

Tablet PC in Restaurant

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Abstract: The growth of wireless technology and tablet PC in this era is creating a great impact on our lives. Some early efforts have been made to combine and utilize both of these technologies in advancement of hospitality industry. Nowadays, the majority of restaurants are still operating in an old fashioned way, by using pen and paper to register the orders of customers. The problem using "traditional menu" is probability of paper lost high and misinterprets the handwriting of order. "TPIR" is designed to overcome this problem. By using "tablet PC", the customer can send orders to the cooking room and cashier in a fast and easy way. TSIR can also give customer feedback to restaurant staff. The methodology that has been used in this paper is based on wireless communication (Wi-Fi). This system is developed by using (visual basic 6.0 and SQL server 2000). This system makes the food ordering process easier. This system, implements wireless data access to SQL server. The Windows 7 application on customer tablet pc will have all the menu details. The restaurant manager can manage the menu modifications easily, via adding and removing items.

Keywords: Restaurant Automation, Wireless food ordering system, Tablet PC, Windows application, Wi-Fi.

I. INTRODUCTION

Some problems, in most restaurants are still used paper and pen to request the orders to customers. Must customer wait, until the waiter comes to register the order from customer. This process takes time from customer. Sometimes, the waiter forgets or he recording the order is mistake on the paper. Another problem traditional menu in restaurants, it not has more details about food for example Calories, food image and time of prepare. We aimed to solve this problem by designing a user interface for a new ordering system. With the new system, the customers would be able to order food from their table using a touch screen (TS) without waiter [1]. When customer order food and press done button in (TS) this bill do to cashier, this bill have more information about food items, price, table number and date/time. Use "TPIR" to make order food easier and faster by use touch screen. This paper presents use tablet pc wireless communication technologies to realize a wireless food ordering system. In this system, it implements wireless data access to the server and food ordering functions through tablet PC [6].

A wireless LAN (WLAN, Wireless Local Area Network) is a flexible data communication system implemented as an extension to or as an alternative for, a wired LAN within a building or campus [6]. The Institute of Electronics Engineers (IEEE) is one of the most influential standards bodies in the world for information technology. IEEE has created many widely adopted standards, such as port-based Network Access Control (IEEE 802.1X), Ethernet (IEEE802.3), Fire wire (IEEE1394), and wireless LAN (IEEE802.11). The 802.11 standards and its variant wireless LAN standards are now the foundation used by virtually all wireless LAN vendors and production in the world [7]. The IEEE 802.11 group of standards specifies the technologies for wireless LANs. 802.11 standards use the Ethernet protocol and CSMA/CA (carrier sense multiple access with collision avoidance) for path sharing and include an encryption method, the Wired Equivalent Privacy algorithm. The 802.11a, b, and g standards are the most common for home wireless access points and large business wireless systems [6]. WLANs have gained strong popularity in some markets, including the health-care, retail, manufacturing, and academic areas. These industries have profited from the productivity gains of using hand-held terminals and notebook computers to transmit real-time information to centralized hosts for processing [6].

A tablet PC may be defined as a type of notebook computer that has an LCD screen on which the user can write using a special-purpose pen, or by hands fingers [9]. This tablet PC without Keyboard and mouse external, make it easy to use by clients. The touch screen is known as user-friendly device since it 'deals' with the user when the user is working on the screen. Tablet PC detect the position of the point of touch. The design of touch screens is good for inputting simple, select and the choices are programmable. The areas of the tablet PC is defined as "Buttons" that the operator choose easy to touch them. The advantages of tablet PC applications are that each screen is customized to reflect only the valid options for each space of an operation [10]. Fig. 1 shows customer order use touch screen.



Fig. 1. The system Architecture

II. DESIGN AND IMPLEMENTATION OF THE SYSTEM

A. System Architecture

1. Client/Server: is a computer architecture that divides functions into client (Requester) and server (Provider) subsystems, with standard communication methods (TCP/IP wireless and wired) to easy the sharing of information between them. Work on a server, responding to each client in line [11] as shown in Fig. 1.
2. Access point (AP): is a device that allows wireless devices to connect to a wired network using (Wi-Fi). (Wi-Fi) enables the user to deploy a computer network without needing to run cable throughout the facility [12].
3. Customer touch screen (TS): connect it with server by (AP), by protocol (TCP/IP wireless IEEE 802.11) [12], after that can customer choose meal to touching on screen and goes order to room cooking and cashier.
4. Printer: is device to printed order or bill, printer connecting with server by cable (USB or Wireless).
5. 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 [13]. Fig 2 shows Package Pattern.



Fig. 2. Package Pattern

In the table 1 below we include commands between Parts of the system.

TABLE I: Command Table

Command abbreviation	Command name	Description
Conn	Connection	For connecting with Server
Disc	Disconnection	For cancelling connection with Server
Order	Request Order	For food ordering
Cancel	Cancel Oder	For menu cancelling
Update	ADD To Order	For updating menus
Ackn	Response from Server	For responding to different orders (Server)

B. Tablet PC

By the "tablet PC" the customer can choose order, he/she finds all information food. The customer can add and remove from his/her list. When customer finished to choose food from list, this order go to tow parts kitchen and cashier with more detail about this order for example Table NO., price and food items. Scheme below shows how customer use tablet to order food. Fig. 3 show Process the customer's order.

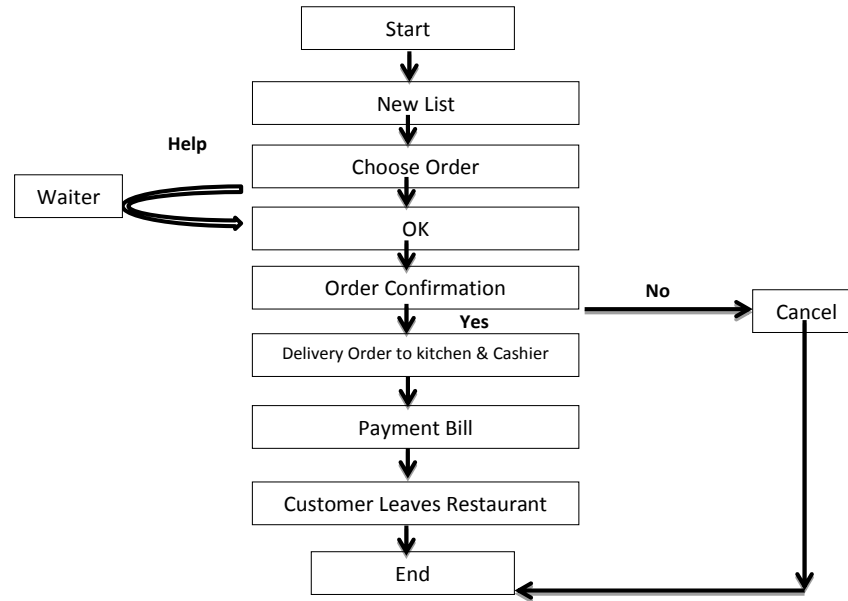


Fig. 3. Scheme shows how customer use tablet PC to order food

C. System design

1. A database (DB) is one or more lists of values. A computer (DB) is one whose values are stored in a computer medium such as a hard disk or another store device. A desktop database is one that is used in one computer. A client/server DB is a DB that is stored in one computer named a server and other computers named clients connect to the server to access and use the DB [14].

2. Entity Relationship Diagram (ERD) the Restaurant includes items, Manager, Cooker, Waiter, Cashier, Customers, Menu, items or foods and Tables. Those items are real world. We will convert the real world to Entities then we find the relationship between entities. An entity type name is a singular noun. Entities in one entity type have the sane attributes [15]. Fig. 4 shows the change the real world to entities.

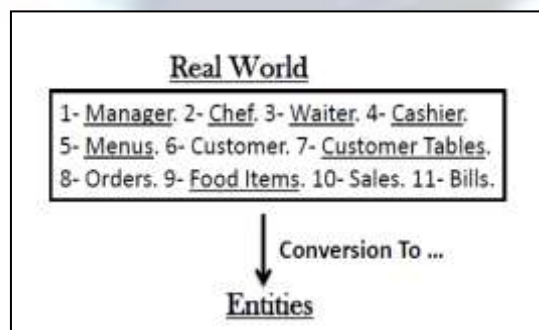


Fig. 4. Entities

We can be classified these entities into four groups (Entity type):

- Person: Staff.(Entity Type){Manager, Chef, cashier, waiter,...}
- Object: Customer Tables (Entity Type) {Table1,table2,.....}

- Object: Food Items (Entity type) {Pizza, Entrees, Hamburger,..}
- Object: Order detail (Entity type) {Order1,Order2,.....}
- Order (Relationship between entities)

3. The ER model a method to describe a database, and the relation between the databases. This model shows the links between entities via points or keys. Fig. 5 shows the relationship between entities.

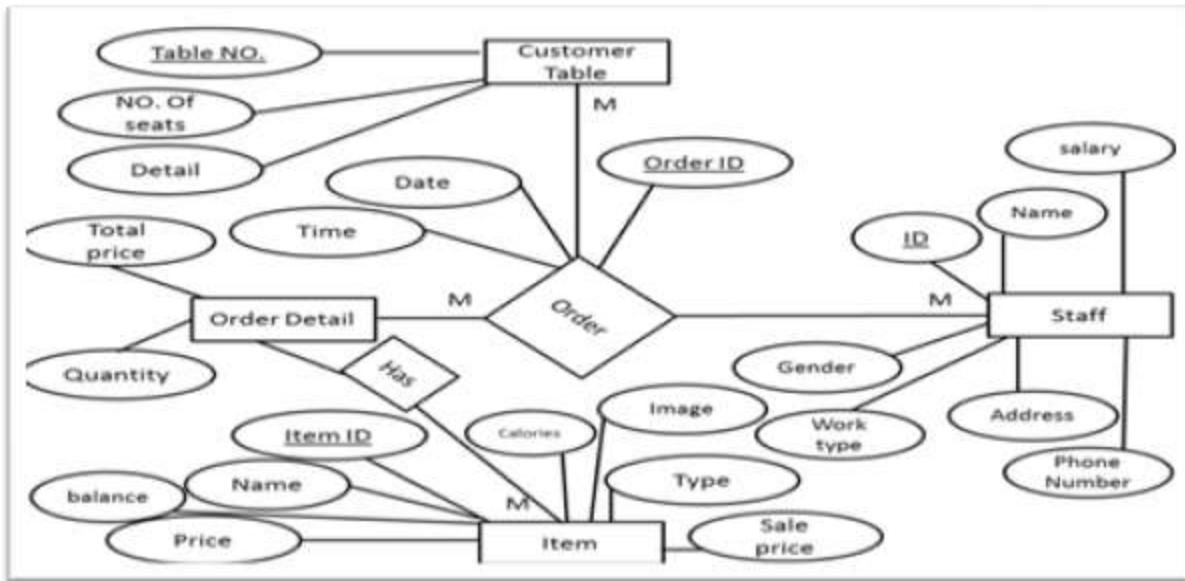


Fig. 5. ER Diagram

D. The Implementation of the System

The whole system was built using the Microsoft visual basic 6.0. Through Visual basic Environment we can build or design interfaces, through which the interfaces can users, used it, for example the user can call data, update and delete and. the database was served by Microsoft SQL server 2000. The functions of the system divided to 4 tasks: system management, cashier management, kitchen management and customer management. The system management setting and control to add, remove and edit items from food list, after the manager add or remove any items from meals, directly update in the tablet PC. In addition the manager can add and remove employees. These tasks shown in fig. 6 and fig.

Item ID	Item Name	Type	Calorice	Price	Sale Price	Balance
AA	Chicken	Grilled Food	Rich in fa	5	6	8

Item ID	Item Name	Type	Calorice	Price	Sale Price	Balance	
AA	Chicken	Grilled Food	Rich in fat	5	6	8	
	Coffee	Hot drinks	Sugarless	4	6	100	
	French	Entrees	EEE	10	12		
	Hambur	Hamburger	Cheese and	10	15	20	
	Hot drinl	Hot drinks	Hot	2	4	90	
	Juices	Orange juice	Juices	Natural	6	7	9
	kabab	Kebab	Grilled Food	Rich	2500	2750	4
	Pizzaa S	Pizzaa Small	Pizza	Vegetables	13	16	10
	Pizza	Pizza	Pizza	Meat and Co	10	10	30
	rice, sau rice, sauce and chick	Iraqi Food	Rich	10	10		
	Steak	Steak	Turkish Food	Chicken	10	16	
	Sweets	Small Cake	Sweets	Fruit	10	14	30

Fig. 6. Add and Remove Item

The kitchen management after the customer chose order, and then this order send to kitchen to prepare food, this order has information about items food, quantity, calories and table NO.

The cashier management receives all bills and the cashier can recognize all bills by number, each bill has id number (unique), this id is same table number. The customer management, the customer can choose his/her food by tablet PC, in case he/she cannot how use the tablet PC can call waiter by button in the customer interface. Fig. 9 shows customer interface.



Fig. 7. Add and Remove Employees



Fig. 8. Kitchen Interface



Fig. 9. Customer Interface

IV. CONCLUSIONS

The aim of this paper has been to develop wireless ordering system in restaurant and use modern touch screen (TS) technology. We use touch screen and provide it to the customer to choose meal directly without any help from waiters. The customer orders via (TS) by customer interface, which was designed by visual basic (VB 6.0) in a user friendly way, and by utilizing the user interface tools of VB. The restaurant owner benefits from this system either, because he/she can manage the restaurant from a central computer, he/she can check the input and output of food. Restaurant owner or admin authorizes the cashier to enter to system, each waiter or cashier has username and password. This type of security has been considered in the developed system. The customer can request help in case he/she can't or they do not know how to use touch screen by (Help button) which appears on customer interface. We used wireless service in this project to connect customer tablet pc or touch screen with server database. Through (TCP/IP wireless 802.11 standard) we can connect tablet pc and access point (AP) device, to delivery customer meal with table number (packet) to server, this is carried out using a client/server indoor application. Client initiates request and server services the request. The server has a number of security features, such as logins, Server Roles, Linked Servers and remote Servers.

By using this technique to solve the problem in traditional restaurants, the customers do not need to ask waiters what drink and food the restaurant offers. The customer finds all food and drinks in customer interface. Besides, he/she finds price of each type of food, drink and time of preparing. As the future work the customer will be able to pay bills from tablets, which means that customer can use visa card to pay. We can make the system multi-language which means any customer can choose his language. (For example English, Arabic, etc.). Another future work for this system is applying it in five Star hotels. We can put in each room in hotel a tablet pc and the customer can request meal using this tablet, each tablet connects with access point in each floor.

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