AUTOMATED RESTAURANT SERVICE MANAGEMENT SYSTEM

Kalpesh V. Joshi, Akshay P. Dhawale, Chinmay Y. Dhekane, Kshitij S. Dhone, Mugdha P. Dhopade,
Vipul P. Dhopate, Aditya S. Dhotarkar

Department of Engineering, Sciences and Humanities (DESH)

Abstract — Today, in the era of rapid advancement in the technology, the world attempts to automate every possible task ensuring ease to human life with improved work-efficiency and quality [1]. This report describes in detail the design, development and functionality of a Smart On-Floor Service Management System developed exclusively for restaurants. The system comprises of an online wireless module enabling the customers to order food from the comfort of their respective tables via tablet phones; and a robot for delivering the dishes to the customers at their respective tables. The order once placed and confirmed by the customers will be directed to the kitchen on a LCD screen. Once ready, the order will be delivered by the robots to their respective table. The project solely aims in aiding the restaurants with a practically implementable automated on-floor service management system.

Keywords — Restaurant, Management, Application, Robot, Orders

I. INTRODUCTION

In the light of the growth and advancement in automation and the robotics industry, the world has begun to witness the applications of robots broadly across various domains, including the service providing and hospitality segment enhancing the quality of service delivered. The implementation of modernized mechanisms has yielded results in the perceiving and performing certain actions by these robots [4]. Such robots have found immense potential in assistive robotics [4]. To tackle the issues related to the rise in the attrition rate of the staff, ever-increasing demands for higher pay and facilities, the restaurants have found ways to incorporate automation into their management systems [1]. The on-floor service staff of a restaurant has a direct impact on the hospitality quotient of the restaurants potentially taking a toll on their active customers. Besides, the availability of a skilled staff required to attend to the customers is also low, especially in countries with lower population or lower literacy rate. The restaurant's image is also hampered due to inconvenience caused to the customers due to human errors and behavioral clashes. In order to avoid any of the situations herewith, the application of robot-waiters is on the rise especially in the developed and developing nations.

II. LITERATURE REVIEW

It is common if customers complain for not feeling satisfied about the services offered there are many reasons leading to the feeling of dissatisfaction including being entertain late in terms of order taken by the waiter and meals serving the issue of being late entertain could be solved with the help of the advancement in the technologies of the communication [1]. In accordance, this study initiates an integrated a networked system, with the focus is on its ability to solve the above describe limitation in order taking [2]. Even though the human system is simple, it involves a lot of human errors in noting down the orders serving them to the right table and calculating bills [3]. Thus, in order to avoid human errors a need for automated technology arises.

III. METHODOLOGY/EXPERIMENTAL

A. Materials/Components/Flowchart/Block Diagram/Theory

We have proposed a system consisting on two parts, ordering system and serving system.
Ordering System –
Each table has its own tablet with an app which consist of the menu of the restaurant. The app can be used to browse through the menu and place Order through it. Order placed can be edited and be re-ordered. Each menu item has an option to add or minus the quantity to the order list, App has the interface where customer can view their order and confirm it. The order is conveyed to kitchen with table number and the order. Along with ordering customer can also see the final bill through their app.

This mobile app was made by using Android Studio. In it the UI was made in the XML part and the backend coding was done in the java classes. Databases were used for adding of data automatically.
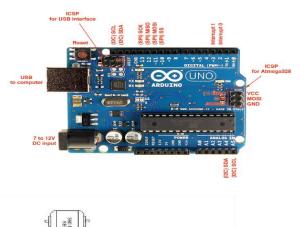
Serving System -
We have used the Arduino Uno board along with a Motor Shield (L293d) which is a ready-made attachable unit that can be used along with basic Arduino board. The motor shield acts

Proceedings of National Level E-Conference on "Science & Technology"
Organized by Shahajirao Patil Vikas Pratishthan's
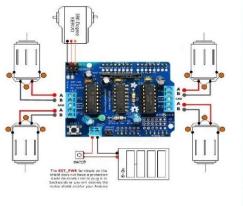**S. B. PATIL College of Engineering Indapur, Maharashtra, India**
INTERNATIONAL JOURNAL OF INNOVATIONS IN ENGINEERING RESEARCH AND TECHNOLOGY [IJIERT]
ISSN No.: 2394-3696, Website: ijiert.org, Held on 15th and 16th June 2020.

as a basic motor controller which can direct and control n number of motors, in our case 2 motors individually. It can control the direction and speed of the motors which is a very much basic essentiality for giving the movement to our bot. Along with the motor shield we have used the Ultra sonic sensor which maneuvers the bot and acts as the eyes. It can sense the obstruction in the path line of the bot and can command the Arduino Board to stop the bot in case of any obstruction thus avoiding any chance of the collision.

The execution of the program starts from the moment the chef puts up the dish on the specially arranged tray on the front side of the bot. The dishes are well secured and the speed of the bot is so iterated so avoid any kind of spillage of the food and drinks in the travel. The chef then puts up the table number through the dial pad and presses the start button to set the robot in motion. The bot then travels to the particular table through the predestined path and looks for any obstacles through the ultrasonic sensor. The paths to each and every individual table are predefined and the path is optimized are by considering the facts like customer disturbance, ease of travel, lesser traveled path etc. The bot then delivers the food to the table and when the customer receives the dishes, he has to confirm the order and just press the done button which will alert the bot that the delivery order is completed and it will visit the kitchen to serve the next order. This process works continuously thus reliving the load of café.

B. Synthesis/Algorithm/Design/Method

C. Characterization/Pseudo Code/ Testing

Here is a pseudo code for button connecting pages using onclick listener.

```
public class MyActivity extends
Activity {

    protected void onCreate(Bundle
savedInstanceState) {

super.onCreate(savedInstanceState);

setContentView(R.layout.content_layout
_id);

        final Button button =
findViewById(R.id.button_id);

        button.setOnClickListener(new
View.OnClickListener() {

            public void onClick(View
v) {

                // Code here executes
on main thread after user presses button

            }

        });

    }

}
```

Proceedings of National Level E-Conference on "Science & Technology"
Organized by Shahajirao Patil Vikas Pratishthan's
S. B. PATIL College of Engineering Indapur, Maharashtra, India
INTERNATIONAL JOURNAL OF INNOVATIONS IN ENGINEERING RESEARCH AND TECHNOLOGY [IJIERT]
ISSN No.: 2394-3696, Website: ijiert.org, Held on 15th and 16th June 2020.

IV. RESULTS AND DISCUSSIONS

There are two main parts in our project, first is application for food order (Software Part) and second is food serving robot (Hardware Part). The first part contains alignment of the tables will be based on the setup of the restaurant. Each table will have a tablet for ordering food. In this tablet, there will be android application for ordering food. In this application, the names of the food items which are in the menu are listed accordingly. When we click on the food item, the information of the food item and price of item will be display. The information of the food item contains customer rating given by the customer and way of serving food by the restaurant. On the screen there also contains price of each item and option for the quantity of the item. Customer can choose quantity of the item and application will show total price. After that customer will click the add to cart button and food item added to the cart along with quantity and total price. In this way customers have to select food items which they want to order. The cart button stores the total food items and total price. After clicking order button, the order has been successfully placed. After the second part comes into system. The list of orders stored in the database along with table number from which it was ordered will be displayed on the chefs display according to which the chefs will prepare food and place it on the food serving robot. The robot which has the paths predefined to particular numbers on the number pad will go to the entered table number on the dial pad. After serving it will return to the kitchen.

V. HELPFUL HINTS

Open the app, you will see multiple buttons of starters, main course, desserts, etc. All you need to do is select the dish you wish to try and then, click on add to cart. If you want multiply it, all you need to do is just click on "+" button nearby this will multiply your order by times you click on the same button. If you want to add anything else in your order, just get back to main menu and select the item you want to add. When you are all done with the selection of your order click on "place order", clicking this will show a page that sums up your order and quantity. If required it can be edited further or can be placed to the chef. Now, just wait for your robot to come with your placed order. Take off the plates from the robot platform, now you just click a button on the robot, which will tell the robot to go back. Now you can enjoy your meal. Any further updates can be done by the app itself.

VI. LIMITATIONS

Only problem with the app being, able to produce a bill of order on the app, but this is tackled by online payment options like paytm, phone pe, google pay etc., but is going to get solved soon. With this your order would be limited to certain weight, chassis being small in size. The robot can only deliver to one table at a time.

VII. FUTURE SCOPE

In view of our future scope we are planning to introduce online billing feature into the app so as to make payment easy. We will also be adding audio greeting system in the robot to make customer comfortable to robot. More paths will be programmed for the robot so as to cover the required number of tables.

VIII. CONCLUSION

In this course of time we were only working and thinking for the way to give any particular management place like restaurant, offices a proper management medium to organize all their work to reduce human efforts and time. This will ensure more work profit and digitalized environment and would also cut down human–errors.

ACKNOWLEDGMENT

REFERENCES

[1] Patel Krishna M., Patel Palak P. , Raj Nirali R., Patel Lalit A. "Automated food ordering system" International Journal of Engineering Research and Development (IJERD) ISSN: 2278-067X Recent trends in Electrical and Electronics & Communication Engineering (RTEECE 17th – 18th April 2015)

[2] Ashutosh Bhargave, Niranjan Jadhav, Apurva Joshi, Prachi Oke, Prof. Mr. S. R Lahane :Digital Ordering System For Restaurants Using Android, International Journal of Scientific and Research Publications, Volume 3, Issue 4, April 2013 1 ISSN 2250-3153.

[3] Aman Jain, Snehal Chauhan, Anish Hirlekar, Suraj Sarange "Automated Restaurant Management System" Student, Department of Electronics and Telecommunication, Vidyalankar Institute of Technology, Mumbai, India

[4] "Waiter Robot – Solution to Restaurant Automation " Zeashan Khan, Air University of Islamabad

[5] NOOR AZAH SAMSUDIN, ZULKIFLI SENIN, MOHD NOR IHKASEN, SAMSUL KAMAL AHMAD KHALID "A CUSTOMIZABLE WIRELESS FOOD ORDERING SYSTEM WITH REALTIME CUSTOMER FEEDBACK" 2011 IEEE SYMPOSIUM ON WIRELESS TECHNOLOGY AND APPLICATIONS (ISWTA)