International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 05 Issue: 08 | Aug - 2021 ISSN: 2582-3930

CANTEEN HELPER ROBOT- WAY TOWARDS RESTAURANT AUTOMATION

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Abstract : **Paper describes the design and working of a canteen helper robot which is used in restaurant automation. It is very useful during the peak hours in restaurants . During peak hour it helps in serving order and help chef in preparation of food. Food is ordered by app, which is then connected to Bluetooth module in canteen robot.**

Key Words : Canteen helper robot, line follower,Canteen automation, Arduino

1. INTRODUCTION

Robots are used by human for the completion of difficult work that require great strength, precision, accuracy and time. The branch of robotics which plays such role is called "social robotics" [1] .In today scenario social robot can communicating with human, interacting and relating to society in all aspect and are capable of understanding social terms [2]. Due to the modernization in robotic technologies, many new designs and mechanisms are being implemented which are capable of reading human thoughts and understand action. Such robots find vast applications in assistive robotics e.g. to help out in injuries and sickness of people [3]. Theses robots are adaptive, i.e. they can be used in different modes as per scenario [4]. So far, the robots are those who learn from us, but that time will not be so far when human will learn from robots. Now days using robot in restaurant for automation is new trend.[5]. These robots can welcome guests, take orders, serve food to customers [6]. Developing such robots shows the effectiveness to learn new concepts in human robot interaction, developing advance model and protocol for the communication as well as use new architectures for real time path ideas, direction and control.

This paper is designed as follows: Section 2 presents the problem techniques; design of the canteen helper robot is discussed in Section 3 with all subsystems.

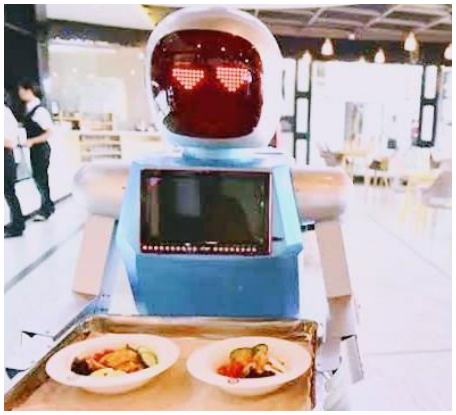

Fig. 1- Canteen Helper Robot

II. TECHNIQUE

Robots can be classified into mainly two types. The first one is manually operated robot and second one is automatic robots. Manual robot is remotely controlled and guided by a human operator who views and senses the environment through the robot sensors. Whereas, the automatic robot has multiple sensors to detect events and measure state information which is then used to apply control logic [7]. We need to design an automatic robot to carryout various tasks by itself, whereas commands are sent to the canteen helper robot via Bluetooth module.

The problem of restaurant automation deals with the structure of communication system and a canteen helper robot which.

III. DESIGN OF canteen helper roboat

The design of a canteen helper robot is based on the line following robot. In manual café systems, one can witness a lot of problems. The robot is an innovation and the concept can be used for restaurant automation in various food chains.

The project has two important parts namely the mobile application and the Robot itself.

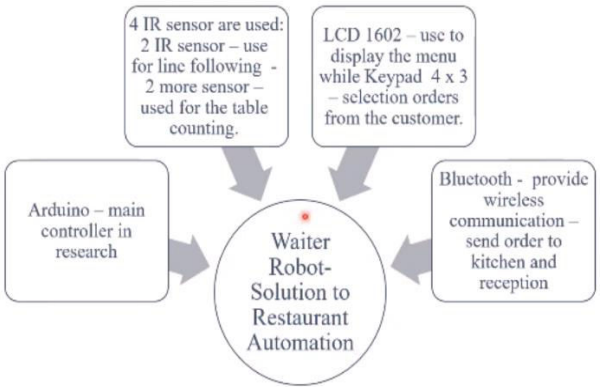

Fig.2 Block Diagram of Component used.

IV. Working

The application is based on the LCD, Keypad and the Bluetooth module. The LCD is used to display the order of menu bar, while the Keypad is used to select the order. The customer places the order using mobile . The order is sent to the kitchen and reception using Bluetooth. The Bluetooth module is used for the wireless communication having the range of 10 meters.

The canteen helper robot will work on the phenomenon of line following, we have used four IR sensors; the two sensors in the center are used for line following and set the robot waiter on line, The other two sensors mounted on sides are used for table counting, i.e. if the robot count one, it means that it has stopped on the first table, and if the robot count two, the robot has stopped on the second table for 20 seconds and so on. The command to stop at the table number is sent to the robot wirelessly from the kitchen using wireless transmitter.

We have used IR sensors as feedback element to keep the robot tracking the line. Once all sensors are "ON" for the first time, the controller waits for the RF command. If command is for table 1, then the arduino follows these instructions:

1. If all sensors is ON for the second time, then wait for 20 seconds.
2. After 20 seconds, a motor ON command is sent till all sensors are ON the fourth time, same as for table number.
3. In case, when second sensor is "ON" and third sensor is in "OFF" condition, the microcontroller sends command to motor 2 "ON" and motor 1 "OFF" in order to follow the line.

Similarly, in other cases, the second sensor is "OFF" and third is "ON". So, in this way, we control the robot on track line and accuracy is also improved.

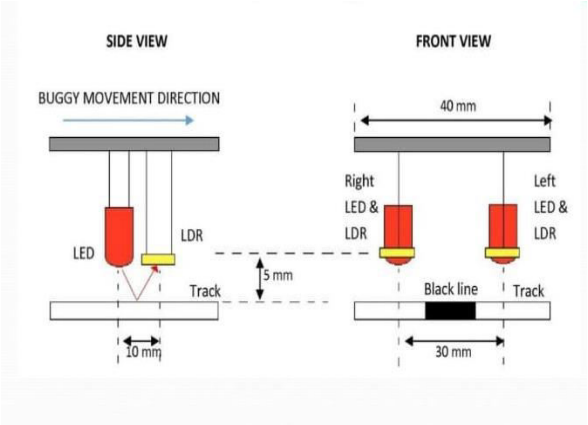

Fig.3 Sensor Unit

V. Methodology

It contains both components hardware as well as software. Software is used to give the order related command and hardware is used to complete operation on ground. The all system is driven by Arduino. Arduino is used to establish proper connection with the software and hardware components. The all processes can be understand into step and by the flowchart.

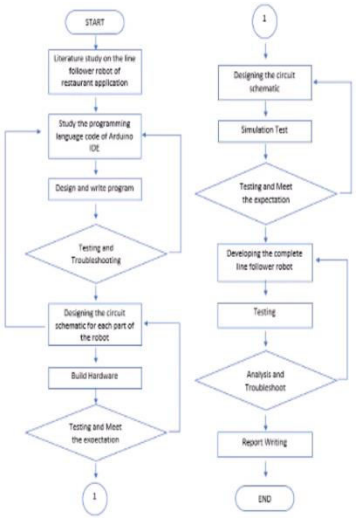

Fig.4 Flow chart

VI. Voltage Regulator:

A voltage regulator is a component of the power system unit that ensures a steady constant voltage supply through all operational conditions. It regulates voltage during power fluctuation. Voltage regulator provides the voltage levels according to our need as shown in Fig. 5. we require two regulators; First regulator can regulate +5V and other provides 3.3V. The +5V regulator used for the supply of a microcontroller and the second one with 3.3V regulated output is used for supply to the X-BEE module. For +5V regulator we use LM 7805 and for 3.3V we used LF 33 regulator.

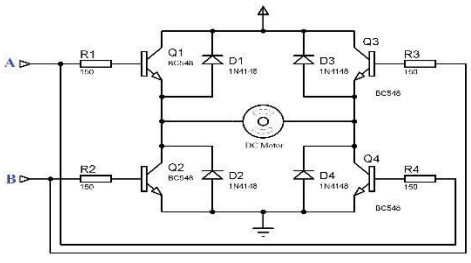

Fig .5 H-bridge

VII. Line tracking sensor circuit

As seen in the block diagram of the canteen helper robot , arduino is managing all tasks for the motor driver as well as communication between robot and customer.

Fig shows the line tracking sensor circuit. The central two sensors are used for line-following and set the robot waiter on line. The two side-sensors are used for tables. If the robot counts one, it means it will stop on the first table, and if the robot counts two, the robot stops on the second table for 20 seconds. The command for table is sent to the robot via wireless link from the kitchen using wireless transceiver.

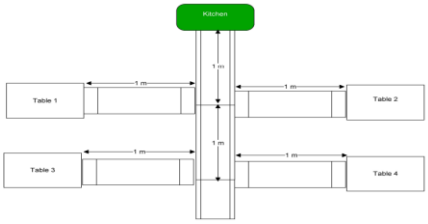

Fig.6 Table Arrangement

IV. Conclusion

Robot designed to serve the customer. Developed app to make the robot to serve. The canteen helper robot is used to reduces the lack of human resources in peak hour of any restaurant and cafes. The maintenance cost of this robot is very low and have very high efficiency. Multiple customer tables are placed or stop over, order placement and delivery from the kitchen. The Canteen Helper Robot is automobile system that has ability to recognize it's path , move and change the robot's position toward the line in the best way to remain in track. This project report presents a photodiode sensor based CANTEEN HELPER ROBOT design of 200gm weigh which always directs along the black line on white surface . The robot is able to detect it's path in case it is out of path .The Canteen Helper Robot project challenged the group to cooperate, communicate, and expand understanding of electronics, mechanical systems, and their integration with programming. The successful completion of every task demonstrated the potential of mechatronic systems and a positive group dynamic.

FUTURE SCOPE

This project includes, higher public acceptance, perceived benefits of protection against electromagnetic field radiation (which is still present in underground lines), lower maintenance and fewer interruption. Failure rates of overhead lines and underground cables vary widely, but typically underground cable outage rates are about half of their equivalent overhead line types. Primary benefits of using underground cables can be cited into four areas: Potentially-Reduced Maintenance and Operating
Costs, Lower storm restoration cost, Improved reliability, less damage during severe weather.

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