

Automated Restaurant Management System

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Abstract: Today the technological world's main focus is to automate every possible thing to take advantage in providing ease in human life. Automation is being seen in industrial consumer and commercial application. In this paper we have proposed an automated restaurant management system which automates the major operations of a restaurant using the Zigbee technology. ZigBee over IEEE 802.15.4 defines specifications for WPAN (LR-WPAN) to support low data rate, low power consumption, low cost, wireless networking protocol targeted towards automation and remote control applications. The overall system is based on Arduino. First part of the system uses Arduino Uno Atmega which is 328P family based and XBee Series 2 radios through which the customers can place their order. The second part of the system uses a conveyor belt to serve the food to the customers also a bill is automatically generated using a java program when the customer requests for it.

Keywords: Restaurant, ZigBee, Arduino Uno, XBee S2 Antennas, Java, Conveyor Belt.

I. INTRODUCTION

Now days not only developed countries but even developing countries like India are facing shortage of trained staff in hotel and hospitality industry. The problem is even adverse in countries with relatively lower population. Attrition rate of the staff in this industry is also significantly high. Ever increasing demands for higher pay and facilities has plagued the industry. In most of the restaurants food ordering and serving process is completely manual and involves human efforts. The waiter has to note down orders from customers, take these orders to kitchen, update them in the database and again make bill. Even though this system is simple, it involves a lot of human errors in noting down the orders serving them to the right table and calculating bills. Besides these errors arguments with customers, behavioural problem absentees due to medical and personal reasons are other major issues. Many of the hotel and food joints have put their shutter down because of these issues.

Our system is aimed to provide a magical solution to all these problems. It will considerably reduce human efforts. Customers will be able to place their orders automatically with the help of the ordering system and a menu card kept on their table. The processing module that has been used for the proposed system is Arduino Uno Atmega which is 328P family based. Once the order is placed by the customer it will be wirelessly transmitted to the monitor inside the kitchen using XBee antennas. After the order is prepared by the chef it will be placed on the conveyor belt controlled by Arduino which takes the food to the customers table. In the end a bill will be automatically generated.

II. RELATED WORKS

Foundation of Computer Science FCS, New York, USA. Volume 6– No. 7, January 2014 – www.ijais.org. 1. **Chef Alerting System** using Wireless Zigbee - This paper elucidates the concept and development of Zigbee technology which is IEEE standard 802.15.4 in dish ordering systems in hotels. This paper has shown the concept of an automatic self ordering system directly given to the chefs by the customer. The real time ordered data is send wirelessly using Zigbee technology. Chef can get the information simply on a display screen regarding dish name to be prepare and on which table it is ordered. IOSR Journal of Electronics and communication Engineering (IOSR-JECE) volume 2- www.iosrjournals.org Automatic Restaurant Ordering System using Zigbee - This paper provides a low-cost, convenient and easy to use system for automating order placement system for restaurants. Each table of restaurant has a menu display unit which is powered by microcontroller. The client will scroll menu list using keypad provided along with. Customer could order his food or drink just using this keypad. Each table will consist of a microcontroller based order placement unit. The unit shall have a keypad to browse through the menu. The menu items, their cost and information shall be

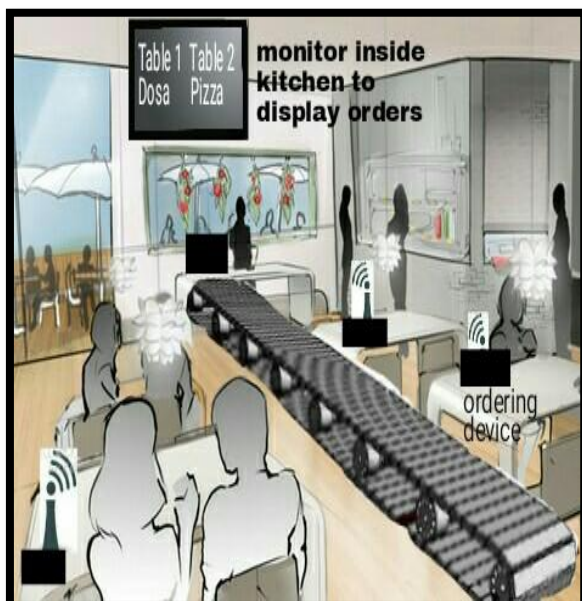


Figure 1 : Proposed System

displayed on the LCD connected to microcontroller. User can navigate through menu using keypad provided. The data for the menu can be written on an EEPROM connected to each such microcontroller based unit, so that portable data updating is possible (by changing only the EEPROM). Upon finalizing the order the user will be able to place it using keypad. The order placed shall be transmitted to the central server (PC) which will also have a ZIGBEE module connected to it for data reception. Both the above paper uses Zigbee for placing the order and making it automated while in our system a solution is proposed to automate the ordering part as well as the delivering of food. This makes the system completely automated with a onetime installation of device and thus making it cost efficient.

III. METHODOLOGY

We have proposed a system consisting of two parts: Ordering system and serving system.

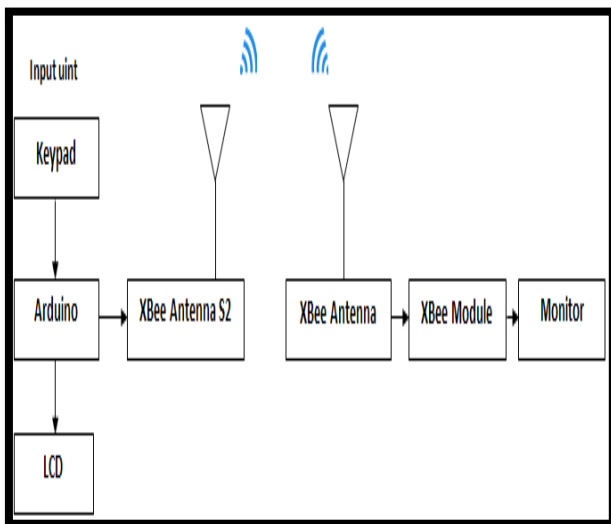


Figure 2: Block Diagram of Ordering System

1. Ordering System

The alignment of the tables will be based on the setup of the restaurant. Each table will have a menu card and an Arduino device which will consist of a 16X2 LCD display, and a keypad. The menu card will have items each with a unique code and respective prices. Customer will place their order using the keypad by entering the unique code of the food item they wish to have and their orders will be displayed using the LCD display on their table and then transmitted wirelessly using XBee S2 antennas which are interfaced with the Arduino devices using the Arduino ZigBee wireless shield. These orders from different tables will be received by a host computer inside the kitchen which is connected to the XBee S2 antenna via serial USB port. A Java program running on the host computer will read the data from the serial USB port and enter the data into a database on the computer. The data will consist information like order description, quantity, table number. The data will be saved in a SQL based database system (eg. MySQL) running on the host computer. The database will also contain the price of each item.

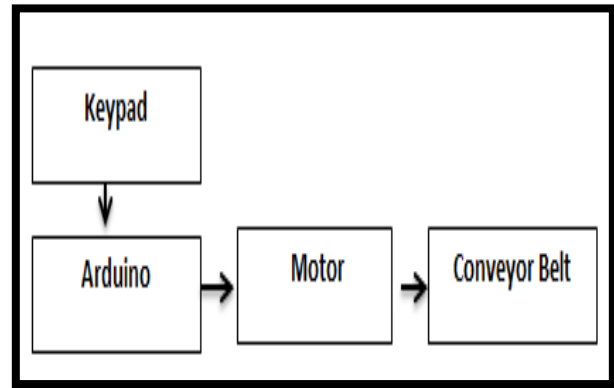


Figure 3: Block Diagram of Serving System

2. Serving System

The list of orders stored in the database along with the table number from which it was ordered will be displayed on the computer screen according to which the chefs will prepare the food and place it on the conveyor belt. This conveyor belt will be controlled by an Arduino which will have a keypad. This Arduino will be fed with the distance of each table from the kitchen so that it knows for how long it has to rotate the motor in order to reach a particular table. The chef will simply have to press the respective table number from which the food was ordered and the conveyor belt will deliver the order to the desired table. In the end the database will be used for generating bills after the customer is done with his meal.

IV. FLOW CHART

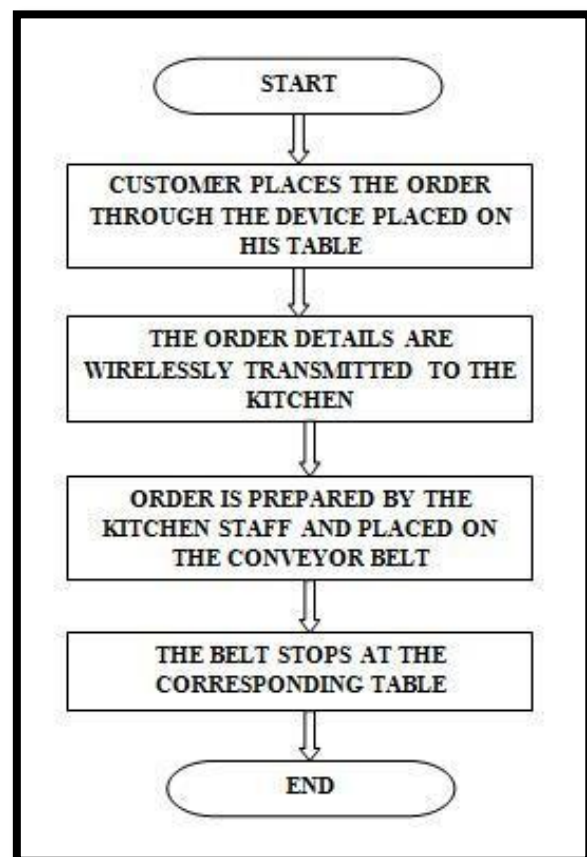


Figure 4: Flow chart

V. CIRCUIT DIAGRAM

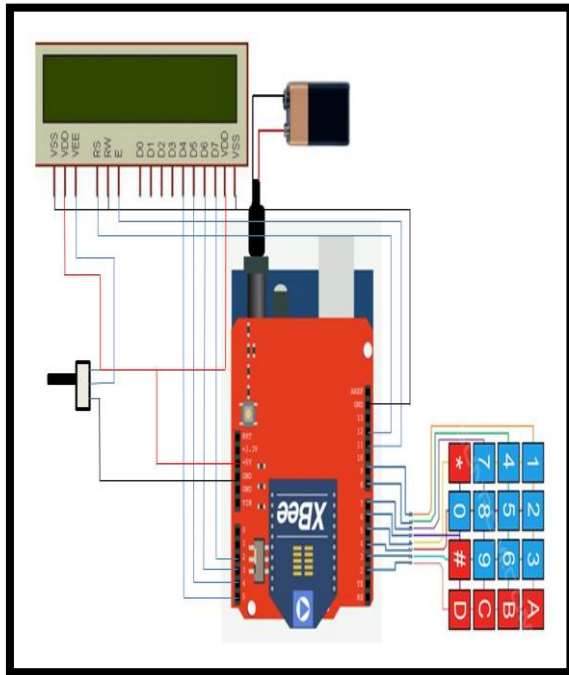


Figure 5: Ordering unit

Components used

- Arduino
- XBee Shield
- Xbee S2 Antenna
- 16x4 LCD Display
- 4X4 Matrix Keypad
- Potentiometer

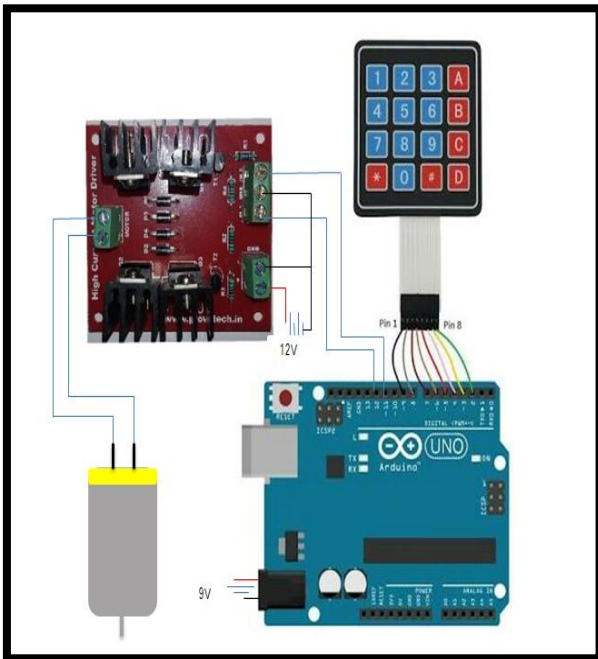


Figure 6: Serving unit

Components used

- Arduino
- Geared Motor
- 16X4 LCD Display
- High Current Motor Driver Circuit

VI. RESULTS



Figure 7: Two XBee communicating with each other

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C:\Users\AMAN\Desktop\cmd.exe - mysql -u netbeans -p
Database
information_schema
restdb
test
3 rows in set (0.05 sec)

mysql> use restdb;
Database changed
mysql> show tables;
+-----+
Tables_in_restdb
+-----+
food_items
orders
2 rows in set (0.08 sec)

mysql> select * from food_items;
+----+-----+-----+
id | name | price |
+----+-----+-----+
1 | Nachos | 175 |
2 | Dosa | 60 |
3 | Pizza | 200 |
4 | Pav Bhaji | 120 |
5 | Sandwich | 110 |
+----+-----+-----+
5 rows in set (0.00 sec)

mysql>
    
```

Figure 8: Database

The names of the food items which are in the menu are stored in the database of the PC in the kitchen along with their individual prices. When the customer calls for a bill, the system check for the orders made by the customer and automatically calculates the total amount to be paid by the customer.

ORDERS			
id	table no	order name	quantity
46	1	Pizza	2
47	2	Pav Bhaji	2
48	2	Nachos	4
49	2	Sandwich	3
50	1	Dosa	3

Figure 9: GUI

The orders of the customers will be displayed in the GUI format shown above. The order name and quantity along with the table number from where it is ordered can be seen by the kitchen staff.



Figure 10: Final product with menu card.

VII. CONCLUSION

Automated Restaurant Management System will work as a link between man machine to provide optimum quick and effective and almost effortless services to the hotel and hospitality industry. It is a low power system which will not only reduce man power required but also reduce the possibility of human errors. It is cost effective as it involves one time investment. The maintenance cost will be considerably low as compared to the salary of the waiters. Automated Restaurant Management System will revolutionize the hotel industry.

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