SERVEXA: The Serving Robot

Shruti B P[*1], Anuson Jose[*2], Harshitha V[*3], Sagar Shah[*4], Shree Lakshmi[*5]
[*1]Faculty of Information Science and Engineering, Sri Krishna Institute of Technology,
[*2,3,4,5] Dept of Information Science and Engineering, Sri Krishna Institute of Technology,
Bangalore, India.

***Abstract* - The project outlines the design and development of a Serving cum Waiter Robot which is considered as a possible solution to address the lack of human resource and to introduce Automation.The Human waiters are replaced by the Robots as Servers and Waiters In cafes, restaurants and Hotels. The lack of human resource can be addressed by automation through an electronically automated system called "Serving Robot" which does the job of a Waiter, Server as well for ordering food items and beverages. The menu bar comprises of a OLED display screen,4*4 Keypad and a WIFI module. The Patrons can place an order with the help of 4*4 remote/keypad built on the robots body. The robot receives the order request from the patrons and the same is forwarded to the kitchen.**

Keywords - RPA, Node MCU, OLED, Keypad.

I. INTRODUCTION

As the world is emerging towards new trends and technologies, there is a need to invent something that is more attractive and useful for the citizens. In the present approach we are introducing Automation into picture which makes things much simple. Basically, Robotic Process Automation is a technology that uses robots to automate monotonous tasks and manual processes. The entities which emulates certain actions are called Robots. Automation is any process which is done by minimal human assistance.

All the actions take place in a virtual reality and not on screen; the robot does not need a screen to operate, rather it elicidates the screen display electronically. The intelligent circuitry along with the potentiometer makes the servo to rotate accordingly. The buttons are placed on each table to summon the Robot which makes the job very easy. Each switch is of 3volt in this way a very small amount of energy is consumed. The ultrasonic sensors are placed inside the robot in order to detect the obstacles lying in its path. OLED screen is used to display the contents of the menu. A 4*4 Remote/keypad is provided for user inputs, So that the customers can order easily by themselves using the keypad on the Robots body.

II. LITERATURE SURVEY

[1] *Serving Robot New Generation Electronic Waiter:* In today's modern world the use of robot is rapidly increasing. Robots are capable of doing work more effectively and efficiently than humans. One such example can be SERVING ROBOT. There are multiple researches done on serving robot. The paper shows the working of Serving Robot which will take order as well as serve the food to the customer. The implementation is done with available resources to reduce the cost of project. [2] *Smart Floor Cleaning Robot:* With the advancement of technology, everyone wants their tasks to be done in a easiest possible approach. The paper concentrates in designing of a Smart Floor Cleaning Robot. The robot can work in both manual and autonomous modes including scheduling for specific time and bag-less dirt container [3]*Waiter Robot– Solution to Restaurant Automation:* The main idea of this paper is to design a robot or an agent that can do the job a Waiter. The problems regarding Increased waiting time can be handled with the help of this "Waiter Robots". The wished order is forwarded to the kitchen. [4] *Social Service Robots in Public and Private Environments:* Research on service robots majorly in hospital industries has been increased nowadays due to this covid-19 pandemic. Possible solutions are to be addressed to overcome the problems faced by the health care professionals in the treatment of their patients without being infected themselves in treating the patients.

III. METHODOLOGY

The proposed system contains both hardware and software tools as components. Here the Raspberry pi is used to establish the connection with the software and hardware components. It also contains Node MCU device which will be used to establish the connection between the Robot and the tables. So that the robot will exactly know to reach the respective table which is requesting for the service. Raspberry pi and Node MCU communicates through http request and response procedure with help of Wi-Fi.

Node MCU: Node MCU is less expensive open source IOT platform. Node MCU is used to establish the connection with the tables. It uses Wi-Fi modules for connection. In the project the robots will be trained to serve food as well as to do the Waiter job.

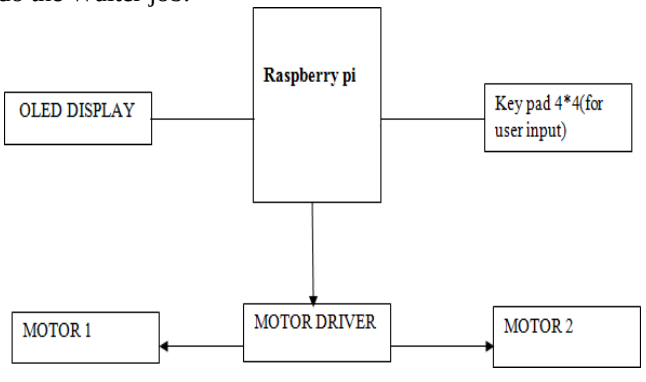

Fig. 1 Connection of Devices

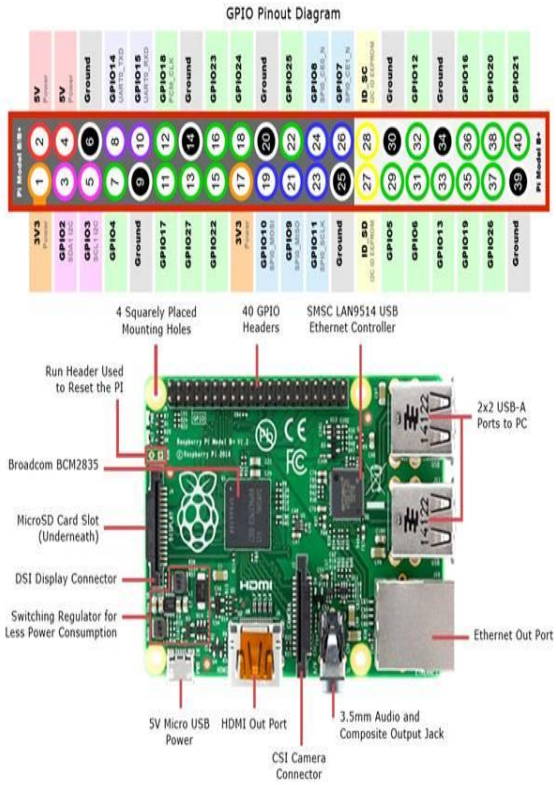

Fig. 2 Raspberry Pi

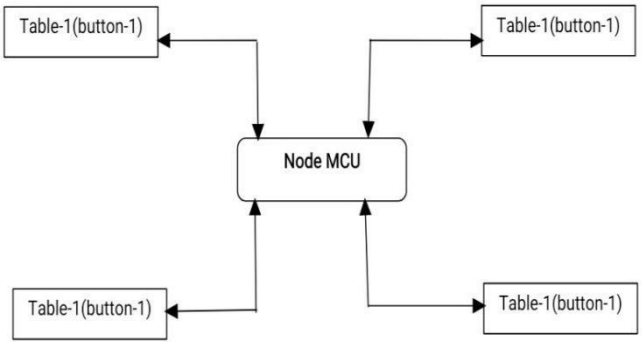

Fig. 3 Connection of Tables

IV. RESULTS AND DISCUSSION

The system uses RPA, is a process that is used instinctively perform certain tasks or operation. Normally all of these actions take place in a virtual reality and not on screen. So, in order to request the Servexa robot the customer should press a button present on each table which makes the task of requesting the robot easier. Each button on the table comprises of 3v of power output and hence the amount of energy consumed is very less. As soon as the button is pressed the robot moves towards the table. Whenever the robot encounters an obstacle in its path, the IR sensor present on the robot will detect the obstacle by observing the change in output of sensor it sends a signal to the buzzer and the beep indicates the presence of obstacles in the path. The customer's order via keypad that is placed on the robot. Customers view the menu, price and make order directly using this system. Then the order will be displayed on the OLED display even that is present on the robot. Autarchic(autonomous) serving robot collects the order as well serves the food to the respective tables assigned.

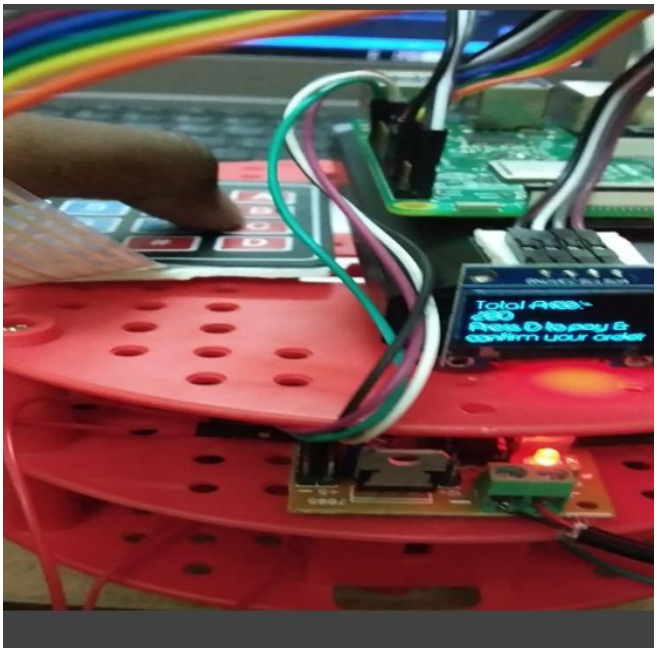

Fig. 4 Robot serving food

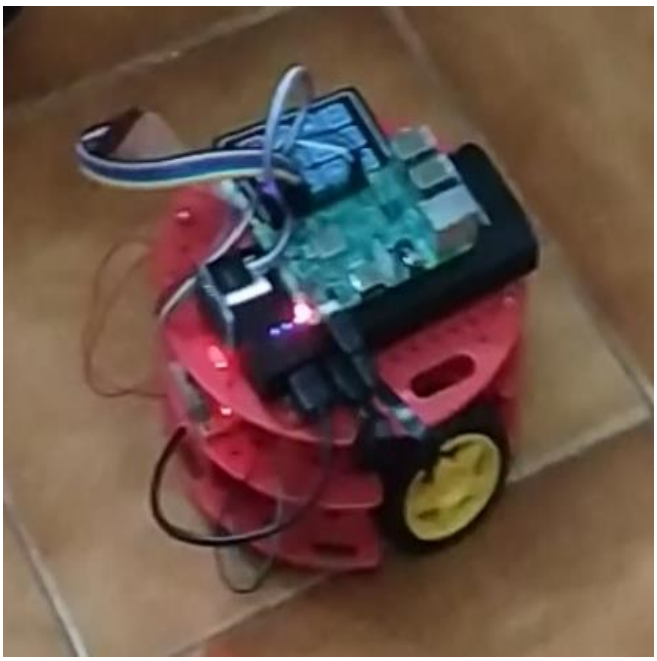

Fig. 5 Serving Robot

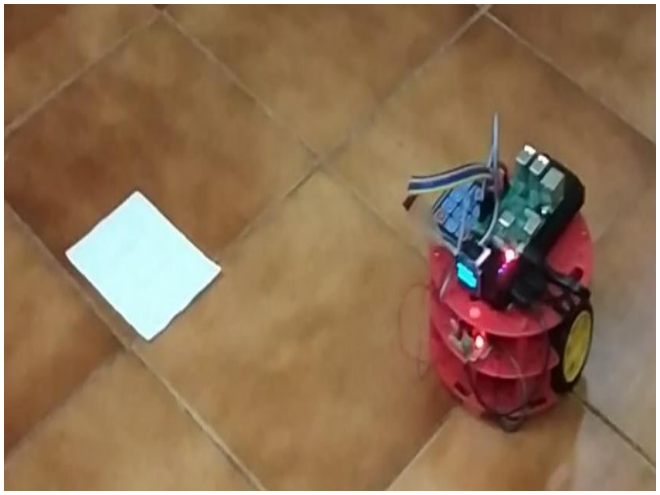

Fig. 6 Robot serving the clients

V. CONCLUSION

This project helps in reducing the lack of human resources to serve in restaurants. The Robot is cost effective once we built later just maintenance is required. In the future work the innovation of the hardware and software components will be done. This model can be used in the hospital to serve a food and medicines for the patients, and in the apartment or in some gated communities to deliver a food or food items. To be more clear and precise the present project is not for a specific use rather it has multiple uses as well. So,with the help of RPA it is easy to achieve time efficiency, cost reduction, efficiency in work and also it addresses the requirement of man power.

VI. ACKNOWLEDGEMENT

This research was carried by Sri Krishna Institute of Technology, Bangalore for which we are immensely grateful. We extend our deep sense of sincere gratitude to our Fellow mates from Sri Krishna Institute of Technology who helped us for this successful research. We express our heartfelt sincere gratitude to Dr. HemalathaK.L, Professor and HOD, Department of Information Science and Engineering for assistance regarding the recommendation of the latest Artificial Intelligence courses and materials, and for comments that greatly improved the manuscript. We extend our sincere gratitude to our guide Mrs.Shruti B.P, Assistant Professors, Department of Information Science and Engineering for sharing their wisdom during this research.

REFERENCES

[1] Neeti Malik, Neetu Rani, Alpana,Singh Pratibha, Srishti Pragya Serving Robot "New Generation Electronic Waiter" International Journal for innovative Research in Science and Technology Volume 2 Issue 11 ISSN:2349-6010

[2] Uman Khalid, Muhammad Faizan Baloch, Haseeb Haider, Muhammad Usman Sardar, Muhammad Faisal Khan, Abdul Basit Zia and Tahseen Amin Khan Qasuria "Smart Floor Cleaning Robot" 2015

[3] M. Asif, M. Sabeel, Mujeeb-ur-Rahman, Z. H. Khan "Waiter Robot – Solution to Restaurant Automation" 2015

[4] Sakari Pieska , Mika Luimulai, Juhana Jauhiainen , and Van Spiz Centria Research and Development "Social Service Robots Publicly and Private Environments"

[5] Tan-Hsu Tan, Ching-Su Chang, and Yung-Fu Chen "Developing an Intelligent E-Restaurant with a Menu Recommender for Customer-Centric Service" IEEE Transactions on systems, man, and cybernetics-PartC:Applications and reviews, vol.42, no-5, September 2012.

[6] Sun Guiling, Song Qingming "Design of the Restaurant Self-Service Ordering System Supportes ZigBee Technology" Communications and embedded system lab College of data Technology and Science, Nankai University Tianjin, China.

[7] M. Z. H. Noor, A. A. A. Rahman, M. F. Said, M. S. A. M. Ali, M. Zolkapli "The Development of Self-Service Restaurant Ordering System" (SROS)‖ 2012. IEEE Control and System Graduate colloquium(ICSGRC 2012)

[8] Soon Nyein Cheong, May Hui Tzu Yeong, Jia Neoh, Chun Yee The, Wen Jiun Yap "Enriching Dining Experience with the Multi-Touchable Entertainment Applications" 2010 International Conference on Science and Social Research (CSSR 2010), December 5 - 7, 2010, Kuala Lumpur, Malaysia.

[9] YongChai Tan, BentFei Lew, KhimLeng Tan, Kevin Goh, KienLoong Lee, ZhiChao KhoT.A "Replacement Automated Food Delivery System Using Autonomous Track" Proceedings of the 2010 IEEE Conference on Sustainable Utilization and Development in Engineering and Technology University Tunku Abdul Rahman 20 & 21 November 2010, Faculty of Engineerin,Malaysia.

[10] Ching-so Chang, Che-Chen Kung, Tan-Hsu Tan "Development and Implementation of an E-Restaurant Customer-Centric Service Using WLAN &RFID".

[11] N. Fathima, A. Ahammed, R. Banu, B.D. Parameshachari, and N.M. Naik, N.M., "Optimized neighbor discovery in Internet of Things (IoT)," In Proc. of International Conference on Electrical, Electronics, Communication, Computer, and Optimization Techniques (ICEECCOT), pp. 1-5, 2017.