Smart Restaurant Menu Ordering System Using Arduino Uno

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Abstract: The major issue faced in restaurants and hotels is the quality of service provided by them especially ordering of food. Traditionally, it used to take a long time for food ordering as waiter used to note down orders, place it kitchen and the food was prepared. It also involved traditional pen and paper method and the process was time consuming. It also involved a lot of wastage of paper. Hence, we have designed the smart restaurant in which the orders will be placed paperless using Arduino UNO, TFT touch display connected to the kitchen chef directly using RF Transmitter. This acted as the transmitting side. At the receiving side, the order placed is seen on LCD screen and indication of buzzer with the help of RF Receiver and I²C Module confirmed the placing of order to kitchen. Hence, the workers focused on billing and other work process and provided better quality services. We found out that this method is useful in many ways like- It not only saved the wastage of paper but also reduced the burden on the waiters and workers to great extent. Time management was also done as more and more customers could be handled by taking their orders and provide quality service. This setup is quite practical on basis such that this system can be implemented for small startups hotels and restaurants. The investment cost is also one-time investment as it requires less maintenance. The only fact it requires is to update the system as per our convenience and new offers. It also required average skilled labor to operate. Hence, we can conclude that this system is eco-friendly as it saves the paper usage by directly giving the order to kitchen and chef. The second grasping factor is that the waiters can involve them in other process of billing and other process. Hence it promotes the multi-tasking process. Third factor covered is that fresh food can be served at a faster rate to the customers due to this table-kitchen friendly process. It even eliminates the errors occurred due to traditional methods and also involves constant upgradation and upliftment of the system helps in better customer end services.

Keywords: Customized menus, tablet-type devices, pen-paper method, allergic etc.

I. INTRODUCTION

Dinning is enjoyed by everyone whenever we go on vacations, holidaying and other activities. We always appreciate the quality of service provided by restaurants if they serve as per our needs and this all depend on the dining and the quality of service provided by them to the customers. But sometimes there is a delay in this service and the customers get irritated. It is not totally fault of either the hotel-staff due to work load of taking continuous orders and customers are also in a jiffy to move ahead in their routine work. So, remedy to this issue is that we have designed a smart restaurant menu ordering system which is direct connection between customer and the hotel chef and the order will be placed directly to kitchen. So, basically our system is divided into two parts i.e. first one is the Transmitter Section and Second one is the Receiver section. In Transmitter section we have used Arduino UNO, TFT display and transmitter which will transmit the data given by the customers which includes the food items ordered and in the kitchen the chef will receive the order. Hence, food will be prepared quickly without wastage of time. The second point of focus is that it is environment friendly. To tell in short, in earlier times the waiter used to note down the order on paper and then place the order. After that the paper would be discarded. So, we know that lacks of people visit the hotels every day. So, there was a huge wastage of paper. But our system overcame that issue by directly placing the orders to the kitchen. Hence,
the hotel staff can be engaged in other work like delivery of the food, billing and remote location services. Hence, it increases the efficiency of providing quality services to the customers. Another issue was the hand-writing of the waiters, sometimes undecipherable to chef. But in our system due to usage of TFT LCD display there is standard font with size and bright cool color which will be eye stress reliever. Earlier there were various systems of smart restaurant which included using of Zig-bee technology, QR Scanner code technique, using Raspberry pie, virtual hotel concept. But all this required highly skilled labors, source of income and setup. So, our Arduino set-up is user friendly as it is easily configurable and even average learned person can operate it. The second interesting fact is that the system is pocket friendly as it is onetime investment.

II. PROBLEM STATEMENT

- To use the traditional food ordering system is entirely a manual process which involves waiters, pen and paper.
- To make customer wait for waiters to take the order in pen and paper system.
- To use traditional system is simple; but it involves errors while noting down the orders as well as in making calculations.

III. SYSTEM SPECIFICATION

3.1. ARDUINO UNO

Arduino UNO is a Microcontroller Board which is based on 8-bit ATmega328P microcontroller. Along with ATmega328P, it comprises other components such as voltage regulator, serial communication, crystal oscillator etc. to support the microcontroller. Arduino UNO consist of 14 digital input-output pins where, 6 pins of them can be used as analog input pins and another 6 pins of them are used as PWM outputs, Power Barrel Jack, a USB connection , a Reset button and ICSP header. Arduino board can be used to communicate with another Arduino board, a computer or other microcontrollers. The ATmega-328P microcontroller delivers UART TTL (5V) serial communication which can be done using digital pin 0 i.e. Rx and digital pin 1 i.e. Tx.

3.2. RF Transmitter and Receiver Module

The 433MHZ RF Transmitter and Receiver module is one of the best reasonable and simple to use module for every wireless projects. These types of modules can be used lone in pairs and only Simplex Communication is possible with these modules. The Transmitter (Tx) module has operating voltage +5V only where the operating current ranges between 9mA to 40mA on the other hand the Receiver module has operating voltage range is 3V to 12 V and operating current is 5.5mA. These types of module could cover a minimum of 3 m(meters) and with appropriate antenna power it can cover upto 100 m theoretically. But practically, roughly we can get nearly 30-35 m in a normal test conditions. and has data transmission speed up to 10 Kbps.

3.3 2.4” TFT LCD Module

A 2.4 TFT LCD module comprises of a Bright backlight and a colourful display of 240*320 pixels. It main highlighting aspect is individual RGB pixel control which gives a far improved resolution than the black and white displays. A Resistive Touch Screen comes pre-installed along with the module as a bonus and hence you can simply detect your finger presses anywhere on the screen. Its Operating voltage is about 3.3V .It also has SPI and 8-bit operating Mode.

3.4 16x2 LCD Module

LCD modules are generally used in many embedded projects, the reason being its low Price, Programmer friendly and Availability. It has 2 Rows and 16 columns. There are many combinations are available such as 8×1, 8×2, 10×2, 16×1, etc. but commonly used one is the 16×2 LCD module. 16×2 LCD module has 32 characters(i.e.16×2=32) in total and each one character has 5×8 Pixel dots. It has operating voltage in between 4.7V to 5.3V and the current requirement is 1mA without backlight in use. Also, it can be operated on both 4-bit and 8-bit mode.
3.5 I2C Module

For displaying received data on LCD module we have used I2C module. I2C Module has an inbuilt PCF8574 I2C chip that converts I2C serial data into parallel data for the displaying on the LCD. This modules are currently supplied with a default I2C address of 0x3F or0x27. Also, in this module with the help of potentiometer Backlight and Contrast is adjusted.

IV. WORKING AND METHODOLOGY

Our Smart restaurant menu ordering system is basically divided into two parts : Transmitter section (Customer Side) and Receiver Section (Chef Side). Whenever the customer will enter the hotel and take a table, he will read the menu given on TFT display which will be mounted on table. hen after making suitable decision the customer will place the order using TFT display with the help of touch-screen or touch-stick system. The order will be processed by the Arduino UNO and the data will be sent serially with the help of radio frequency transmitter through antenna to the kitchen. The antenna which is at the kitchen side will receive the food order with the help of radio- frequency receiver installed at kitchen side while Arduino uno will process the data and the chef will see the data with the help of 16 x 2 LCD display and start preparing of food.

In this way, the food will be prepared at the faster rate and time will be saved and more orders can be taken. The prepared food will be taken directly to the customer from kitchen. Hence, also called as interaction cum service.

4.1 Transmitter Section

In the transmitter section circuitry of our system shown in fig.(1) consist of Arduino UNO which is the brain of the transmitter side that processes all the data and also it is a open sourse Microcontroller board based on 8-bit ATmega-328P Microcontroller chip. This Arduino UNO board consist of 14 Digital I/O pins in which 6 pins are Analog I/O pin., and the RF transmitter module is used to transmit the selected data to the receiver ie. for transmitting the data from customer side to kitchen side and for that we have used RF Transmitter module of 433MHZ which can transmit data at the speed of 10kbps. Afterwards for displaying menu and taking order from customer we have used 2.4 inch TFT LCD Touch shield at the transmitter side. As shown in circuit The data pin of the RF transmitter module is connected to digital pin 12 of Arduino GND while and VCC pins are connected to GND and 5V pin of Arduino respectively. After successfully running simulation we got menu list containing tea, chocolate, lassi etc items at the customer side as shown in fig.(2) and after selecting the desired items by customer and it will be get transmitted by RF transmitter module to RF receiver module at the kitchen side.
4.2 Receiver Section

In the transmitter section circuitry of our system shown in fig.(3) consist of an Arduino Uno, RF Receiver, 16x2 LCD module, and I2C module. Here we have assembled RF receiver module to receive the data from the transmitter section, and the LCD module is used to display the received data from transmitter side. Also, we used buzzer to make a sound whenever a new order is placed and connected the data pin of the RF receiver to digital pin 11 of the Arduino while GND and VCC pin are connected to the GND and 5V pin of Arduino respectively. We have connected the positive pin of Buzzer to the digital pin 2 of Arduino, and the negative pin is connected to the GND pin of Arduino. Also, SCL and SDA pins of the I2C module are connected to analog pins A5 & A4 Arduino while VCC and GND pins are connected to 5V and GND pins of Arduino. After receiving the data it is shown on LCD module at kitchen side as shown in fig.(4).
V. RESULTS

VI. FUTURE SCOPE

This Smart ordering system has great potential to make a big change in the hotel industry. This will entirely change the way the people order their food from restaurants or hotels. Currently this system is capable of having the Menu of a individual brand of restaurants. But it can be designed to encompass a Digital Menu of all the hotels and restaurants, all in one place which will give the customers more comfort. This way the customers can easily browse through the different menus of a variety of hotels and pick up the right dish according to there need and taste. This expansion to hold the menu details for all the hotels is the true potential of this system. This feature can also be added in future along with improvement in quicker and simpler, responsive user friendly interface. In this way this system can become a great product for the customers and entirely change the way food is ordered and the industry is operated.
VII. CONCLUSION

In this project, we have proposed a system which is extraordinary headway in technology because of its highlights like minimal expense and usability. This system permits a quicker and more advantageous admittance to the world. The Restaurant automatization is a progressive idea and makes certain to overwhelm individuals. This system is helpful, viable and simple along with improving the exhibition of restaurant’s staff. It will likewise give new dining habits of individuals and transpose the way of people to dine. It would prompt expanded incomes and gives the customers a superior insight of what kind of food they wish to have to give customers an extraordinary experience of dining. There is an extraordinary progression in this system because of its main advantages like minimal expense and convenience. This types of system empower a quicker and more helpful access to the world. This system is fruitful, convenient and simple , subsequently improving the functionality of restaurant’s staff. Also, Some component can be added to the this system later on to make it more intelligent and easy to use. One of the components is to add the diversion page like games, films or music etc. The customer can use this application during food readiness and keep them from exhausted of holding up during top hour.

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