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Hotel Automation by Wireless Menu Ordering and Serving Robot

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Abstract: *In today"s world the use of robot is going on increasing. Robots are able to carry out every work more effectively and efficiently than a man can do. Hence one of such application of robot could be SERVING ROBOT. There are many areas of research that could be done for a serving robot. In this project we have try to demonstrate a prototype of Autonomous Serving Robot which will serve the food to the customer. The implementation is done with available resources to reduce the cost of project. In today"s restaurant Digital multi-touch menu cards and other forms of digital facility are replacing old fashioned services like-waiters can take order from customer and serve them. Intelligent Restaurant system delivers almost infinite flexibility in promoting meal and snack options. Intelligent Restaurant system uses technologies Innovatively in a modern restaurant such as multi-touch LCD with Microcontroller, Bluetooth module, database & line following Robot to enhance quality of services and to enrich customer"s dining experience. A line following robot is designed using sensor operated motors to keep track the line path predetermined for meal serving. PayPal is used for online payment. In this paper we demonstrate the idea of automatic menu serving robot. In this paper we have made a robot which provides proper service to customer in restaurant. If a person wants to give an order then he can call the robot by simply pressing a switch on his table. The whole system makes use of wifi/bluetooth technology*

Keywords: Arduino, Motor driver, IR, LCD

I. INTRODUCTION

Technology is such a term which can change the complete operation of a particular system. In today"s world we find that each and every field is based on the use of some kind of technology. In such a world wherein developments are being taking place in many field, but we find that the most commonly visited place by every person that is a hotel, is still the same. No advancements have been made in the ordering system of a menu in the hotel. We will still find the earlier paper based systems in many of the hotels. People visit a hotel in order to have a tasty food in less time and of their desired choice. The customer requirements are very necessary while considering the hotel business. If we analyses the different types of customer requirements, we will find that they are almost the same.

In today"s restaurant Digital multi-touch menu cards and other forms of digital facility are replacing old fashioned services like-waiters can take order from customer and serve them. Intelligent Restaurant system delivers almost infinite flexibility in promoting meal and snack options. Intelligent Restaurant system uses technologies innovatively in a modern restaurant such as multi-touch LCD with Microcontroller, Bluetooth module, database & line following Robot to enhance quality of services and to enrich customer"s dining experience. A line following robot is designed using sensor operated motors to keep track the line path predetermined for meal serving. PayPal is used for online payment. In this paper we demonstrate the idea of automatic menu serving robot. In this paper we have made a robot which provides proper service to customer in restaurant. If a person wants to give an order then he can call the robot by simply pressing a switch on his table. The whole system makes use of wifi/bluetooth technology.

Restaurant is a place where people come, sit and eat meals that are cooked and served by the chef and the waiters respectively. After eating the food, customers will pay the bill. This system relies on large numbers of manpower to handle customer reservation, inquiry about them, ordering food, placing order on table, reminding dishes of customer. Currently, there are a lot of ways of serving the customers. For instance, waiter serving system (conventional),

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conveyor belt serving system (Japanese style), self-carrying system (fast food), pen-and- paper self-ordering system, etc.

These systems are made in order to get attraction from customers and to reduce the need of hiring more employees in their workplace. When there is a robot that can conduct all the tasks done by human being, it will strictly reduce the need of hiring more employees. Therefore, a serving robot is proposed. The proposed system reduces the man power and makes the whole process in the restaurant to be done automatically starting from welcoming the customer to payment of bill. The proposed system consists of three main blocks. First block deals with ordering process through which the customer can order the food item without the need of the server. The customer table is provided with the keypad and LCD display using which the customer can type the item code and can see the ordered food item along with cost respectively. The second block is to serve the ordered food to the customer. It is done by using the food serving robot. It will modify the real time problem of time delay and delivering of incorrect food item. It consists of the vehicle which moves according to the sensor output .The robot consists of proximity sensor to count the wheel rotation and IR sensor for obstacle detection. The third block is for payment of bill amount. The cost of the ordered food item will be displayed to the customer at the time of ordering itself and if the customer finished ordering, the total amount of the ordered food item will be calculated and the entire bill amount will be displayed to the customer The other technique in this paper includes the common display of available food item with their code so that the customer can be aware of the menu. There will be a helping technique available at each customer table which is used by the customer to order the food item. In this technique the instruction for the entire process will be played at the time of ordering the food item. This system replaces the conventional method in restaurant and it reduces the human need and makes the process simple and efficient. This system is also meant for the attraction of the customer

By seeing this technology the amount of customer will be increased and so the profit will be increased.

II. BASIC IDEA

Today in this fast developing world hotels play a vital role in getting the tourist attraction. Today the customers in the hotels want hygienic food but above all a „quick service". Time is important for all. Today numerous types of technologies are emerging for the different section of society but there are limited solutions being provided to the hotel industry.

Restaurants would avoid losing their customers due to a long wait on the line. Some restaurants initially provide more waiting chairs than they actually need to put them in the safe side, and reducing the chairs as the time goes on safe space. However, waiting chairs alone would not solve a problem when customers withdraw and go to the competitor"s door; the service time may need to be improved.

2.1 Block Diagram of System

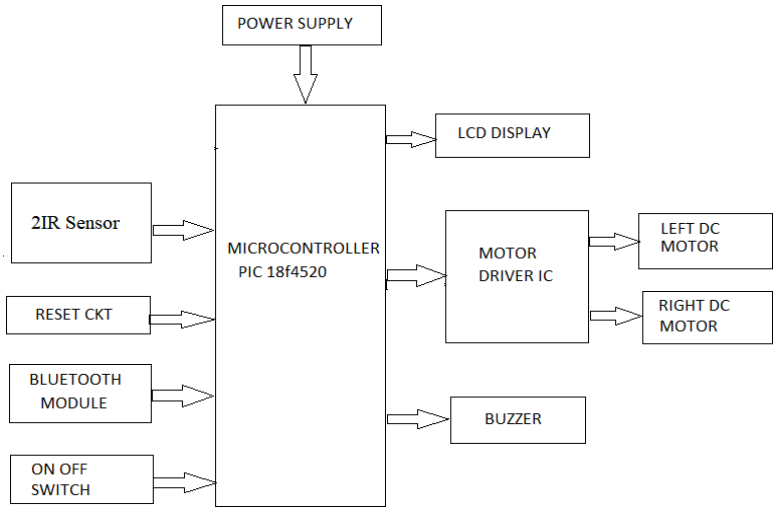

Figure 2.1 Basic Block Diagram

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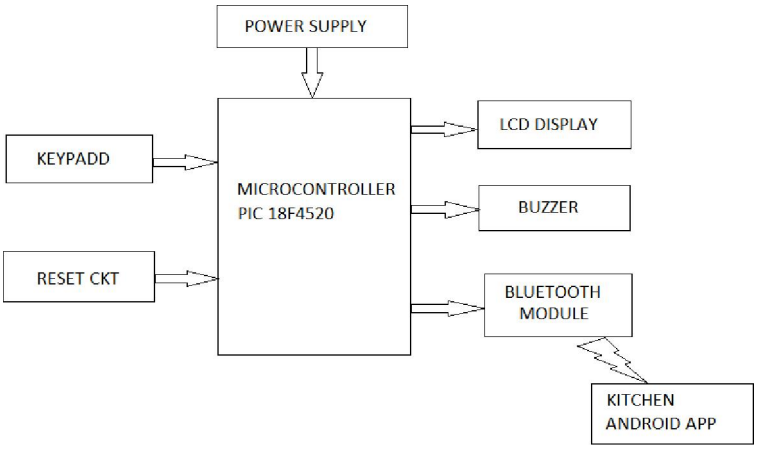
Imagine that you enter in a restaurant and there is not even a single person to attend you or come to take your order, only a single message on wall that to use their Wi-Fi to order and a robot will serve you. The biggest issue before introducing the robots in restaurants is to order food. Because to implement the vision of robots as a waiter, each and every single action to be performed, starting from entering in the restaurant should be human less. To resolve this we are proposing a smart food ordering web based application. The automation in restaurants that we are proposing will bring technology in the restaurants. The traditional method of human waiter and menu on paper is very time consuming, where we have to wait for waiter to order. Whereas in robotic restaurants, with our application the customer just have to order via his or her mobile phone and do not need to wait for waiter. This replacement of robots in place of human will reduce the problems arise by human waiters and smart menu in place of paper menu card will support the go green theme. This app will directly interact in the kitchen part. The parameters that kitchen side require is the table number (from which the order came) and ordered food by the particular table. The system allow quick and easy managing an online menu which customers can browse and use to place orders with just few clicks. For placing any orders customers have to visit robotic hotels or restaurants. They can order through their own phone or from the tab (already there on the table). This paper is focusing on smart ordering system to be introduced in restaurants along with serving robots.

III. WORKING OF PROJECT



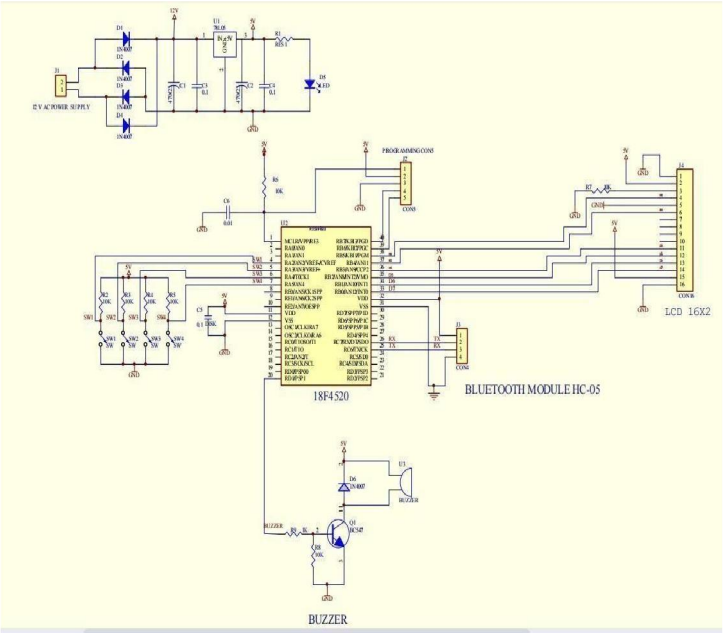


Fig. Circuit Diagram

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Now day"s automation systems are everywhere whether its home, office or any big industry, all are equipped with automation systems. Restaurants/Hotels are also adopting recent automation trends and are installing robots to deliver food and tablets for taking orders. Using these digital menu cards like Tablets, customers can easily select the items. This information will be sent to the kitchen of the Restaurant and also displayed on the display. In this project, we are building a Smart Restaurant Project using Arduino, TFT display, and 433MHz RF transmitter/receiver module. Here the transmitter section will consist of Arduino, TFT display, and an RF transmitter, using which customers can select the food items and place the order. While the receiver section consists of an Arduino, LCD module, RF receiver, and a Buzzer, which will be installed in the restaurant kitchen to track the order items.

IV. LITERATURE SURVEY

[1] Neeti Malik, Neetu Rani, Alpana Singh, Pratibha, Srishti Pragya , "Review paper on- Serving Robot New Generation Electronic Waiter" : IJIRST –International Journal for Innovative Research in Science & Technology| Volume 2 | Issue 11 | April 2016 ISSN (online): 2349-6010 in this paper Serving Robot is designed to reduce the work load of waiter and to increase the efficiency.This system provides an online menu ordering and reservation-making process, and also personal menu recommendation service. With the help of RFID-based membership cards, waiters can immediately identify help of Arduino. LEDs will be place on the path of robots customers according to their consumption records. The waiter uses a PDA to take orders from the customer and with the use of WLAN order is send to the kitchen. Then chefs prepare the menu and waiter can deliver it to customer. When the customer has finished the meal, the cashier uses RFID-based PDA to identify the membership ID to calculate the bill.

[2] Neelima Mishra, Dr. Dinesh Goyal, Dr. Ashish Dutt Sharma , "Automation in Restaurants: Ordering to Robots in Restaurant via Smart Ordering System" : Suresh Gyan Vihar University, Jaipur International Journal of Converging Technologies and Management (IJCTM) Volume 4, Issue 1, 2018 ISSN: 2455 – 7528. The proposal of a fully automated menu ordering system in which the paper based menu is replaced by a user friendly Touchscreen based menu card. The system has PIC microcontroller which is interfaced with the input and output modules. The input module is the touchscreen sensor which is placed on GLCD (Graphical Liquid Crystal Display) to have a graphic image display, which takes the input from the user and provides the same information to the microcontroller. The output module is a Zigbee modulewhich is used for communication between system at the table and system for receiving section. Microcontroller also displays the menu items on the GLCD. At the receiving end the selected items will be displayed on the LCD and by using the conveyer belt the received will send to the particular table.

Anjali M. Yelasange, Husain K. Bhaldar, Kirti A. More, Anjali P. Katkar , "Autonomous Robot for Delivering The Orders in Restaurants By using Raspberry Pi" : International Journal of Recent Technology and Engineering (IJRTE) ISSN: 2277-3878, Volume-8 Issue-6, March 2020. They makes the use of static system in which the robot moves on static lines by using Digital differential algorithm and dynamic system in which the arrangement of the following lines is changed accordingly using Bezier curve algorithm . Author Shivraj P. (2018) tells that they are uses the collaborative operation. It has ability to solve many difficult issues in automation of a system using MATLAB which is act as line follower robot. So that Author proposed the Food Delivery Automation in Restaurants Using Collaborative Robotics

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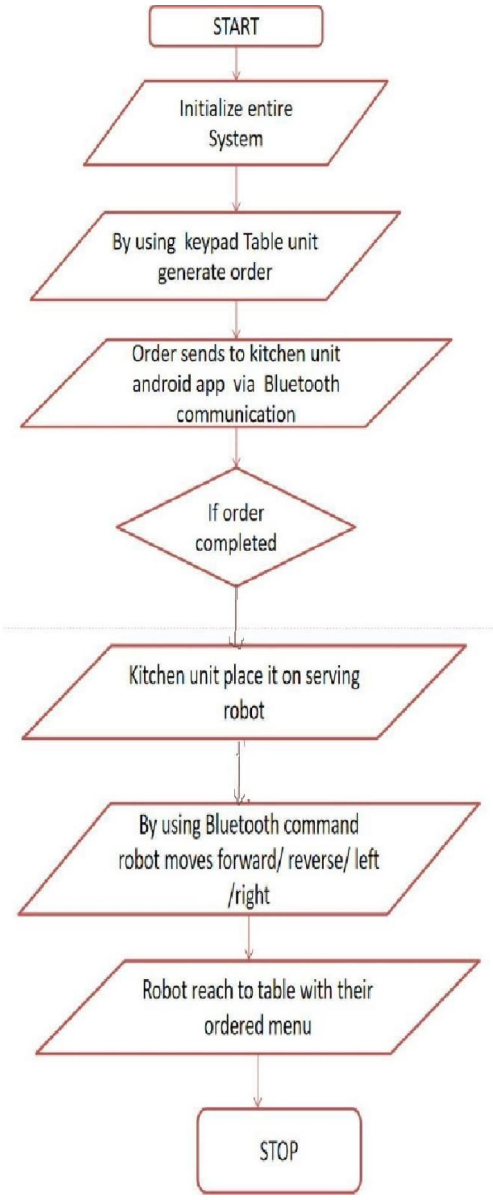
V. FLOWCHARTS



VI. RESULT AND DISCUSSION

As we see the robots are increasingly becoming the of everyday life, the use of Serving Robot can be extending to various functional purposes. This system allows customers to order food by LCD module surface which is programmed by embedded c, Which is wirelessly connected to the counter via RF module. A line following robot is used to carry meal from counter to customer. we have tried to implement the robot waiter from the existing appliances which could be use by elderly people or disabled people for house service. Such types of robot system can work in different areas of human societies like hospitals,libraries and restaurants with small change in programming areas.

In this study, we designed two models. The first one is for a waiter robot. The Second one is for a smart restaurant.Both are suggested to provide smooth restaurant services for customers. The proposed waiter robot is facilitated by essential hardware parts. These are the E-Menu, Keypad, LCD display, Bluetooth, Arduino and credit card device. On the other hand, the proposed smart restaurant is facilitated by main four sectors. These are the reception, tables, waiter robot and appropriate track position. The waiter robot can follow the determined track to collect the customer orders. These orders can directly be sent to the reception. When the waiter robot reaches the reception it can pick the orders up. Then,

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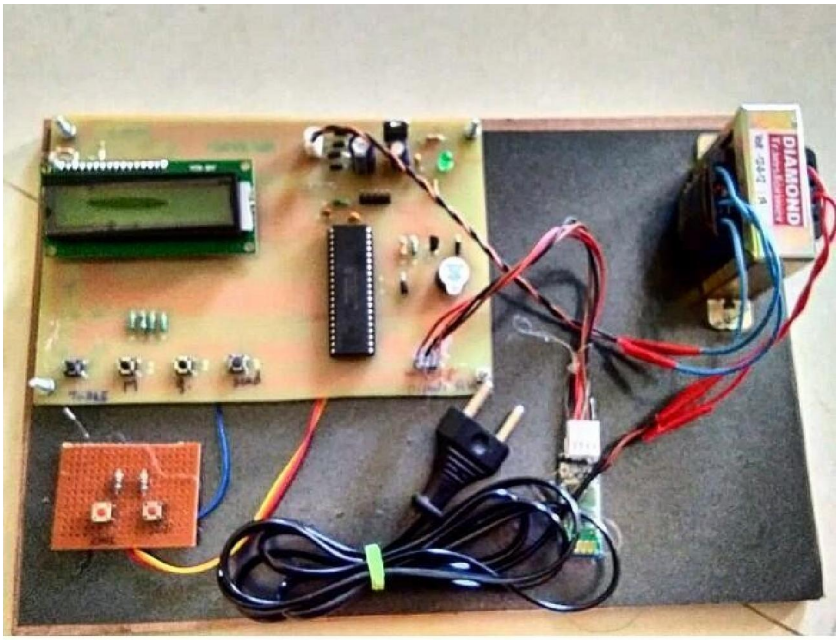
these orders can be delivered to the specified customers (the customers who requested the orders). Any customer can make the payment by using a credit card device which is proposed to be within the robot body. This may reduce the customer efforts to make his/her payment in the reception or in any restaurant payment

6.1 Photographs of Circuit Build

Table Side:



Robot Side:

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VII. CONCLUSION

7.1 Features

In this Project The robotic waiter system is a design concept that integrates autonomous omnidirectional mobile robots with an eco- system which provides knowledge of the environment in which the robots operate. This allows for a quicker translation from research to the industry. The robots are designed to be productive and efficient replacement where there is a shortage of human labour which does mundane and repetitive work such as carrying food to the tables. In addition, the ability to carry more than one order in the robot significantly helped in reducing the workload of a waiter during peak periods. Tests with the prototype and full scale robot in the restaurant have shown that the design is able to provide assistance in the restaurant, and therefore the next challenge is to have multiple robots in the restaurant. With a one off development of the smart eco-system, the cost of additional autonomous robots will increase the total cost significantly as compared with using multiple state of the art AI waiter robots with human skills and abilities.

- Waiter bot will deliver food without any loss.
- It will be smooth drive bot.
- It will say hello to customer while delivering the food.
- It will improve hospitality of the restaurants/hotels.

7.2 Applications

- As it is a dedicated application waiter bot will be used in hotels, restaurants, hospitals, or any other table food or medicine delivering services.
- Hotel Robo is used for delivering food, drinks, to the respective tables and rooms.
- It is also used for room service.
- It reduces the customers waiting time.

7.3 Advantages

- This waiter-bot can also be used in Pandemic situations like “CORONA-VIRUS ” to sever medication to the suspected patient‟s.
- This robot can even be used in situations where human can‟t reach.
- Reduces customer waiting time.
- These types of robot movement are usually automatic.
- It is relatively cheap.
- They can also be used for long distance.
- This type of robot are simple to build.
- One time investment in the system.
- Work can be faster and may reduce the cost of labouring.
- As customers place their own orders, waiter„s staff numbers can be reduced.
- Applications are performed with precision and high repeatability.

7.4 Disadvantages

- Cost of maintenance is high for robots.
- We will have to recharge battery of bot every day.

7.5 Future Scope

- In future ,it can implemented for cooking in restaurants.
- Carrying luggage from one place to another of customers of restaurants.
- Implemented as staff in hospitals.
- Bill printing can be provided with in the waiter- bot.
- Debit/Credit card enabled payment acceptance machine could be connect to Robot.

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In future the robot can understand the customer language and can communicate with them in there languages using artificial intelligences. They can communicate in different languages such as English, Hindi, Marathi, Tamil, Telgue , French, German and so on.

REFERENCES

[1]. Anjali M. Yelasange, Husain K. Bhaldar, Kirti A. More, Anjali P. Katkar , "Autonomous Robot for Delivering The Orders in Restaurants By using Raspberry Pi" : International Journal of Recent Technology and Engineering (IJRTE) ISSN: 2277-3878, Volume-8 Issue-6, March2020.

[2]. Neeti Malik, Neetu Rani, Alpana Singh, Pratibha, Srishti Pragya , "Review paper on- Serving Robot New Generation Electronic Waiter" : IJIRST –International Journal for Innovative Research in Science & Technology| Volume 2 | Issue 11 | April 2016 ISSN (online):2349-6010.

[3]. Livisha.K,Vinothini.S, Dhaheera Banu.M , R.Poonguzhali , "Wheeled Robotic System for Restaurants" : International Journal For Trends In Engineering & Technology Volume 32 Issue 1 – August 2018 - ISSN: 2349-9303.

[4]. Neelima Mishra, Dr. Dinesh Goyal, Dr. Ashish Dutt Sharma , "Automation in Restaurants: Ordering to Robots in Restaurant via Smart Ordering System" : Suresh Gyan Vihar University, Jaipur International Journal of Converging Technologies and Management (IJCTM)

[5]. Volume 4, Issue 1, 2018 ISSN: 2455 – 7528

[6]. Ang Benson (2016), Robot Lucy at your services at newly opened Rong Heng Seafood, The Strait Times Lifestyle, http://www.straitstimes.com/lifestyle/food/robot-lucy-at-your-service [Accessed 16 Mar 2016]

[7]. Patel Mayur Kumar, "online food order system for restaurant "(2015)Technical library .Paper 201

[8]. Referred "Robot Building for beginners" book by author David cook and " Introduction to al Robotics" by Robin R. murphy.

[9]. Raman Maharjan and Jyotir Moy Chatterjee, "Adoption And Impacts Of Robots In Service Sectors Of Nepal" : Volume 1, Issue 2 (December 2019) ISSN: 2705-4683; e-ISSN: 2705-4748