and data can be written into database by android application users. The Confirmation details are provided to customers once managers verifies the data written by users on same android devices. Whereas in restaurant the KIOSK is used for same purposes only the difference is KIOSK is connected to local database.
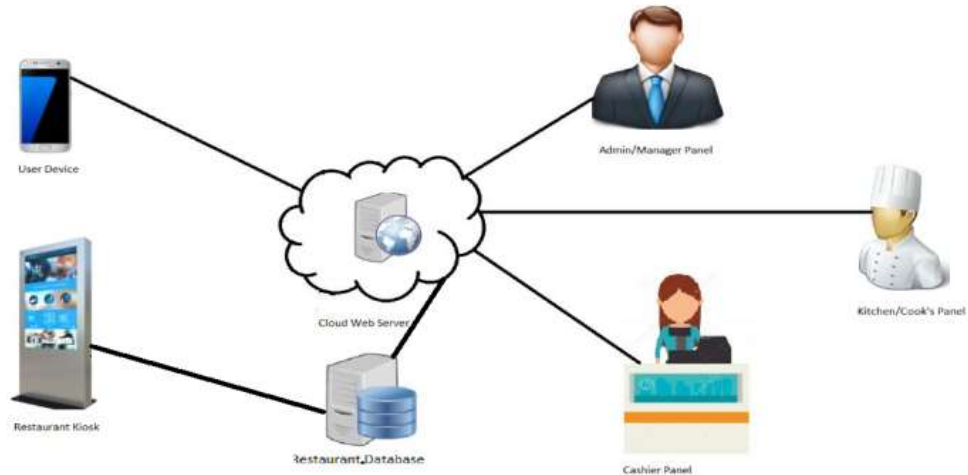
Fig.1: System Architecture

Manager act as a admin which handles the booked orders done either through online or local devices, also adds or deletes the food items in the database .Users verified orders are directly forwarded to cooks panel which is generally a large LCD panel provides basic functionality via Raspberry Pi.Cashier panel is generally for accountant which keeps track of transactions regarding restaurants. Manager, cook and cashier has access to cloud web server of restaurant. Changes committed on local database by KIOSK are reflected on cloud web server immediately. The customer gives the order as his choice and sends the request to the manager .The Manager confirms the request and provides to the cook panel for processing .The cook then process on the order and gives the ready confirmation message to the manager. Finally the Order gets delivered to the client. The client then deals with the billing.
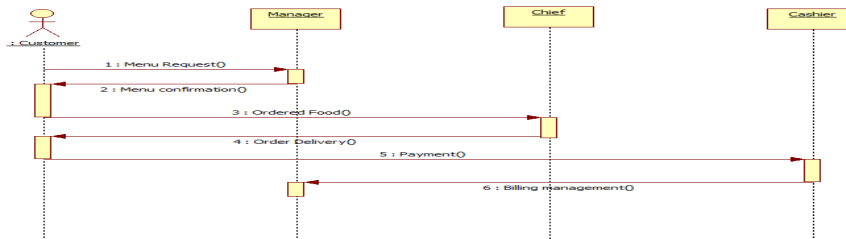

Fig.2: Sequence Diagram

4.3. System Implementation

a) **Android Application:**

Android application is implemented using android studio 2.3 SDK package of version 27 is used. Application is compatible with android 4.0+ OS versions.

b) **KIOSK System:**

It is a standalone machine. Domain Specific Languages are used for development of KIOSK. It consists of Raspberry Pi as a core and GLCD display Raspberry Pi is mainly used as a single board   computer to be interface to the touch-screen and is responsible for writing user order into MySQL database. Touch-screen GLCD display interface with Raspberry Pi using HDMI interface. It is a resistive type of touch panel, dimension is (121*78) and it has HDMI interface for displaying where no I/O required. It consumes low power because of back light control.

c) **MySQL Database:**

MySQL is most popular open source SQL database management system. A relational database which stores data in separate tables and adds speed and flexibility. It is heart of the system where orders send from costumer table gets stored and it is installed in the system at the billing counter

d) Manager Panel:

Manager has its own panel which can only be   accessible by manager of restaurant. Manager panel acts as a admin of a system and has ability of manipulating the database from this panel which is implemented by PHP scripting. The PHP scripting is responsible for adding/updating/deleting data entries in MySQL database.
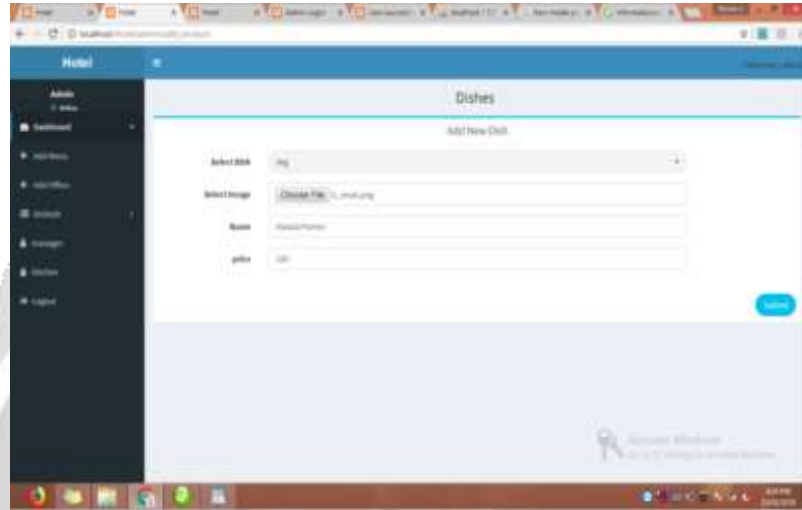
Fig.3 (a): Manager Panel

Fig. 3(b): Manager Panel

e) Kitchen Panel:

Kitchen Panel is generally used for displaying the orders from customers to cook on Kitchen display. Cook is able to delete completed orders using delete button provided with respected order and manager can see above changes on his panel.

Fig 4: Kitchen Panel

Manger verifies and sends the order to kitchen panel by clicking on 'Go to Kitchen' option.
'In process' status indicates that the orders is in preparation status by cook.
Once the order is prepared by cook , he informs to manager about the order completion and respected order details are updated at managers panel as 'Order Ready' status.

f) Billing Panel:
Billing panel is implemented using PHP scripting language. Orders selected by customers are updated in real time and total amount to pay is visible to customer and copy of bill gets generated along with bill number after user submits its order in pdf format.

Fig 5(a): Billing Panel

Fig 5(b): Billing Panel

4. CONCLUSIONS

We present an automated food ordering system with-real time customer feedback. This system is convenient, effective and easy thereby improving the performance of restaurant's staff. It will also provide quality of service and customer satisfaction. Overall conclusion is that, this is a smart food ordering system for the restaurant sector, made by combining the Android and Wireless technology. In the next phase, we will be working on providing provisions to customers for reservation in the hotel from their homes as well as parcel ordering to enhance the automated system. The project will reduce workload of the servicemen who take orders and hence guarantee more attention towards each and every customer. It will increase the speed of order with real time monitoring along with minimum ambiguity, fault or cheat for an instance, no mislead of customers by waiters or change in orders by the customers etc. A calculator will not be required if one's budget is limited. As an interesting and attractive user interface will attract more customers and with an increasing trend towards a smarter world, it will bring in a good profitable business. There are possibilities of further additional automated sub-systems like banking system which will be able to provide bill payment online using net banking or a credit card. Also, a visual graphical user interface can be projected on the table itself for a more attractive and user friendly ordering system.

5. ACKNOWLEDGEMENT

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