

# Wireless Two-way Restaurant Ordering System Via Touch Screen

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## Abstract

*This paper was written to present a wireless two-way restaurant ordering system via touch screen. There are three stages of the ordered menu shown: waiting for order, cooking, and waiting for serving. The system can also show the menu promotion and the total service charge. The menu and special offer can be simply adjusted wirelessly via the server. This can also be programmed and the duration set in advance. Furthermore, a call waiter button on the screen can also enable the light at the dining table to show that a waiter is requested at that table. The whole ordering system works via touch screen gadgets where communication between the devices relies on wireless network. The system consists of the ordering device at the customer table, the server, and the device in the cook room.*

**Keywords:** Restaurant Ordering; Restaurant System; Two-way Restaurant

## 1. Introduction

At present, information and communication technology has been brought to a number of businesses in order to make the operation more convenient or add to their values. Restaurant management can be more efficient with the help of technology. Both the owner and the customer will find it more convenient and hence values will be added from the good impression and the efficient administration and management of the entrepreneurs. In addition, with the advent of food consumption problems nowadays, such as overeating and obesity, or even the problem of food expenses; this program will answer the questions by showing the details of food of each meal like nutritional values and expenses.

## 2. Literature Review

### - PixelPoint

PAR PixelPoint Company uses this software for managing the restaurant. The system consists of the company's software and hardware. This network system is compatible to TCP/IP, enabling information sending through both wireless and conventional networks [1].

### - LRS Restaurant Server Pager Starter Kit

This system improves the food-ordering service quality in restaurants and reduces the waiting time of clients. The on-site paging system is used at UHF frequency or the frequency range of 467 MHz for sending the order data [2].

### - Billpro Pocket® and Billpro POS for Restaurant

This system receives a client's order and makes a list by means of the designed client's template in the kitchen. The food ordering device is portable. The waiter takes the client's order and sends it to the client's template in the cook room [3].

### - Restaurant System By Ericsoft

This program administers and manages general restaurant services wirelessly. Food ordering is taken by waiters who then order the cashier, who in turn tells the cook room what to cook [4].

### - Implementation of Network-based Smart Order System

The Smart Order System in Restaurants (SOSIR) has been modified to take order from the client's table through RS-232 signal, which is sent to the cashier counter. The cashier counter system is connected to a database. When the clients' orders are sent the cashier counter system will screen and prioritize the orders before sending the information to the kitchen for the chef to cook [5].

**Table 1: Compare features**

	PixelPoint	LRS	Ericsoft	Smart Order System	Wireless Two-way Ordering System
<b>Wireless Network</b>	Yes	Yes	Yes	No	Yes
<b>Touch Screen</b>	Yes	No	Yes	No	Yes
<b>Easy Call Waiter</b>	No	No	No	No	Yes
<b>E-menu</b>	No	No	No	Yes	Yes
<b>Status of ordering</b>	No	No	No	No	Yes
<b>Group orders</b>	No	No	No	Yes	Yes
<b>Prioritize customers</b>	No	No	No	No	Yes

Table 1 shows the comparison of functions of each system. In general, most systems are already based on wireless network and touch screen. However, the disadvantages include the missing of an efficient waiter calling system and checking of order status in order to lessen customers' anxiety. The capacity in prioritizing customers and grouping orders is also not effective.

**4. System Design**

By gathering each benefit from various previous works, this paper aims to implement a restaurant ordering system which enables each customer to wirelessly order his own choice of food straight from the e-menu shown on an embedded touch screen on each customer table without bothering any staff and send the order straight to the cook room. The whole food process can also be monitored via this touch screen.

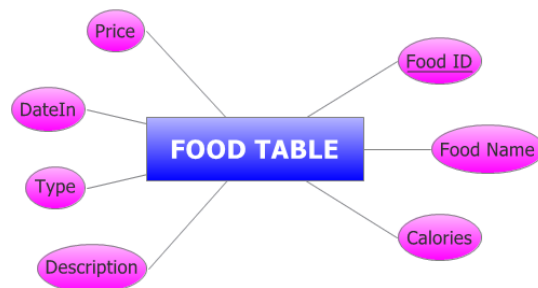
The proposed system consists of three main components, namely, a touch screen embedded on the customer table, a main server and another touch screen in the cook room, shown in Figure 1. When the customer orders food, the data is sent to the server, which will compile the data in order to prioritize the customers and to group the orders before sending the order to the cook room. The status shown at the client's table is 'waiting for food'. When the order reaches the cook room, the chef will press the 'accept' button which will show the cooking stage at the client's table. When cooking is done, the chef presses the 'waiting for serving' stage to the client's table and the server will take the dish to the client.



**Figure 1: Two-way Ordering System**

This food ordering system is capable of informing the food status when the menu has been ordered via wireless touch screen communication network. The touch screen is the system's input-output device. Besides, waiters can be called using the table device by pressing the "Call Waiter" button, which will immediately activate the light.

Database comprises 3 major components. The first is the food table which is used to store menus including dish codes, names, food calories, prices, cooking time, the date this dish was added, types and additional information. (Figure 2)



**Figure 2: Food Table Diagram**

The second is the customer table for storing customers' information in order to manage the menu effectively. It includes customer's code, customer's name, date of birth, ID number, address, telephone, email address, blood group, details on food consumption, member type, membership date, expiration date, as shown in Figure 3.

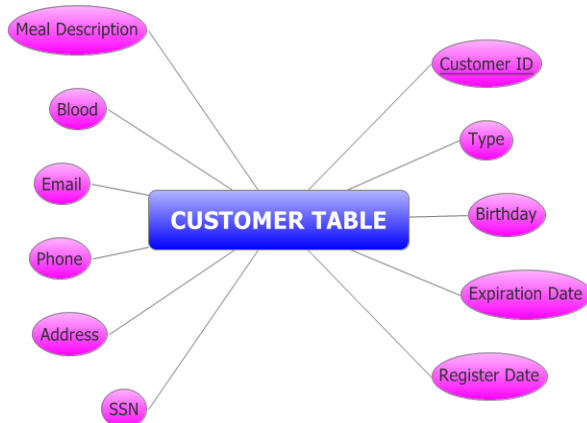


Figure 3: Customer Table Diagram

In Figure 4, the order table stores information on ordering. The food information is connected to the respective customer through the customer's code and food codes. The connection is shown in Figure 5. Additionally, there is information on ordering code, time, date, ordering table, and quantity, to store details in the order and enable the entrepreneur to analyze the information later and increase the restaurant's efficiency. For instance, he may use the detail in food ordering from the order table to create promotion of unpopular menus and accompany them with popular ones, etc.

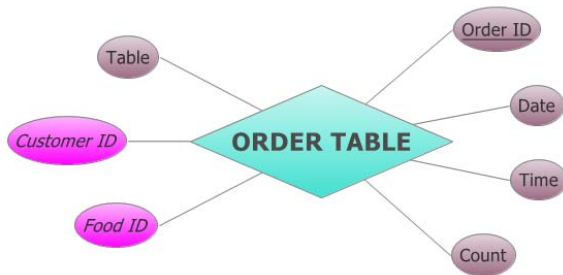


Figure 4: Order Table Diagram



Figure 5: Customer and FOOD Relation Diagram

The network operations are based on the design of protocol in the application layer for different functions in the restaurant system. The package comprises command, data and end string, as shown in Figure 6.



Figure 6: Package Pattern

Table 2: Command Table

Command	Command Name	Description
conn	Connection	For connecting with Server
disc	Disconnection	For cancelling connection with Server
orde	Order	For food ordering
cord	Cancel Order	For menu cancelling
stat	Status	For sending food status information
upda	Update	For updating menus and promotions
ackn	Acknowledge	For responding to different orders

Response of server is based on "Any Client By One Server Respond", i.e., the response is for one client at one time. Thus, if there are many clients contacting the server, the server can only respond to the next client in the line when the present client has been accounted for, as shown in Figure 7.



Figure 7: Any Client By One Server

## 5. Experiments and Result

When the 'menu' button is pressed, the menu will appear on the screen as in Figure 2. It also shows the details for the client to decide. The client is also able to check the status of the food and the whole food ordered, by entering the 'status' button. And by entering 'userID' button, total price and total energy can be exhibited. There also are 'special offer' and 'call waiter' buttons to show the special offer of the day and to call a waiter.



Figure 8: Example Of Show Menu Client Program

## 6. Conclusions and Future Work

This paper presents a wireless two-way restaurant ordering system which gathers a number of advantages of existing works and work via touch screens at three different units: customer tables, cook room and main server.

However, the operation based on “Any Client By One Server Respond” is questionable because the next client has to wait until the client being serviced is taken care of before he can connect to the server. One way to solve this problem is to use the **Thread Server Respond** as shown in Figure 9.

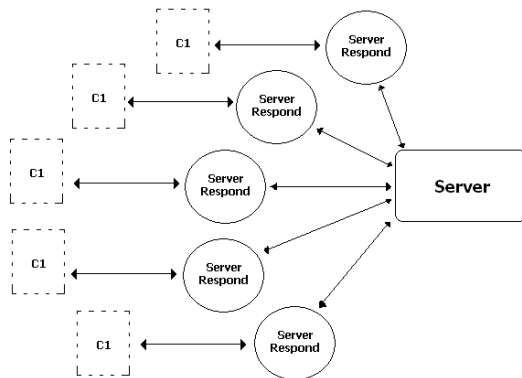


Figure 9: One Client One Server Respond

The three order statuses are also difficult to understand because when the status shows that the order is ‘waiting to be served’ and the assistant already takes the food to the client, the status still shows ‘waiting to be served’. Thus, we should add the status, ‘already served’ for ease of understanding.

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