

# Wheeled Robotic System for Restaurants

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**ABSTRACT--** Nowadays, People prefer eating in restaurants. Eventually crowd in the restaurants has increased. In the restaurant manual system, the waiter has to note down the customer orders in a paper. So there is chance of missing the paper or misplacing the orders. In order to solve this problem, automation is brought in this scenario. This project consists of IR sensors, a serving robot and two android applications (Customer Android application and Management Android application). Each table consists of a tablet with customer android application, which consists food menu. Another tablet with management android application will be placed in kitchen. When order is placed, the food is prepared and placed on the tray in the serving robot. After that, the chef has to enter the table number using keypad in the robot. Infrared Ray sensors will be placed in the front and back of the robot, to detect obstacles. When obstacle is detected, the robot is stops moving until the way becomes clear. The serving robot reaches the table. After serving the food, the robot returns to the kitchen.

**Index Terms--** *Android Application, Embedded, Restaurant, Tablet, Robot*

## 1. INTRODUCTION:

“Wheeled Robotic System for Restaurants” has been implemented to replace the manual system. We handled Hardware as well as Software for this project. Mainly we focused on to make the restaurants are Manual workers free like Robots will serve the order. Android app is developed to order the dish separately. The main aim of this project is to computerize of all the process in the restaurant In today’s world people have many workloads, lot of stress in the working area, so they are unable to manage the cooking work in the home. So they want to less their loads they choose the restaurants with the fast and reliable service for eating foods. Once they arrived to a restaurant, they will order the foods to the waiter, but he has a chance to misplace the order. On the hardware side technologies like “LPCXPRESSO” as an IDE for programming and “Flash Magic” as an user interface, command line interface allowing use in IDE’s and batch files ,programming a device and setting key options has been done. Hardware kits like “LPC812” chip along with “ARM Cortex Mo+”, “IR” Sensor which has been used to detect the interruption occurrence, Motor Driver “L293D” has been used to enable all the pins and used as a key to rotate the shaft which has been used to rotate the wheels.

On the software side android application is developed through an Android Studio IDE. Two Applications has been developed. One is Customer Application and another one is Admin or Chef Application. Customer has been provided with tablets on their table to order the food along with the

table number as well as they can give suggestion or their opinions and chef has also provided with the tablet to receive the orders and he/she will complete the process by delivering the food to the customer.

Serving system has been done through the wheeled robots, it has provided with the 4 buttons, once the chef/Admin has received the order from the customer and the ordered food is ready means then the chef place the food in the robot plate and press the enter button along with the table number. Then the wheeled robot will start moving, if any interruption occurred means then the device will get stopped, after the clearance of interruption the robot again will start moving and reach the table to serve the food to the customer. After the food served to the customer, the process is reversed, customer has to press the go button along with their table number, then the device get reversed moving then reach the Chef/Admin.

## 2. LITERATURE SURVEY:

*Mr. Maderla Rajesh G.Satya Prabha,Mr. P.V.Vara Prasad et.al.*The main purpose of this paper is to design an advanced e-restaurant online management system using android smart mobile with Bluetooth wireless technology. The menu will be displayed automatically using android application on the table and we can directly order the food items with the help of Android Phone. The controller also takes the responsibility to display the menu items selected on the LCD display unit. At the Kitchen section using wireless RF communication the selected items will be displayed on LCD along with user table number.

*Sushmita Sarkar<sup>1</sup>, Resham Shinde<sup>2</sup>, Priyanka Thakare, Neha Dhomne<sup>4</sup>, Ketki bhakare.et.al.* In this paper, they compared the major automaton tools in Restaurant sector namely, the PDA based System, QORDER system and Android based system. The GUI of Android applications are more attractive and informative than the PDA and QORDER systems. The processing speed of Android system and QORDER system is almost the same whereas the PDA based systems are slower than the other two systems. Therefore, it is clearly visible that Android based systems are the cheapest automation solution for the restaurant owners. Thus, the proposed system has the potential to attract customers and also adds to the efficiency of maintaining the restaurants ordering and billing sections.

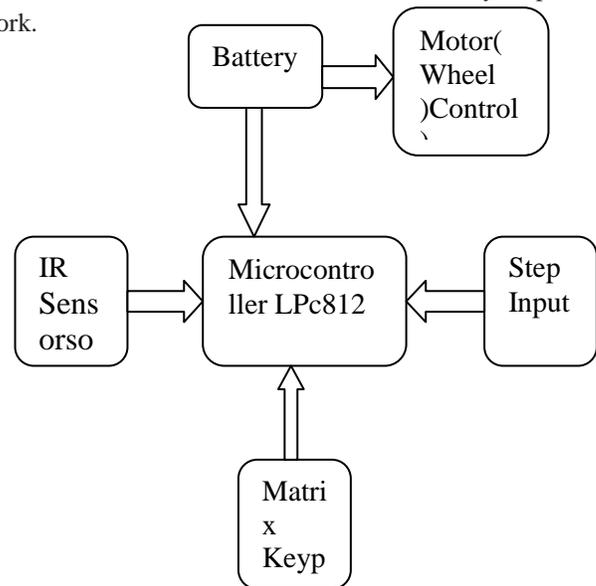
*Juhana Jauhiainen, Sakari Pieska, Markus Liuska, Antti Auno.et.al.* In most of the restaurant meal ordering is relying on the interaction with waiters to place order into the kitchen. In busy hours of restaurant this coordination is a challenge result in un-satisfaction to the customer. To realize this, Intelligent Restaurant is designed. It used modern innovation such as multi-touch module, RF module, Meal Serving Robot and database to improve quality of services of Restaurant and to enhance customers' dining experience. A meal serving robot is a line following robot which is designed using sensor to track the black line path predetermined for serving. Android Application - PayPal is used for online payment.

*SongQingqing and sun guiling..et.al:* In this paper they have tried to demonstrate a prototype of Autonomous Serving Robot which will bring order and serve the food to the customer. The implementation is done with available resources to reduce the cost of project. In this paper they demonstrated the idea of automatic menu serving robot. They have made a robot which provides proper service to customer in restaurant. If a person wants to give an order, then he simply connect to a Bluetooth connection available which is assign by the restaurant, and the menu card will be displayed on their mobile screen. The whole system makes open use of Bluetooth as well as RF technology

### 3. ARCHITECTURE:

**Battery:** An electric battery is a device consisting of one or more electrochemical cells with external connections provided to power electrical devices such as flashlights, smart phones, and electric cars. When a battery is supplying electric power, its positive terminal is the cathode and its negative terminal is the anode. The terminal marked negative is the source of electrons that

when connected to an external circuit will flow and deliver energy to an external device. When a battery is connected to an external circuit, electrolytes are able to move as ions within, allowing the chemical reactions to be completed at the separate terminals and so deliver [energy to the external circuit. It is the movement of those ions within the battery which allows current to flow out of the battery to perform work.



**Motor(wheel control):** In this system motors are used to control and move the robot from one place to another using the connection of the controller and the sensors. Motors are connected to a wheels for moving and active the robots.

**IR Sensor:** It is an electronic instrument. It is used to sense 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. Infrared waves are not visible to the human eye. The key benefits of infrared sensors include their low power requirements, their simple circuitry and their portable features. Infrared transmitter is also known as infrared emitter, or IR emitter. It is a source of light energy in the infrared spectrum. It is a light emitting diode (LED) that is used in order to transmit infrared signals from a remote control. It delivers strong and wider resulting signals. Infrared emitters are also partly responsible for limits on the range of frequencies that can be controlled. Infrared receiver, or IR receiver. It is a hardware that sends information from an infrared remote control to another device by receiving and decoding signals. The receiver outputs a code to uniquely identify the infrared signal that it

receives. It converts signals from the remote control into a format that can be understood by the other device

**Microcontroller LPC812:** The LPC812 are an ARM Cortex-M0+ based, low-cost 32-bit MCU family operating at CPU frequencies of up to 30 MHz . The LPC81xM support up to 16 kb of flash memory and 4 kb of SRAM. The peripheral complement of the LPC81xM includes a CRC engine, one I2C-bus interface, up to three USARTs, up to two SPI interfaces, one multi-rate timer, self-wake-up timer, and state configurable timer, one comparator, function-configurable I/O ports through a switch matrix, an input pattern match engine, and up to 18 general-purpose I/O pins. In this management or automated system we used a IC called LPC812M101JDH20 (microcontroller which is all are connected in a single chip no connection is established as external device) for sensing the robots.

**Matrix Keypad:** It is an android application which is developed in this project. This part is connected to the kit for ordering and receiving the foods/dish. Two application were developed. One is customer side application which is used for the customer to order the foods/dish separately provided with their smart tables. Another one is Admin/Chef side application which is used to receive the foods/dish from the customer and complete the process after delivering the food to the required customer.

#### 4. PROPOSED SYSTEM:

The system uses the android application for ordering the food by the customer to avoid the misplacement of orders and missing orders by the waiters/workers, also uses the wheeled robot to serve

the food to the customer using the ultrasonic sensor to correctly place and serve the food to the correct

table which is ordered by the customer. Also the robot will be stopped while the interrupt or motion detected while moving into the table. The system will processed and mainly used the sensor to detect the robots and also used for turning the robots.

#### 5. CONCLUSION:

In this project, provides implementation of a wheeled robotic system for restaurants using microcontroller and place the order using the smart android tablets. Statistical report for wireless technology like web service under PHP along with the android usage its reviews how the technology used for designing the portal device. The project provides LPC 812 kit microcontroller along with the ARM Cortex Mo+, IR sensor, Motor Driver L293D

on the hardware side to control the device/wheeled robot and two android applications on the software side to place the order by the customer and receive the order by the admin/chef. The project has been designed and implemented successfully using the unique data.

The idea of the wheeled robotic system for restaurants can also be extended for future using the Ultra sonic sensor, alarm or microphone. Ultra sonic sensor can be used to measure the distance for moving easy to the robot, alarm can be used to alerting while the interruptions remains stable, microphone can be used for voice alerting while the interruption remains stable. It can be also solved in another way using the automatic turning by the usage of highly sensed Microcontrollers and sensors.

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[10]<http://ieeexplore.ieee.org/document/5370961> real time ordering system.