ISSN XXXX XXXX © 2018 IJESC

Research Article Volume 8 Issue No.4

Smart Automated Restaurant

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Abstract:
Smart Automated Restaurant provides an efficient and user friendly system. This system will solve key problems faced by restaurants today through the use of technologies such as Mobile and Web applications, Android applications and cloud computing. Restaurants have much inefficiency due to human limitations that can be resolved through automation. This Smart Automated Restaurant accomplishes this by providing two interfaces for the two types of users in restaurants; an Android mobile application for customers and a web application for restaurant staff members. The Android mobile application allows customers to have a seamless dining experience with features such as finding available parking spaces easier through Internet-connected infrared proximity sensors in the parking lot. Also finding available tables at the restaurant gets easier through the use of sensors. Ordering dishes through an interactive menu and being able to pay the bill from their Android phones are some of the other features. The web application provides staff member's benefits such as collecting data and statistics on the restaurant's performance in real time and automating the order placement system for waiters and cooks.

Keywords: Smart Restaurant, Restaurant Automation, Near Field Communication and Smart Cities, Cloud Computing, mobile application.

I.INTRODUCTION

The Smart Automated Restaurant is technology from reservation to ordering and storing customer records where a customer would experience a great dining instead of going through tedious process. The Smart Automated Restaurant would help in increasing the profit margins. Today, hotels suffer inefficiencies and in spite of all of the great technical advancements that have been made in recent decades with rise of the Internet, mobile smart devices and cloud computing, the restaurant industry still has not fully exploited the full capabilities of these technologies and hence a great deal of inefficiencies are still unaddressable. We are proposing a system that will try to fill in for these inefficiencies and help with the better administration of the restaurants. The main aim of the project would be including the desired features to provide a lavish dining experience by the restaurant should be fulfilled by the system. Examples of inefficiencies in a regular restaurant management systems include: customers waiting for a table to open up and for a waiter to seat them, receiving a non-interactive paper menu displaying limited information about the food available (typically containing only the dishes' names, prices, and brief descriptions), waiting for a waiter to arrive to them before customers can order, receiving no information about the progress of their meal while waiting for it to arrive, waiting once more for the waiter to provide their bill to pay, and finally no automated way for customers to directly provide feedback to the restaurant's management immediately after finishing their meal. This project aimed at improving the efficiency of the regular system. To overcome the limitations of regular system, we have devised Smart Automated Restaurant Management that uses mobile smart, proximity sensors and cloud technology to offer a more complete and efficient automated dining experience.

II. LITERATURE REVIEW

MieszkoWalerych [1] proposed a system supporting hotel management, which significantly helps to administration this type of building. It is designed for both sides of system users: hotel employees and guests who want to make reservation. The system has several kinds of accounts (guest, reception, administrator, employee). To have access to the guest resources one should correctly complete the registration. This kind of account gives us ability to book online, check personal information, accommodation and reservation. The most important feature is of course, the possibility of booking online. First is "Customers". Thanks to this option receptionist has access to information about guests' personal data. The receptionist has the ability to check the status of a particular customer. Second part is the data that tells whether a person has a reservation for today. Another type is an administrator account. it gives access to the advanced functions. **Antti Auno [2]** proposed an intelligent restaurant system Smartmenu. These kinds of systems may change the everyday life in restaurants in the future. The system covers the whole order process of a restaurant including the applications of the customer, the waiter, the kitchen and the cashier. In this paper, they first present related work concerning the development of restaurant systems and service processes with advanced technology, such as digital menus, radio frequency identification (RFID). We then introduce our intelligent restaurant system Smartmenu which diverges from the current digital restaurant ordering systems by its expandability features. Smartmenu is not limited only to the electronic menu application but it can be extended to be a total intelligent restaurant service platform. **MontriWiboonrat [3]** proposed a system where cloud systems have been included for management. Cloud solution is ideal for a small or limited service hotel. Cloud services are faster and more efficient which improves customer service by decreasing waiting times and providing a more personalized service on arrival. Cloud systems decrease the cost of entry to hotels and provide an extended arm of computer power which makes the service unilaterally accessible and can be summarized through these primary benefits. This research deliberated on how the cloud computing technology reform the budget hotel chains for doing business by used a case study of Thailand budget hotel chains.

III. SYSTEM ARCHITECTURE

The system architecture is presented in Fig. 1 that shows the interconnection among the various system components. The two main software components of Smart Automated Restaurant are the Android application and the web application. The Android application is used by the users i.e. customers to interact with the restaurant staff and facilities, while the web application is used by the staff to connect to the customers and cater to their needs as well as to analyze the workings of the restaurant. The Android and web applications in the system do not interact directly, instead they both have access to the Apache HTTP web server .Both applications access, query, and update the database via this web server. presents a high level overview of the various components including the Android application, and web application, the proximity sensors, and Node MCU 1.0. These components can be grouped together to create 4 subsystems in this project. All of the subsystems work together to create the fully functioning system. The firebase cloud subsystem, and the parking subsystem, is the hardware subsystems while the web application and the Android application are the software subsystems. A short description of the functionality provided by each hardware subsystem is presented.

1. The parking subsystem has the proximity sensors and the Node MCU 1.0 that works together to handle the booking of the parking slots.The Node MCU 1.0 is a Wifi module with Wi-Fi transmitter and receiver.
2. Firebase cloud subsystem includes the firebase database that includes the android and web application data. Some of the web application database has been added to the SQL database.
3. Web application subsystem is the application to be used by the restaurant staff to communicate with the customers.
4. Android application subsystem is the application used by users for bookings and ordering.

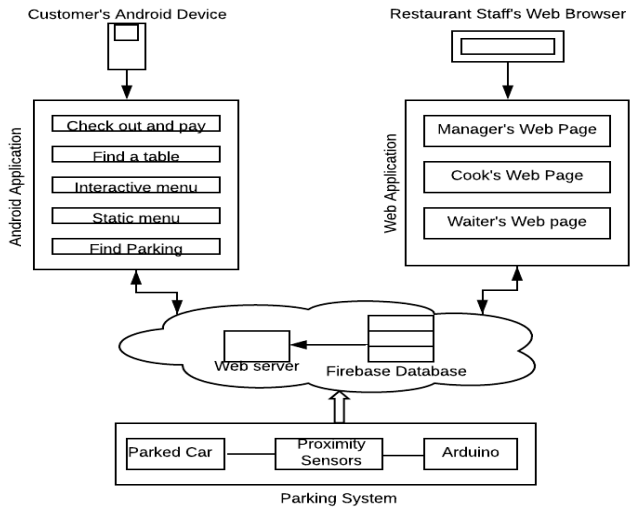

Figure.1. System Architecture Diagram

IV.PROPOSED SYSTEM

The system design includes the Android application, the Web application and the Hardware.

Android application:

The Android application consists of 3 phases.

Phase 1 deals with the "Find Available Parking " feature.

Phase 2 deals with the "Table Booking" feature.

Phase 3 deals with what happens from the customer's end once they are seated at the restaurant and begin to order their meals from their Android application i.e. the "Interactive Menu"

Phase 1: The 'Find Available Parking' feature provides the customer with the check parking button that leads to a page that showcases the parking availability in form of 0's and 1's where-in the 0's denote available parking space and 1's denote unavailable parking space.The available parking slots help the user to make a decision as to where to park the car. The ThingsSpeak interface is an open IoT platform that has been used to create the smart parking feature. The user has to login using the username and password provided by the application and hence gets to access the feature.

Phase 2: The Table Booking feature helps to check what tables are available and hence book a particular table. The table remains booked upto 20 minutes and after that becomes available once again.

Phase 3: The Interactive Menu feature allows the user to browse through the menu which has been added by the manager. The feature helps the user to add items to the cart and then add any comment of their own for the chef. By comment we mean their preferences for a particular dish.This helps to form an interaction directly with the chef.The order items can be deleted if the user wants and finally submits the order. The order is displayed for the Manager on the web application on the manager's page. The user gets to check the progress of the dish.

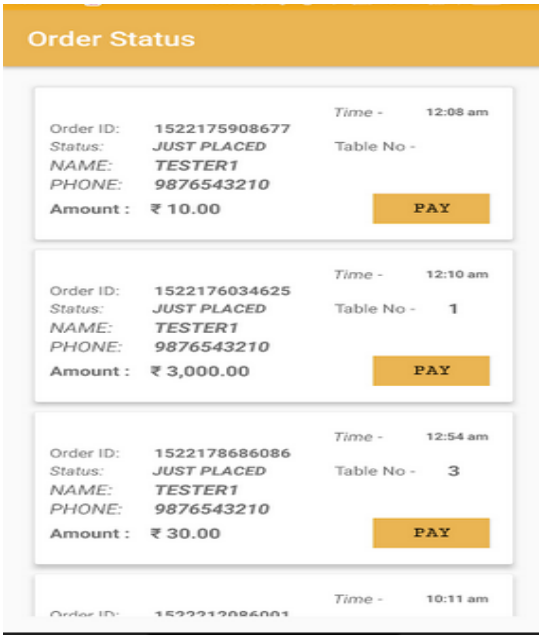

Figure.2. Android application page (Order status)

Phase 3: The Interactive Menu feature allows the user to browse through the menu which has been added by the manager. The feature helps the user to add items to the cart and then add any comment of their own for the chef. By comment we mean their preferences for a particular dish.This helps to form an interaction directly with the chef.The order items can be deleted if the user wants and finally submits the order. The order is displayed for the Manager on the web application on the manager's page. The user gets to check the progress of the dish.

Web application: Restaurant staff members interact with Smart Automated Restaurant through the interface of a web application, which is accessible through any internet browser on a desktop, tablet, or a mobile device.

The application consists of 3 pages.

1. Manager page- It allows the manager to add cook or waiter details to the interface. He can also add dishes to the menu i.e. he gets to update the menu. He is provided with the analytics page that has various day to day analytics such as the revenue generated, the number of orders placed and the most popular dish. He can also view the cook and waiter details.
2. Cook page- The cook page provides the cook with the order placed by the customers. The order placed can be seen alongside the table number. The cook can update the status of the order as, "Received", "In progress" or "Completed". The android application receives a notification of the same.
3. Waiter page-Waiters page shows the details about the food ordered by the customers. The chef updates the status of the ordered food and once the order is prepared waiter enters the kitchen to serve the prepared food to the customers. This saves the waiter's time from revisiting the kitchen again and again since he is notified by the chef once the requested order is done. This will also help the restaurant to keep less employees as waiters and gradually increase the annual income of restaurant.

Figure.3. Web Application Components

The above Fig.3. shows the components such as chefs and waiters wherein the manager can add and view their details. It also shows the daily analytics such as number of orders, number of customers, number of food items and total revenue generated.

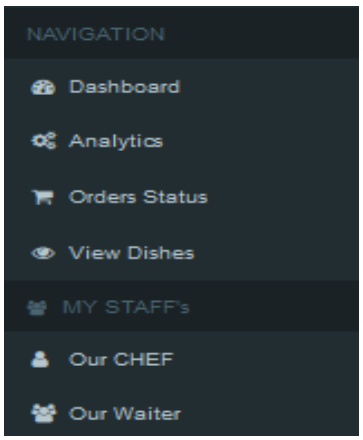

Figure.4. Dashboard

Hardware: The hardware part comprises of the following:

1. Node MCU 1.0- It is an open source IoT platform. It includes firmware which runs on the ESP8266 Wi-Fi SoC. It reads the data from the sensors which it receives when we upload the arduino code through the Integrated Development Environment(IDE).When you open the Arduino program, you are opening the IDE. Once all of the data gets uploaded, based on whether the parking spot is occupied or empty, the Thing Speak fields get updated.
2. Proximity sensors- These detect the presence of nearby objects without any physical contact. Here as the vehicles occupy the parking spot, the proximity sensors detect them and send the input to the node MCU.

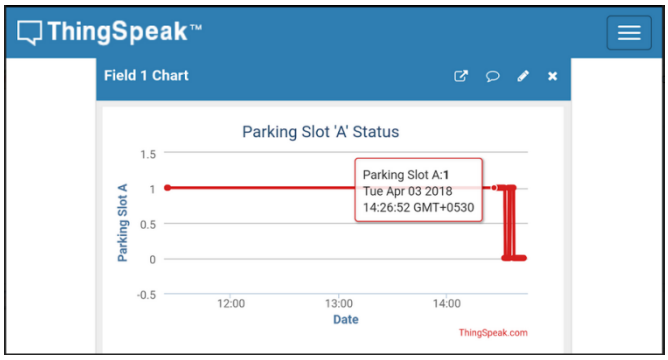

Figure.5.ThingSpeak Interface to check Parking availability

V.CONCLUSION

In this paper, we have presented an efficient and user friendly solution that will solve many of the problems faced by restaurants, by effectively using technologies of mobile and web applications, Internet of Things, and cloud computing. Different from previous approaches, our solution of Smart Automated Restaurant does not require restaurants to purchase multiple iPads/PDAs to give customers for ordering. Instead it allows customers to bring their own device and wirelessly order food from an Android application on their mobile Smartphone or tablet. As well, through the use of proximity sensors , customers can also use the Android application on their personal smart devices to find available parking spaces, find an available table, and pay for their own bill. Smart Automated Restaurant also provides a web application that allows restaurant staff members to manage their respective work and view real time analytics about the restaurant. The current status of the project is that a functioning prototype of a SAR has been built. Future work includes the testing of SAR in real restaurants with actual customers in order to receive feedback about its usability, reliability, and practicality.

VI. REFERENCES

[1].MieszkoWalerych, Wojciech Zabierowski: Application Supporting Hotel Management as an Example of Web Technologies Usage

[2].Intelligent Restaurant System Smartmenu: SakariPieskä, Markus Liuska, Juhana Jauhiainen Centria University of Applied Sciences Ylivieska; Antti Auno,Delitaz Oy Koria, Finland

[3].MontriWiboonrat: Cloud Computing in Budget Hotel Management