

Implementation of Smart Restaurant E-Menu Card in Smart Cities

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Abstract— The paper is proposed with the Zigbee technology as the communication medium which implements faster ordering system. The technology able to solve lack number of worker, reduces the error on ordering foods by the customers. The e-menu food ordering system is based on software-hardware platform of Arduino (ATMega328p) and using Zigbee short range radio communication technologies. We have divided the system in two sections one is handheld section (customer section) and other is main section (owner section), both section consists of Zigbee transceivers. At handheld section Nextion with touch screen is provided to place the order and order sends further to main section via Zigbee transceiver. Simultaneously buzzer will indicate that order has arrived and LCD display which is at main section is used to display food menu order and cost.

*Index Terms— Arduino, Nextion Touch screen, 16*2 LCD, Zig-bee*

I. INTRODUCTION

In the past 10 years India as a country has developed significantly. Standard of living of people has also improved. Now more and more people are willing to spend money on food in restaurants, so they expect sophisticated system, because of which competition in the catering industry is becoming increasing very fast. These industries need to update with some new innovative ideas or else they will find themselves lagging behind the others in our society. Also India is an overly populated country; very often people find themselves standing in long queues to place their orders in fast food restaurants. Having placed their order, the customer waits near the counter until their order is ready for collection.

In order to solve this issue here there is an idea of Matrix keypad based ordering system for restaurants. Our goal is to develop a user friendly matrix keypad based menu card which will be placed on every table

at the customer side. Now the customer will need to select the menu items by pressing on items displayed on Nextion Display.

The order is then received by the receiver section (kitchen section) and by using the conveyor belt; the ordered items will be supplied to the customer. After the whole order is placed, bill is displayed in the 16*2 LCD.

II. LITERATURE SURVEY

Moreover, Starting from the time when it was realized that hospitality, service have great impact on restaurant business transactions, many new ordering and serving scheme has been proposed up till now.

These menu ordering techniques are as follows –

- 1) Paper based menu card.
- 2) Self-service food ordering technology.

1. Traditional Ordering System (Paper Based Menu Card)

It is the method in which customers specify their desired menu to the waiter who takes the order on a paper. Personally he then takes the order to the kitchen department and then he supply the food item to the customer. So it was a time consuming process. It leads to wastage of paper and also it requires reprinting of all menu cards. Also, in many cases for small change to be making in menu card it is not convenient to print all menu cards again and again. Simply saying that the menu card once printed can't be changed. After some days the menu card lost its worthy look and attractiveness.

2. Self Service

Self-service or self-ordering systems in restaurants refer to the restaurants taking order from customers using technologies such as the internet, kiosks etc. Usually the users prefer self-service because of speed and convenience in making order and transaction while minimizing the miscommunication. The advantage is that there are no money related issues as the transactions are done online. The disadvantage is that high installation cost, authorization cost and the development of custom software.

LIMITATIONS

- Expensive
- Monotonous
- Difficult to Maintain
- Staff Training
- Lack of Attention

III. PROPOSED METHOD

A. Comparison with other System

Traditional system of catering is a very time consuming and is prone to mismatch of orders due to human errors. The problem with this system is that self-service restaurants are more popular in metro cities. So the developing cities or underdeveloped cities are mostly lagging from this technology. Many a times these self-service systems take unreasonable amount of delays to deliver the order.

B. Block Diagram:

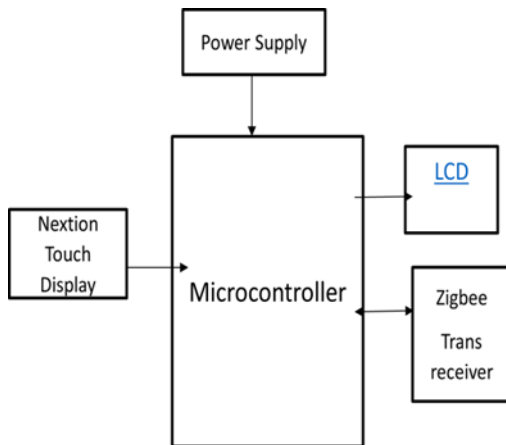


Figure 1: Transmitter Block diagram

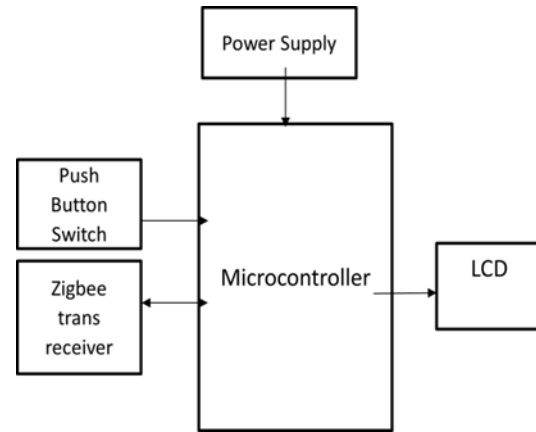


Figure 2: Receiver Block Diagram

Zigbee:

The IEEE 802.15 standard is named as ZigBee. It is a wireless communication protocol that operates in the frequency range of 2.4GHz. The reason behind choosing the ZigBee as wireless interface is, it is an open source communication standard.

No licensing for band usage is required. It uses the OQPSK modulation technique, where the phase of the message signal will vary in terms of its phase with 4 angles. The ZigBee is also faster in data transfer with 20 to 250Kbps

based on the frequency used. The major preferable feature in ZigBee is, the Zigbee devices can be used as either receivers or transmitters. So there is no need to use the separate devices for transmission and reception. The operating range of a ZigBee device practically tested is nearly 50m which is an enough range for a restaurant geographical measurements.

Nextion Display:

Nextion is a Human Machine Interface (HMI) solution. Nextion displays are resistive touch screens that makes it easy to build a Graphical User Interface (GUI). It is a great solution to monitor and control processes, being mainly applied to IoT applications.

There are several Nextion display modules, with sizes ranging from 2.4" to 7".

The Nextion has a built-in ARM microcontroller that controls the display, for example it takes care of generating the buttons, creating text, store images or change the background. The Nextion communicates with any microcontroller using serial communication at a 9600 baud rate.

LCD:

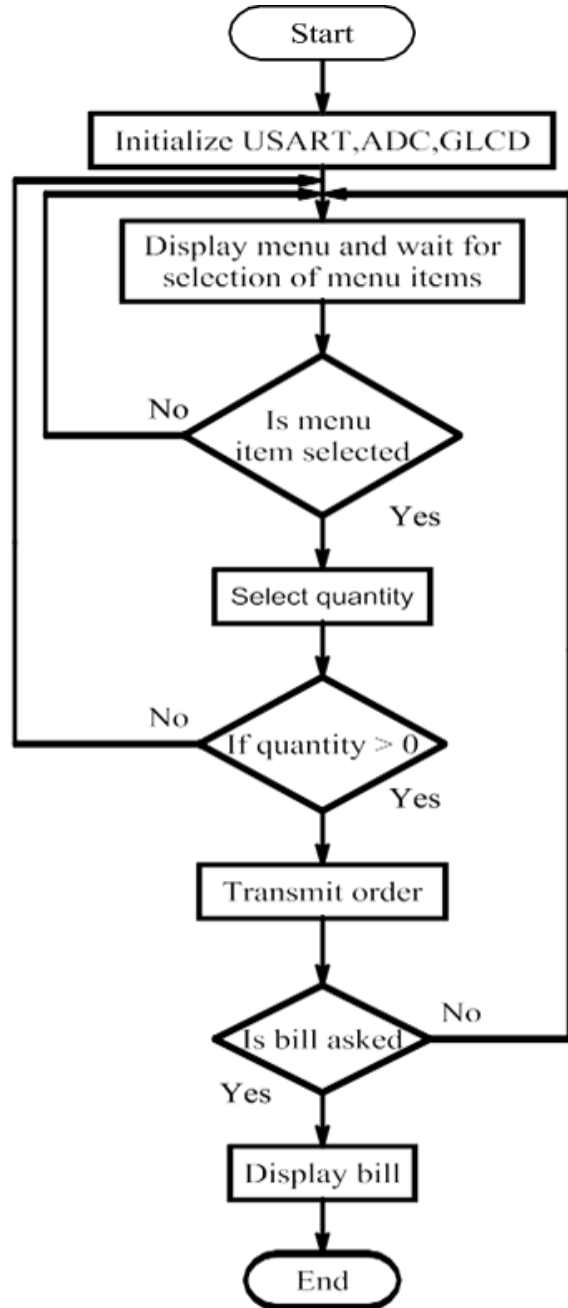
Most common LCDs connected to the microcontrollers are 16x2 and 20x2 displays. This means 16 characters per line by 2 lines and 20 characters per line by 2 lines, respectively. The standard is referred to as HD44780U, which refers to the controller chip which receives data from an external source (and communicates directly with the LCD).

C. Project Scope

There is a major scope in enhancing the visual experience by replacing paper menu with electronic menu card. To avoid delay in ordering process, wireless communication can be used here to replace the waiter who manually delivering the order to kitchen. Currently due to an increased literacy, awareness of advanced communication technology among people, they are crazy about the latest technology and they are eager to automate their routine tasks. So introducing new technology and new approach in conventional food ordering system will lead to improved experience of a customer.

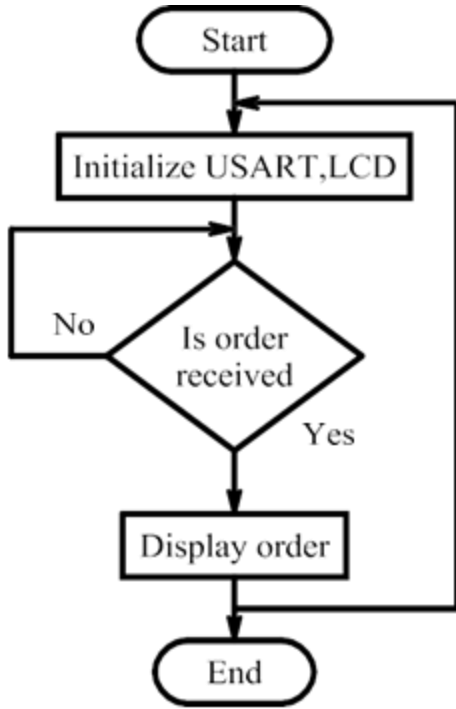
IV. WORKING

A. Transmitter Section:



Menu is displayed on the Nextion display and then the program waits for the selection of menu item. If the menu is selected and the quantity is greater than 0 than the order is transmitted to the ordering department. And if the user asks for the bill then the bill is displayed on the screen.

B. Receiver Section:



On the receiver side only USART and LCD modules are initialized. If the order is received than it is displayed on LCD along with the table number.

V. TEST RESULTS

A. Transmitter Results:

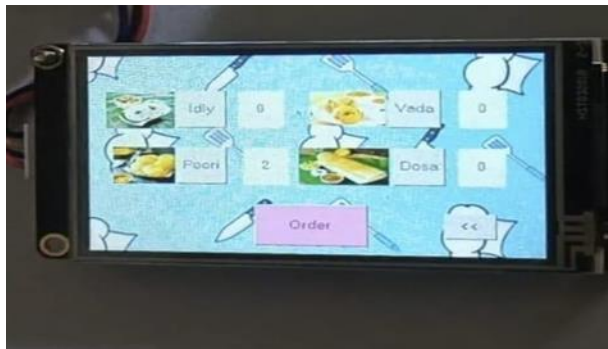


Figure: Emenu card view of Nextion Display



Figure: LCD Sending Order Transmitter

Receiver Results:

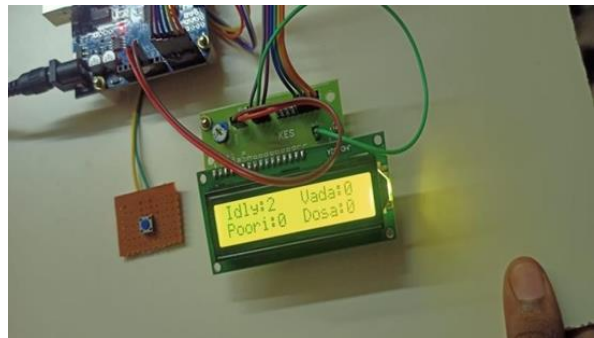


Figure: Count of items in Receiver LCD



Figure: Order Received

CONCLUSION

Such kind of systems can prove worthy in transforming the whole catering industry. The proposed system will help in reducing the number of staffs used in the restaurants hence will help in considerably reducing cost of restaurant management. It will also minimize manual service given by waiters and serving staff, thus eliminating the human

mistakes. It can also help in reducing child labor problem, which is a huge problem in countries like India.

Many improvements can be done in the proposed system like the resistive touchscreen can be replaced by more responsive capacitive touchscreen. RF module which is used for communication purpose starts to malfunction as more and more RF modules are used. This problem can be addressed by using costlier communication technologies like zigbee technology

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