

ROBOTIC WAITER

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ABSTRACT

In today's world the automation technology such as machine learning and robotics play an increasingly great role in everyday life. At restaurants customers face a lot of things due to congestion at peak hours and unavailability of waiters, customers waste their valuable time due to manual order processing. These lacks can be overcome by our design "ROBOTIC WAITER". It is used for ordering food and beverages and delivering food and beverages. Here customer needs to scan the QR code on a particular table. After scanning QR code a menu card will be opened on his/her smart phone from where he/she can order the food. As the orders will directly display in the kitchen and kitchen staff prepare order and then load the order on the robot & then the only task of the robot is to deliver the food on particular table. Robots produce accurate and high quality work. Robots rarely make mistakes and are more precise than human workers they can produce greater quality in short amount of time they can work at a constant speed with no breaks ,days off or holiday time . We use line follower to move the robot.

Keywords: Qr Scanning, Line Follower Robot, Hotel Automation, Rendering, Sensors.

I. INTRODUCTION

In today's restaurant automation technologies and other forms of digital facility are replacing old fashioned services for example digital menu card. Intelligent Restaurant system delivers almost infinite flexibility in promoting meal and snack options[1]. It uses technologies such as Arduino mega, RF module, database management & line following robot innovatively in a modern restaurant to enhance quality of services and to enrich customer's dining experience[1]. Line follower robots, following a certain path or trajectory controlled by feedback mechanism. Infrared sensors are used to locate the path that the robot has to follow. It is fundamental line follower robot's function. Customers can pay the order bill through cash or any mode of online payment.

In this project we demonstrate the idea of automation in restaurant. In this project we made a robot which provides 100% hygienic food to customer at restaurant. Here customer needs to scan QR code present on the table, after scanning the code menu card will be open and customer will counter on their own mobile itself. There they can order the food and beverage. The order will directly display in the kitchen and chef prepare order, the kitchen staff will load the order on the robot and then the only task of the robot is to deliver the food on particular table.

II. METHODOLOGY

Block Diagram:

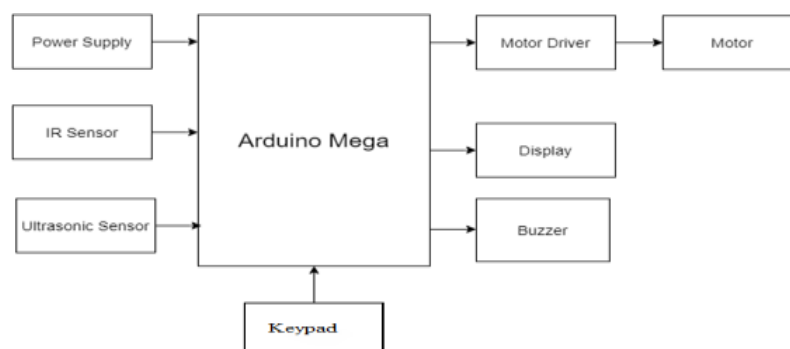


Fig 1: Block Diagram

1. Electronics Component:

The entire robot is designed in such a way that it is consistent so that it can move freely in the restaurant. The electronic parts include Arduino Mega 2560, battery, motors, relay ,buzzer and sensors.

Arduino Mega2560:

- These are some important features of Arduino Mega2560.
- The microcontroller used for this module is Atmega2560.
- This module needed 5 volts for operation.
- The range of input voltage for this board is from seven volts to twelve volts.
- There are fifty-four pinouts exits on this board fourteen are used as pulse width modulation.
- There are sixteen analog inputs on this board.
- The direct current for every input and output pin-out is forty milliamperes.



Fig 2: Arduino Mega

Line Follower:

A line follower robot is a robot that follows fixed path indicated by a line usually black line on a light coloured surface. It consist infrared sensors. It functions by illuminating a surface with infrared light, the sensor then picks up the reflected infrared radiation based on its intensity.

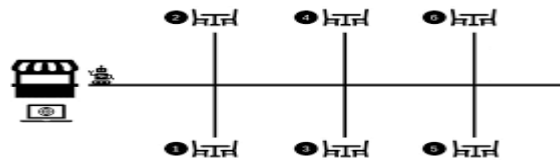


Fig 3: Table Structure

Obstacle detect and avoidance:

Ultrasonic sensor is used for obstacle detection. The ultrasonic sensor transmits the ultrasonic waves from its sensor head and again receive the ultrasonic waves reflected from an object. By using ultrasonic sensor the line follower can detect an obstacle. If the object detect obstacle from ultrasonic sensor then line follower robot immediately stop and the buzzer start ringing till the obstacle is removed.



Fig 4: Ultrasonic Sensor



Fig 5: Buzzer

Keypad:

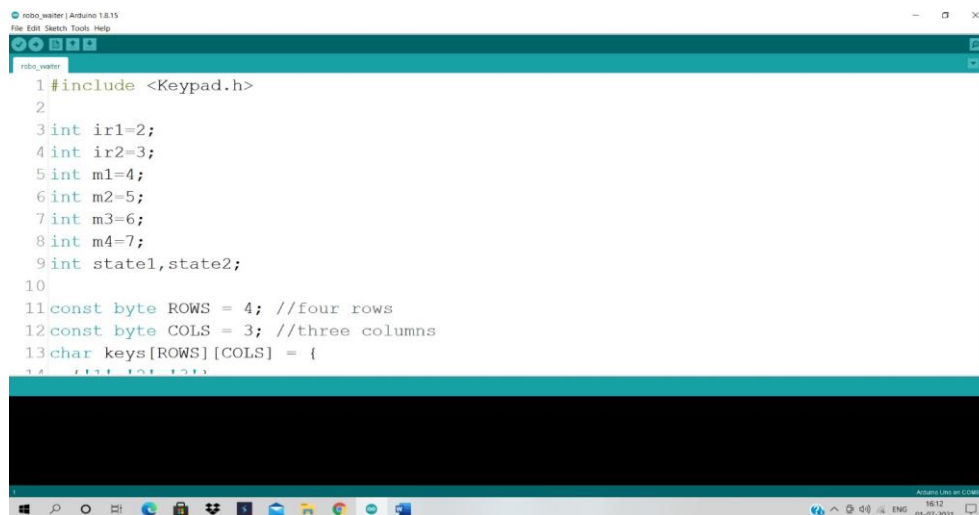
The keypad is input placed on the back side of the robot. The keypad is used to select table number. Without increasing the complications the keypad is used, so that the cook given input (respective table number) to the robot and robot can directly recognize the predefined path and go there.



Fig 6: Keypad

Indicator LED's:

Indicator LED's are used for the indication of the particular tasks. Red led will glow when the robot is power on, green led will glow when the robot is in working condition, and the orange led will glow when the robot is loaded and it is going to serve

2. Software Used :1 Arduino 1.8.15

```
1 #include <Keypad.h>
2
3 int ir1=2;
4 int ir2=3;
5 int m1=4;
6 int m2=5;
7 int m3=6;
8 int m4=7;
9 int state1,state2;
10
11 const byte ROWS = 4; //four rows
12 const byte COLS = 3; //three columns
13 char keys[ROWS][COLS] = {
14   { '1','2','3'},
15   { '4','5','6'},
16   { '7','8','9'},
17   { '*','0','#'}}
```

Fig 7: Arduino IDE**III. MODELING AND ANALYSIS****Working :**

In this project we demonstrate the idea of automation in restaurant. In these system we designed digital menu card and robo-Waiter. It is used for ordering food and beverages and delivering food and beverages. Here customer needs to scan QR code present on the table. After scanning QR code a menu card will be opened on his/her smart phone from where he/she can order the food. And the orders will directly display in the kitchen and kitchen staff prepare order and then load the order on the robot The keypad is input placed on the back side of the robot. The keypad is used to select respective table number. the cook given input (respective table number) to the robot and robot can directly recognize the predefined path and go there.

The only task of the robot is to deliver the food on particular table. We use line following technique to move the robot. A line follower robot is a robot which follows fixed path indicated by a line usually black line on a light coloured surface. It consist infrared sensors. It works by illuminating a surface with infrared light, the sensor then picks up the reflected infrared radiation based on its intensity. By using ultrasonic sensor the line follower can detect an obstacle.

If the object detect obstacle from ultrasonic sensor then line follower robot immediately stop and the buzzer start ringing till the obstacle is removed. Main purpose of our project is provides 100% hygienic food to customer at restaurant.

**Figure 8: 3D view of Robot**

IV. RESULTS AND DISCUSSION

1. Problem Statement:

- Customers face lot of problems due to unavailability of waiters due to manual order processing.
- Nowadays waiters are demanding huge salary for limited time service. In that some waiters are not giving 100% in their work.
- In this pandemic maintaining social distancing between customer and hotel staff needed.

2. Objective:

- To reduce the man power.
- To bring automation in hotel Industries
- To make hotels smarter with the help of automation technology.
- To maintain social distancing with hotel staff and customers.
- To deliver 100% hygienic food to customers.

3. Future Scope:

- In 2020 pandemic people have got real value of social distancing .So in hotels to maintain social distancing between hotels staff, customers and travelers is important.
- And hotel business has grown up in metro cities so we need to bring automation technology in the hotel industry will be the revolutionary idea.

4. Benefits of this project:

- Easy for customer: Our proposed system will bring convenience for customer as they do not have to wait until the waiter arrive and take their order. They can just enter the dining room and will order directly by their smart phones (QR code scan) and later a robot will facilitate them by serving delicious meal.
- It does not need salary.
- It will never be late for work and rarely make mistakes.
- Our robot waiter needs only one thing which is regular charging.
- The restaurant saves salaries and taxes. It saves quality time of customers.
- It saves your waiter expenditure.
- It improves the service time.

V. CONCLUSION

Lately in this modern technology world, people have started accepting robots as a part of their lives because it not only makes getting work easier but also the amount of time required is less. The efficiency and productivity of the robot is also more. Though there are many robots available all over country and cost has become a major factor to customers but our design of restaurant robot is cost efficient since we have used the concept of line follower to move the robot. The design used is very compact, comfortable and can be used in any restaurant. Our design has ensured the almost safety factor for the robot while serving food. Restaurant is a place where family and friends come to have a fun time and to make their visit more enjoyable as well as memorable, robots are a different way to deliver food and beverage for the people. Our design also makes ordering and payment easy with just a few clicks on the button. Our robot is a very useful solution to all types of restaurants and in future it can be enhanced more[1].

VI. REFERENCES

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