

# ROBOTEL

## [ROBOT+HOTEL]

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**Abstract--**The project is based on an objective to develop a modern technology Robot for replacing the servers working in the hotel. The main aim of this project is to provide a remedy for the people working in the hotel as servers is to be replaced with robots so the efficiency of the delivery will also be good with respect to time, misplacement etc. This technology will also create a tremendous change in the autonomous world. The robot is developed in such a way that the robot has features to handle the food and clear the food when required. It also has the Speech instructions option where it will help the customers and the operators in the user friendly manner. It gives us each and every instruction as it works. The microcontroller used in this project is Arduino(ATmega 328). Also it has the arm to deliver the food as well as to clear the food.

**IndexTerms --**Smart Robot,Robot,Robotel,Robots used in hotels,Robots in automation field.

## I. INTRODUCTION

The foremost aim of the project is to make an easy the food delivery in the hotels and to increase the human values as well. So that these servers can be replaced with the robotel robots so that the delivery of the food in the hotels can be made easy with the help of the robots and the human values can be increased. Normal hotels will be having the technique of the delivering the food by the servers, they will have to carry the food as well as they have to attend each of the tables to take the orders and also some of the peoples are there to clean the table. To treat the human and to increase the value of the humans they should be replaced with the robot robots. [1]Other set of hotels will be carrying the conveyor type delivery system where they can place order through the computer attached with the HMI (Human Machine Interface). In these type of hotels the food will be continuously carried by the conveyor and when it reaches the table where you sit, you yourself have to take out the food, you yourself have to stop the conveyor at your point. These problems can be rectified in the form of automating the same existing process by delivering the food by itself and clearing the customers by itself can increase.

## DISADVANTAGES OF EXISTING MODEL

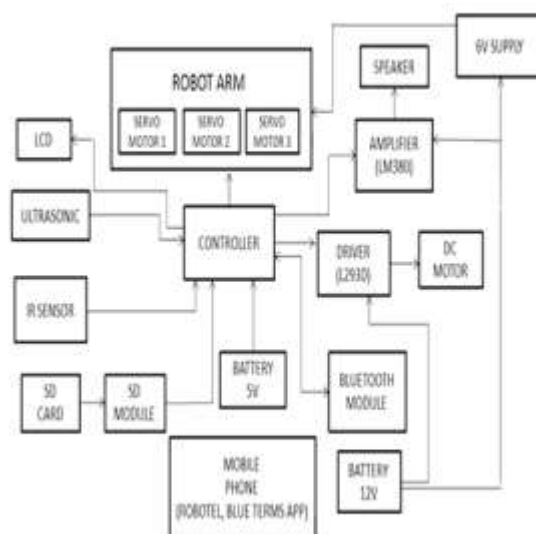
- Human values goes down
- More space occupation
- Energy loss
- Wrong delivery
- Labor
- Cost



Figure.1.Conveyer type food delivering robot

## II.PROPOSED MODEL

### A.BLOCK DIAGRAM



## B. INFRARED SENSOR

An infrared sensor is an electronic instrument which is used to sense certain characteristics of its surroundings by either emitting and/or detecting infrared radiation. Infrared sensors are also capable of measuring the heat being emitted by an object and detecting motion. All objects which have a temperature greater than absolute zero (0 Kelvin) possess thermal energy and are sources of infrared radiation as a result. Sources of infrared radiation include blackbody radiators, tungsten lamps and silicon carbide. Infrared sensors typically use infrared lasers and LEDs with specific infrared wavelengths as sources. A transmission medium is required for infrared transmission, which can be comprised of either a vacuum, the atmosphere or an optical fiber. Optical components, such as optical lenses made from quartz,  $\text{CaF}_2$ , Ge and Si, polyethylene Fresnel lenses and Al or Au mirrors, are used to converge or focus the infrared radiation. In order to limit spectral response, band-pass filters can be used. Next, infrared detectors are used in order to detect the radiation which has been focused. The output from the detector is usually very small and hence pre-amplifiers coupled with circuitry are required to further process the received signals.[2],[5]



Figure.2. IR Sensor

## C. ULTRASONIC SENSOR

Ultrasonic transducers are transducers that convert ultrasound waves to electrical signals or vice versa. Those that both transmit and receive may also be called ultrasound transceivers; many ultrasound sensors besides being sensors are indeed transceivers because they can both sense and transmit.

Active ultrasonic sensors generate high-frequency sound waves and evaluate the echo which is received back by the sensor, measuring the time interval between sending the signal and receiving the echo to determine the distance to an object. Passive ultrasonic sensors are basically microphones that detect ultrasonic noise that is present under certain conditions, convert it to an electrical signal, and report it to a computer. Ultrasonic probes and ultrasonic baths are used to apply sound energy to agitate particles in a wide range of laboratory applications.[2]



Figure.3. Ultrasonic Sensor

## D. BLUETOOTH MODULE

Bluetooth is a technology for wireless communication, it is designed to replace short-range cable connections. HC-05 Module is a Bluetooth spp (Serial port protocol) module, designed for transparent wireless serial connection setup. It is a serial port Bluetooth, which replaces wired serial connections. It can be used for a serial port replacement to establish connection between MCU and GPS, PC. Bluetooth Serial module's operation doesn't need driver, and can communicate with the other Bluetooth device who has the serial [3].

The master device cannot only make pair with the specified Bluetooth address, but also can search to make pair with other slave devices. On some specific conditions, master device and slave device can make pair with each other automatically based on the unique address within their respective signals.



Figure.4. Bluetooth Module

## E. DC MOTOR

A dc motor converts electrical energy to mechanical energy, through the interaction of magnetic fields and current-carrying conductors[4].

The DC motor has two basic parts: the rotating part that is called the armature and the stationary part that includes coils of wire called the field coils. The stationary part is also called the stator. The armature is made of coils of wire wrapped around the core, and the core has an extended shaft that rotates on bearings. The ends of each coil of wire on the armature are terminated at one end of the armature. The termination points are called the commutator, and this is where the brushes make electrical contact to bring electrical current from the stationary part to the rotating part of the machine.



Figure.5.DC Motor

## F.MOTOR DRIVER

Motor driver L293D[11] aims the motors to run at either directions with the usage of 4 output pins and 4 input pins which reads the control commands from the microcontroller. It uses H-Bridge which is typically an electrical circuit that enables a voltage to be applied across the motor in either direction as an output. And it just results in reversing the direction of current to rotate the motor in reverse direction.

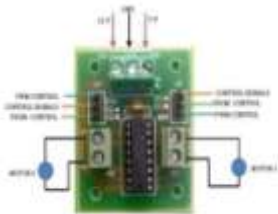


Figure.6.Motor Driver

## G.SD CARD MODULE

The Arduino SD card Shield is a simple solution for transferring data to and from a standard SD card. The pinout is directly compatible with Arduino, but can also be used with other microcontrollers. It allows you to add mass storage and data logging to your project.

SD cards work only at 3.3V and both the power and I/O levels must be accommodated. The module shown here uses FETs for level shifting and a 3.3V regulator for power when operating from 5.0V. A switch allows the module to be used with Arduinos/ YourduinoRobo 1 or Minis etc. running at 3.3V. We have tested the YourDuinoRobo 1 with it's power jumper set to 3.3V and the SD card module set at 3.3V and it works well.



Figure.7.SD Card Module

## H.GROVE SOUND SENSOR

Grove - Sound Sensor can detect the sound strength of the environment. The main component of the module is a simple microphone, which is based on the LM358 amplifier and an electret microphone. This

module's output is analog and can be easily sampled and tested by a Sseeduino.[12]



Figure.7.Grove Sound Sensor

## I.SERVO MOTOR

A servomotor is a rotary actuator or Linear action that allows for precise control of angular or linear position, velocity and acceleration. It consists of a suitable motor coupled to a sensor for position feedback. It also requires a relatively sophisticated controller, often a dedicated module designed specifically for use with servomotors.[10]

Servomotors are not a specific class of motor although the term servomotor is often used to refer to a motor suitable for use in a closed-loop control system.

Servomotors are used in applications such as robotics, CNC\_machinery or automated manufacturing.



Figure.8.Servo Motor

## J.LCD (LIQUID CRYSTAL DISPLAY)

16\*2 LCD module is a very common type of LCD module that is used in 8051 based embedded projects. It consists of 16 rows and 2 columns of 5\*7 or 5\*8 LCD dot matrices. The module we are talking about here is type number jHD162A which is a very popular one. It is available in a 16 pin package with back light, contrast adjustment function and each dot matrix has 5\*8 dot resolution. The pin number, their name and corresponding functions are shown in the figure,[13]

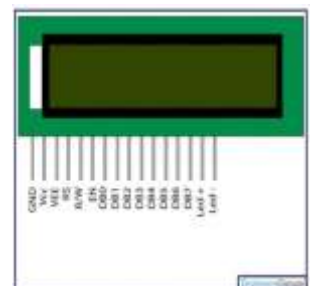


Figure.9.LCD Display

## K.HARDWARE IMPLEMENTATION

Firstly the customer who is sitting in front of the table will be provided with a mobile phone. Each of the mobile phones will be installed with the robotel app. The application will ask for the details such as the table number in which they are sitting and after selecting the corresponding table number it shows the menu card. The list of the items displaying in the application can be changed whenever we want to change the items or the rate of the item. This application will be user friendly so that any of the users can handle it very simply.[8]

Similarly another mobile with the installed robotel application will be provided to the controller or the kitchen person. This application acts as the receiver for the application which is going to transmit the information. This application communicates with the other application through the Bluetooth available with the mobile phone.[6]

Through this way the orders can be placed or cancelled as much as the customers do. When the order is received from any one of the customers the controller should have to make ready the items which have been placed by the customers. When the controller places the food on the robot, through the robot speech instructions the robot will ask the controller to select the respected table to which the food has to be delivered.[1]

When the controller presses the table number, the robot starts moving. The robot movement or the path of the robot is pre-defined through the line follower technique. This line can be made in any way as for as the design of the floor of the hotel at which the robot has to work. Through the line follower technique and with the help of the IR sensors the path of the robot is programmed and for the identification of the tables, the technique used in this robot is encoders. After reaching the respected table, the robot will welcome the customers through robot speech instructions. After that it delivers the food which is placed on the robot through the help of the robot arm. Here we have used three axis robot along with the gripper. Three servo motors have been used to deliver the food.

After delivering the food to the respected table the robot will automatically come back to the kitchen. While the robot is moving around the tables, when the robot faces any objects as the obstacle it will stop moving. This operation is made through the help of the ultrasonic sensor. While delivering the food simultaneously when the customers place the waste food on the robot, it wishes the customers and come back to the kitchen and troughs the plates at the kitchen.

When the controller comes to know that the customer is going to leave the hotel, he will again send the robot the respected table and the robot will itself clear the table.

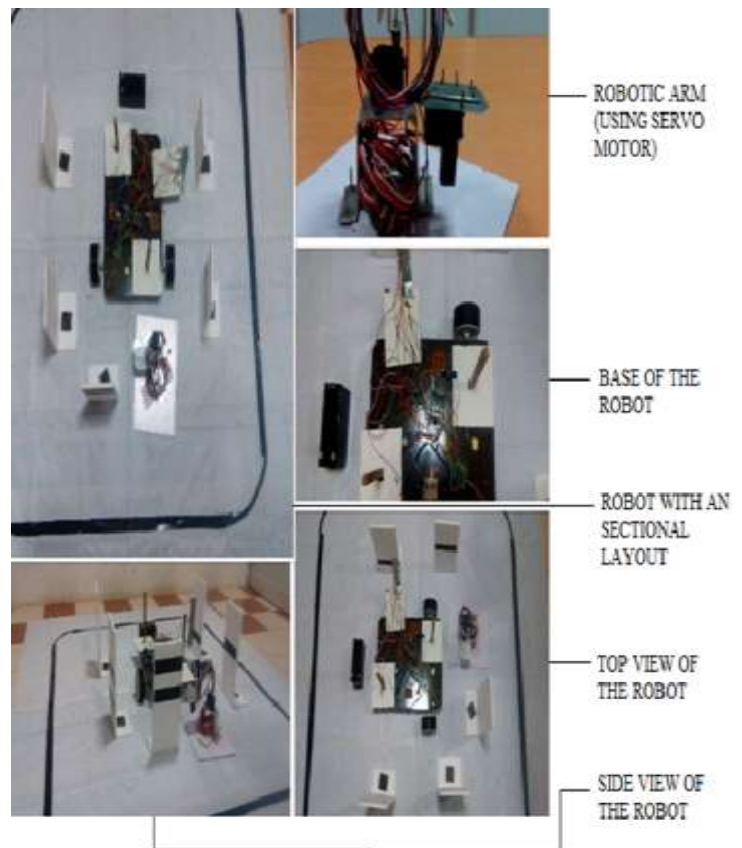


Figure.10. Hardware Implementaton pictures

## III. CONCLUSION & FUTURE SCOPE

The main aim of this project is to provide a remedy for the people working in the hotel as servers is to be replaced with robots so the efficiency of the delivery will also be good with respect to time, misplacement etc. This technology will also create a tremendous change in the autonomous world. It also has the Speech instructions option where it will help us in the hence of the customers and the operators in the user friendly manner. Also it has the arm to deliver the food as well as to clear the food. So this may be the best replacement for the existing model.[1]

A battery backup can be made in this system so as to with stand the power in terms of the malfunction. The robot arm can be enhanced by adding the number of axis in its arm so the functioning of the arm will be more effective and the jerks can be eliminated completely. Number of sensors can be increased for adding more number of tables.



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