Zigbee Based E Menu Ordering System Using ARM 7 TDMI LPC 2148

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ABSTRACT

The paper mainly aim in designing Electronic Menu in hotelswith the help of ARM in user friendly environment.The Rapid growth of wireless technology and Mobile devices are creating a great impact on our lives. A new design scheme of the E-Menu ordering terminal applied to middle and small hotel is proposed. The development of the E-Menu ordering is based on the software-hardware platform on ARM7 (LPC2148), using ZigBee short-range radio communication technologies. It has advantages of high performance-cost ratio, low power, high reliability and friendly user interface.

This paper introduces two sections one is hand held device section and other is main section. Both sections consist of Zigbee transceivers. From the first section menu should taken and saved in memory in that section. This information is forwarded to the main section via Zigbee wireless communication. Main section will receive the information from the first section and stores that data in memory. According to that order which is stored in memory service is provided. Here LCD is used to display the data PC is used to display data and record for billing.

Keywords: TouchScreen, GLCD, ZigBee, ARM 7(LPC 2148).

1. INTRODUCTION

E Menu Board is a set of integrated electronic menu based tablet (IPad or Android tablet) and back-office service management software service management system catering industry. Using the Internet, intranet or extranet, using multimedia approach to screen presentation, menu content at any time and place, to do a single, group, or update all the restaurant's menu. [1].

Utilizing information technology to upgrade the service quality and management efficiency has always been received great concern in information development of catering industry. E-Menu Ordering System can help catering enterprises reduce the costs of human resources, improve work efficiency and leap forward from the external image to the internal service quality. Using wireless modules, can save the development costs. However, the user interfaces are not friendly, input errors easily occurs, and the display is single color. And besides, because of using infrared ray communication, transmission range will be extremely limited. The analysis shows that the scarcity of wireless ordering system for the medium-sized hotels directly leads to promote slowly. Through comparing with different grades of E-Menu ordering systems, the key difference lies in selection of ordering terminal and wireless communication. In this paper, the development of wireless handheld terminal is based on the Software-hardware platform of ARM7 (LPC2148) and, using ZigBee short-range wireless communication technologies. [4].

The restaurants have to provide the best services and maintain relationships with their customer in order to survive in this competition .In any restaurant food ordering was a completely manual process when waiter takes order from customer he should write down the order on piece of paper and then enter it into a computer .The order is then taken to the kitchen, bring the food and make the bill. Although the current system is simple it requires a lot of time as the waiter keeps going to and from the customer. It also requires investment in purchase

and storage of paper, wastes a lot of paper. Large manpower required and also is prone to human errors and time consuming.

2. LITERATURE SURVEY

Available Systems in Orderings–
- o   Paper based menu card
- o   Self service food ordering KIOSK technology
- o   QORDER
- o   Computerized ordering system

Out of this we can notice

QORDER-Other Advancement in menu ordering in hospitality industry is QORDER which is a portable ordering system. It is a portable handheld device that runs the complete QMP POS software on android device. It requires a WIFI to connect the remote corner. This system also involves waiter as in case of paper based menu card system. In this, the waiter no longer approaches the table with his notepad instead with the portable device known as QORDER, and then takes the order from customer. He then sends the order to kitchen for further processing. Once the customer finishes, the waiter prints the bill.

This technique is somewhat advanced because the portable QORDER device uses wireless technology to communicate with kitchen. However, the problem arises during rush hour when large number of people visits restaurant at the same time, the work load on waiter along with QORDER device increases.

Customers may have to wait for an arrival of waiter so that they can place their orders. Also if during the meal customer needs something then he have to call waiter. This ordering system is totally depends on manpower approaching customers to take order. Due to limited number of portable devices and manpower this system leads to failure. An error while taking order can still occur and the customer ends up with unsatisfactory experience. Also important thing to be noted in this system is that the customer doesn't get fully customized order. [1].

3.PROPOSED SYSTEM

The above mentioned traditional menu ordering and catering systems are time consuming and susceptible to human errors which can be reduced but can't be avoided. The problem with the self service ordering system is that self service restaurants are more popular in metro cities. So in smaller cities there are hardly any self service restaurants available. Many a times these self service systems take unreasonable amount of delays to deliver the order. The problem with the recently developed zigbee based system is its high cost and limited range. Our aim is to develop a cost effective system which could work in small restaurants that are not willing to invest huge amount of money in these systems. The newly suggested system is emphasized on increasing user friendly interface, simple navigation and low cost, increasing service range of wireless communication used and decreasing order processing time. This is done by efficient use of GLCD, Touchscreen, GSM module, and ARM7 .
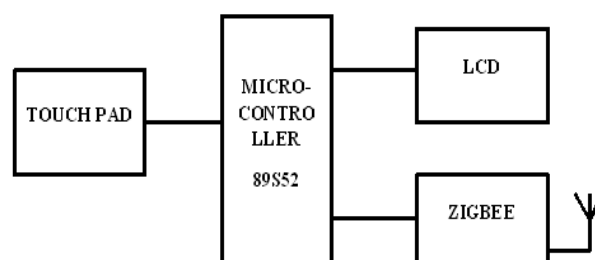
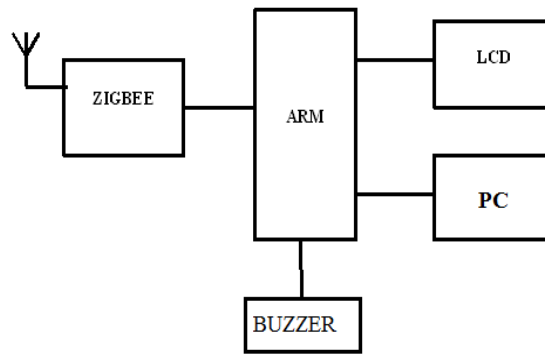Fig. Block diagram of Transmitting Section.

Fig. Block diagram of Receiving Section.

A new design scheme of the E-Menu ordering terminal applied to middle and small hotel is proposed. The development of the E-Menu ordering is based on the software-hardware platform on ARM7 (LPC2148), using ZIGBEE short-range radio communication technologies. It has advantages of high performance-cost ratio, low power, high reliability and friendly user interface. This paper introduces two sections one is hand held device section and other is main section. Both sections consist of ZIGBEE transceivers. From the first section menu should taken and saved in memory in that section. [5].

This information is forwarded to the main section via ZIGBEE wireless communication. Main section will receive the information from the first section and stores that data in memory. According to that order which is stored in memory service is provided. Here LCD is used to display the data PC is used to display data and record for billing.

4. FUNCTIONAL DESCRIPTION

The functional description of overall system is explain with the help of the diagram as follows
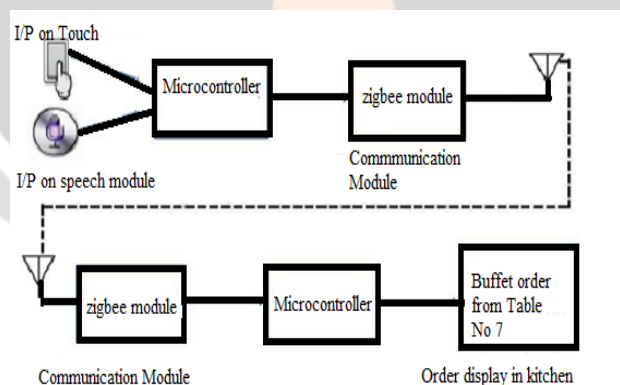

Fig. Functional Working of Overall Project

The E-Menu ordering is mainly applied to middle and small hotels are proposed. By using this technology help catering enterprises reduce the costs of human resources, improve work efficiency and leap forward from the external image to the internal service quality In this wireless handheld ordering system there will be one center server (main section), and any number of slaves (customer section). In this the data from the different slaves will be transmitted to the main section (master) through Zigbee. In this paper we have one main section and five handheld sections (customer section).

In the customer section (slave) we have one GLCD (Graphical LCD), one ARM7 (LPC2148), Zigbee transmitter and at main section we have one controller, buzzer, LCD, PC, Zigbee receiver. When the customer

take seats and he orders the requirements by using GLCD on which the items are displayed in images format, and when the customer selects the item, the input from the touch screen will be sent to the controller of ports p1(27,28,29,30) the data from the controller will be in analog form and controller will convert the analog data to digital data by using in built ADC, the controller receives the data in digital form and according to user input the controller will display the data(images) on GLCD which is connected to the port0(17-24) and sends the data to the zigbee through the transmitter pin(P0.1) then the zigbee transmits the data to the main section zigbee, The main section zigbee receives the data transmitted by the handheld section zigbee and sends the data to the controller 10th pin and as soon as the data has received, the controller will make the pin(p2.2) high to which the buzzer is connected, when it is made high then the buzzer will blow which indicates data has received and the controller in mean while display the data(order by the customer which) on the LCD is connected to the controller to the port1 pins and the controller will send the data to different section of server and it will display the data on PC as table no, items ordered by the customer for billing.

This is overall system is been work with wireless network with Zigbee enabled.[2].

5. HARDWARE REQUIRED

Hardware module required for this are

       ARM 7
       ZIGBEE Module
       Touchscreen
       LCD
       Microcontroller

5.1 ZigBeeModule :

The ZigBee network is defined by the ZigBee Alliance and based on the IEEE 802.15.4 standard, which is target data RF embedded applications that require a low data rate, long battery life and secure networking. It is intended to operate in the 2.4GHz unlicensed ISM band [1-2]. There is no large numbers of data which need to convey between the wireless ordering terminal build-in ZigBee module and the center node, and because of having no high requirement of data rate, so ZigBee is well suited for wireless ordering system. Each ZigBee modules includes an IEEE 802.15.4-compliant radio, an 8051 microcontroller, programmable I/O, flexible antenna and range solutions, Transmit range is up to 300m, which can meet the demand of wireless ordering system completely.

ZigBee module can be configured in star, mesh, and cluster tree network topologies. IP-Net includes support for our innovative 'serial mesh mode', allowing RS232/RS485 data streams to be transmitted over multiple hops to improve data reliability and increase transmission range. ZigBee Wireless network of restaurant which is configured in star topology. In this routing topology, data traffic and network commands are routed through a central node. Peripheral nodes require direct radio contact with the central node. An ordering end device acted as a peripheral node in the network is an RFD, it have stringent requirements for low power and memory space. An IEEE 802.15.4 network requires at least one FFD usually line powered to act as a network coordinator. The coordinator sets up a network, initializes a network, manages network nodes, stores network nodes information, and transmits to control center server via RS232.

GLCD and Touch Screen:

The handheld ordering terminal implements human computer interaction by 128x64 GLCD and touch screen. There is a high performance GLCD Controller integrated on chip. CPU transfers pixel data to GLCD screen. The terminal uses 4-wire resistive touch screen. S3C44B0X need sampling to judge whether a touch screen has been touched. FM7843 is a 4-wire resistive touch screen input controller integrated circuit which is widely applied to small portable devices battery powered. The device is a 12-bit analog-to-digital converter with a synchronous serial interface and touch screen driving circuit.
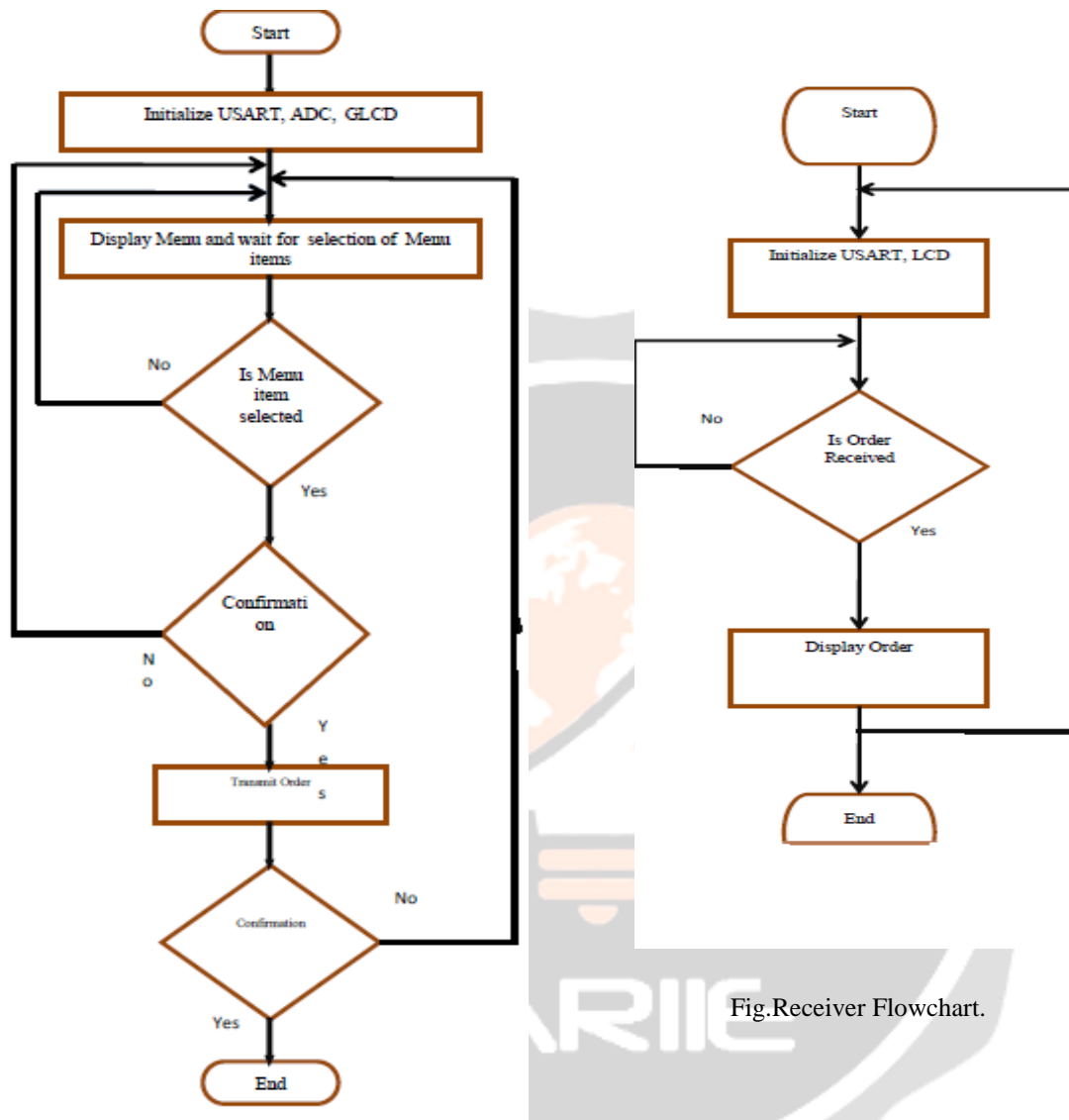
6. FLOWCHART

Fig. Transmitter Flowchart

Fig.Receiver Flowchart.

7. CONCLUSION &FUTURE ENHANCEMENTS

Menu will penetrate into the future of electronic retailing most restaurants, high-end restaurant will also use digital signage technologies, applications mobile devices, such as tablet computers, electronic tables and other devices to interact with customers and increase brand image and attract young consumers those with household customers.

Technology, electronic menu restaurant POS system combined with the use of a database to strengthen management, advertising, and promotional applications. In combination with a mobile device, the electronic menu can be connected to the consumer's smart phone or tablet, so that consumers know in advance of today's

restaurant dishes, prices, and to wait for the time to be a la carte restaurant, perhaps even with e-commerce combination will Takeout or delivery are done on the same platform.

Outdoor electronic menu to increase, so that our consumers to choose which restaurant has not before, will be able to understand a nearby restaurant menu, and then decide as to which dining.
In this paper, a high performance-cost ratio wireless handheld ordering terminal is proposed, which is based on the hardware platform of ARM7, and ZigBee wireless communication technology.
The ordering terminal has the advantages of simple structure, stable operation, low power consumption and friendly interface, thus it has bright market prospect.

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