

Advanced Ordering System for Restaurant

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ABSTRACT:

This research work aims at improving the quality of services and business of the hospitality industry by incorporating technology. A detailed research on the integration and utilisation of technology in hospitality industries showcased that various applications based on wireless technologies are already in use enabling partial automation of the food ordering process. In today's restaurant digital multi-touch menu cards and other forms are replacing old fashioned services like- waiters taking order from customers and serving them. The tablet at the customer table contains the android application with all the restaurant menu details. The customer tablet and kitchen display connects directly with each other through Bluetooth. This wireless application is user-friendly, improves efficiency and accuracy for restaurants by saving time, reduces human errors and provides customer feedback. This system is less expensive as it requires a one-time investment for gadgets.

KEYWORDS: Tablet; Automated food-ordering system; Bluetooth; Android Application

INTRODUCTION:

In any typical restaurant when a waiter takes an order from the customer he must write down the order on a piece of paper and then enter it into a computer. The order is then taken to the kitchen, the current system wastes a lot of time as the waiter keeps going to and from the customer. It also wastes a lot of paper since the order must be written down, printed out for the order to be given to the kitchen, and finally a paper receipt must be given to the customer.

To overcome the problems faced by the restaurants, a wireless application could be designed and implemented in any medium or large scale restaurant. The application is installed on each of the tablets or he/she can download it from the web; the customer selects the food from the menu provided to him and places the order. The order from the customer's tablet is sent wirelessly to the kitchen with the help of Bluetooth through an android application. In order to select and place order the user must have a login id and a password.

The android application is built with the help of java environment based web site named MIT app inventor [10].

This project is designed to reduce the efforts of the waiter and increase the efficiency of the ordering system. The references regarding this project are:

Khairunnisa K. proposed "The Application of Wireless Food Ordering System [1]". This work presented in-depth on the technical operation of PDA based Wireless Ordering System (WOS) including systems architecture, function, limitations and recommendations.

M. Fir douse Ali Khan and V. Swapna later on added facility like speech commands and wireless technology like Zigbee for data transmission from input section i.e. customer to kitchen section[3]. The system would automatically complete data receiving, storage, display, and analysis.

Sushmita Sarkar presented "The Integration of Touch Technology in Restaurants using Android[4]". This system was a basic dynamic database utility system which fetches all information from a centralized database.

Asan, N. Badariah introduced Smart Ordering System which used a small keypad to place orders. These codes came along with the menu. The signal would be delivered to the order by the Zigbee technology, and it would automatically be displayed on the screen in the kitchen[5].

PROPOSED SYSTEM:

In the proposed system, Bluetooth is used to transmit the data from transmitter to the receiver. There is an android app installed on a pad or a mobile on the transmitter side (user) which is used to browse through the order and place the order. The receiver (kitchen) has a hardware component installed used to receive the order from the customer. Whenever a customer comes to a table, they can select their order with the help of a Graphical LCD with touch screen provided. This GLCD displays MENU items with its corresponding cost of each of them. As soon as the customer places the order, it will be displayed on the LCD provided in the receiver section. The app will display the final items selected along with their quantity and total amount.

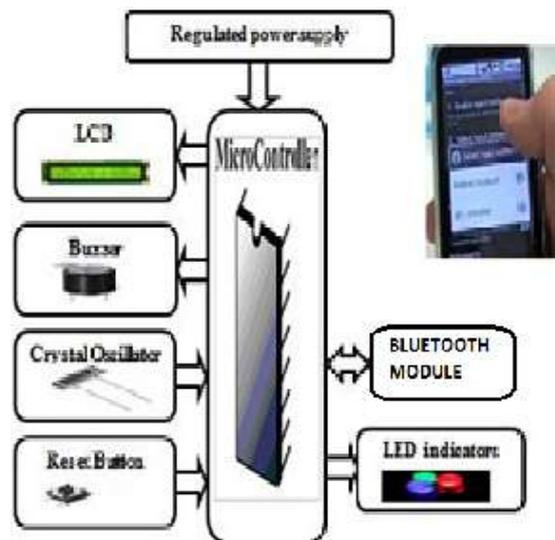


Figure 1. Block diagram

HARDWARE DESCRIPTION:

The above is a schematic of transmitter section of Design of Restaurant Self-Ordering system based on Bluetooth using an android mobile application. It describes the outline architecture of the system and the devices involved for the ordering process to take place.

ARDUINO UNO:

The Arduino Uno[11] is a microcontroller board based on the ATmega328. It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button.



Figure 2. Arduino Uno

It contains everything needed to support the microcontroller; simply connect it to a computer with a USB cable or power it with a AC-to-DC adapter or battery to get started.

LCD



Figure 3. LCD

One of the most common devices attached to a micro controller is an LCD display. Some of the most common LCD's connected to the microcontroller is 16x4. This means 16 characters per line by 4 lines. The LCD requires 3 control lines as well as either 4 or 8 I/O lines for the data bus. The user may select whether the LCD is to operate with a 4-bit data bus or an 8-bit data bus.

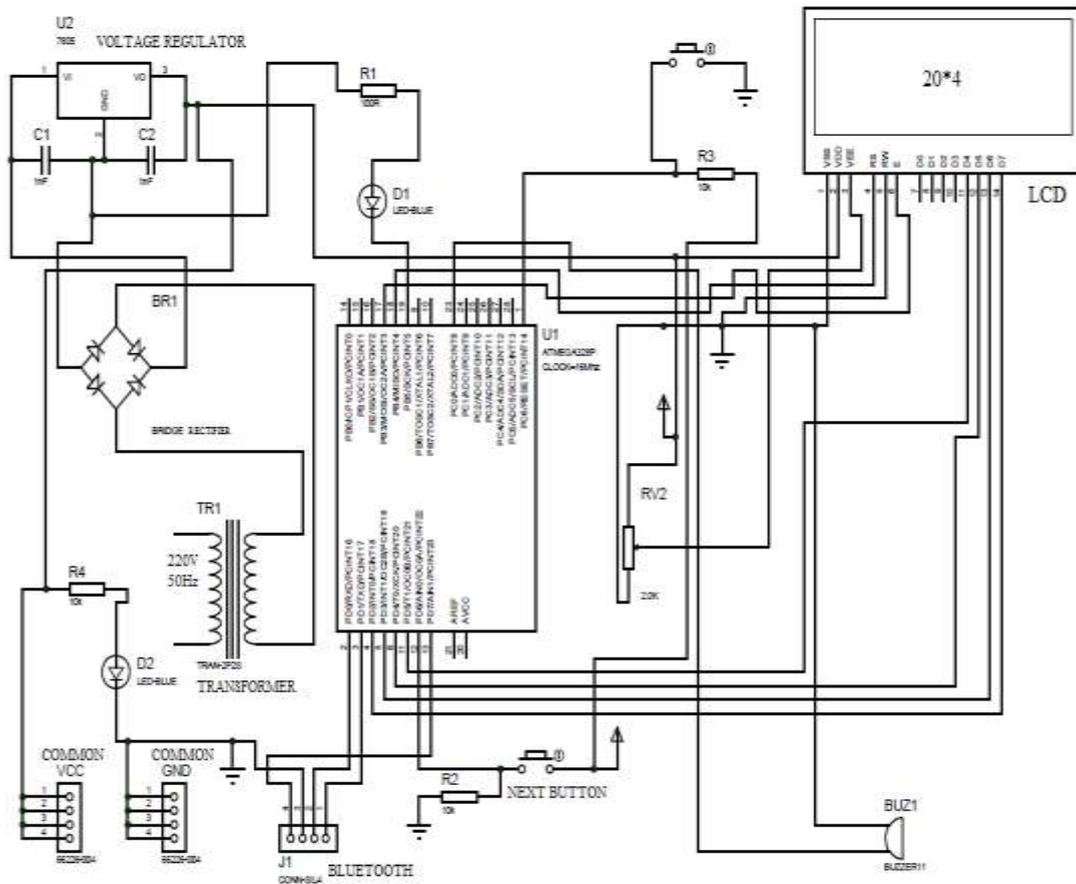


Figure 4. Circuit Diagram

ATmega328P



Figure 5. Atmega 328p

The high-performance Atmel[12] picoPower 8-bit AVR RISC-based microcontroller combines 32KB ISP flash memory with read-while-write capabilities, 1024B EEPROM, 2KB SRAM, 23

general purpose I/O lines, 32 general purpose working registers, three flexible timer/counters with compare modes, internal and external interrupts, serial programmable USART, a byte-oriented 2-wire serial interface, SPI serial port, a 6-channel 10-bit A/D converter (8-channels in TQFP and QFN/MLF packages), programmable watchdog timer with internal oscillator, and five software selectable power saving modes. The device operates between 1.8-5.5 volts.

BLUETOOTH MODULE (MASTER/SLAVE): HC-05:

HC-05 module is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. Serial port Bluetooth module is fully qualified Bluetooth V2.0+EDR (Enhanced Data Rate) 3Mbps Modulation with complete 2.4GHz radio transceiver and baseband. It uses CSR Bluecore 04-External single chip Bluetooth system with CMOS technology and with AFH (Adaptive Frequency Hopping Feature). It has the footprint as small as 12.7mmx27mm.

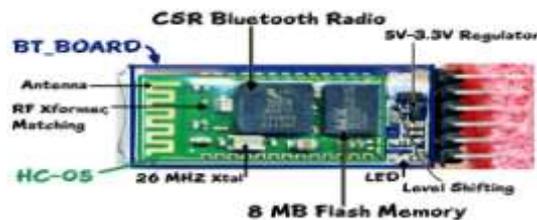


Fig6. Bluetooth hc-05

SOFTWARE SUBSYSTEM:

Java based app development

The android app installed on the phones are built on java platform using the MIT app inventor. The jvm (java virtual machine) provides a platform independent environment with is architecturally neutral.



Figure 7. Application home page

EMBEDDED C:

Embedded C is a set of language extensions for the C programming language. Because of High level languages i.e. C in the embedded systems, various kinds of support tools like compilers & cross-compilers, ICE, etc. came up and all this facilitated development of embedded systems using C. Embedded c is used to program Arduino UNO

RECEIVER AND TRANSMITTER SECTION:

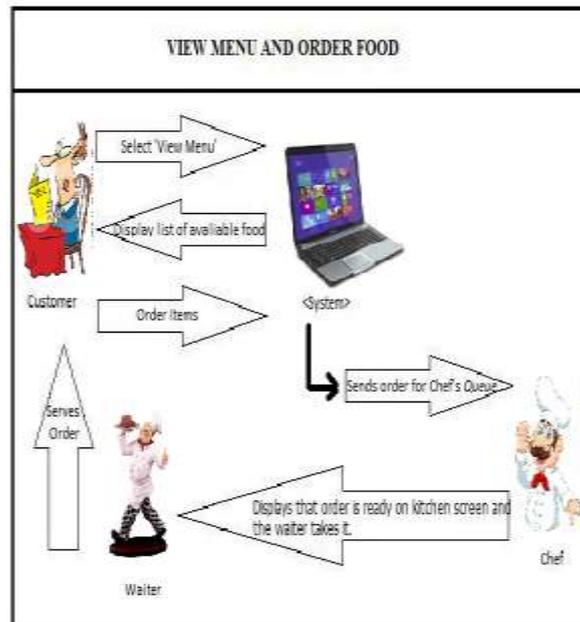


Figure 8. Food order procedure

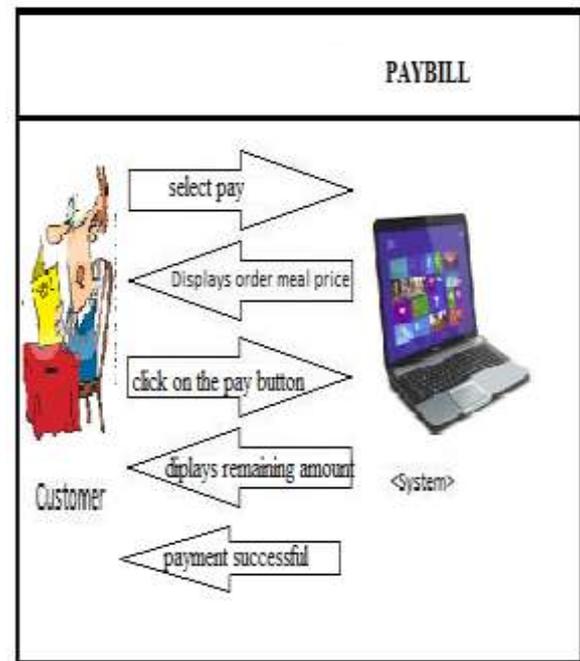


Figure 9. Procedure for bill payment

The main modules of this project are as follows:

Tablets at the customer’s table: (module 1):

- These tablets are designed for the use of normal users arriving at the restaurant.
- These tablets display the whole menu of the restaurant. The menu contains texts that describe each item to an average customer.
- They will work efficiently by enabling Bluetooth connectivity.
- The customer can view the menu of the restaurant and add menu items to cart, see total price, and specify quantity. The menu also displays a brief description of the item when selected.

- When the desired list of dishes is finally selected, customer can click on “Place Order”. This order is then sent to the chef via the kitchen display.

KITCHEN DISPLAY INTERFACES (MODULE 2):

- These displays are set up at the kitchen near chef so that he is able to view the orders requested from customer.
- All the ordered items along with their table numbers are displayed punctually at the chef’s interface.
- The resolution and font size is sufficiently large to be seen by chef at a reasonable distance.
- Chef is able to notify and close an order when a particular placed item is acknowledged.

METHODOLOGY:

Our main aim is to increase the efficiency of the food ordering system and reduce human errors and provide high quality services to the customers of the restaurants.

- The application on the tablets must be able to communicate wirelessly with the other devices.
- The customer sees the categorized menu card in the digital form on the tablet.
- The orders are sent to the kitchen via Bluetooth.
- If there is a need for modification in the food menu, the manager modifies the menu. The menu gets changed in the database. The changed menu then gets updated on the customer’s tablet.

ADVANTAGES:

- Low power consumption.
- No need of a person to take order from the table.
- Easy to install because of wireless interface.
- Usage of Android touch screen smart phone in performing the task.
- Bluetooth wireless transmission
- Reduced man power.

LIMITATIONS:

- Status of order is not obtained.
- Limited distance confined to the range of the Bluetooth device which is about 15m.
- App works for only android platform devices.

CONCLUSION:

The wireless ordering system has revolutionized the restaurant business industry and other fields. This system is convenient, easy and effective thereby improving the restaurant staff’s works performance besides providing quality of service and customer satisfaction. This system has addressed many hindrances in food ordering process and management of restaurants by lessening the time of customer and management for ordering of food and cost for the pen and papers. This system provides pleasure to customers for making orders and management can meliorate their management.

FUTURE SCOPE:

The main drawback of the system is it does not give the feedback regarding the time of order being placed after the request of the user. This can be eliminated using GSM modem which sends the SMS messages about the requests to the manager when the responder does not respond to the requests of the user. The system can also extend using smart card technology through which the bill payment can be done based on the smart ATM debit or credit cards directly. This provides a time saving process and avoids a cash counter for it.

Further, if the customer wants to give additional details regarding their order (for example if the customer wants a particular dish to be more or less spicy), then an additional textbox can be provided in the application for any further comments and/or requests given by the customers. Also, if the customer

requires anything after the order has been served (for example extra dishes or other cutleries), then a PING button can be provided in the application or as additional hardware to satisfy the needs of the customer.

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