CANKAYA UNIVERSITY

GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCE

MATHEMATICS AND COMPUTER SCIENCE

MASTER THESIS

TOUCH SCREEN IN RESTAURANT

ALI ADIL ALI

MAY 2013

Title of Thesis: **TOUCH SCREEN IN RESTAURANT**

Submitted By **Ali ADIL ALI**

Approval of the Graduate School of Natural And Applied Science, Çankaya University.

Prof. Dr. Taner ALTUNOK
Director

I certify that this thesis satisfies all the requirements as a thesis for the degree of Master of Mathematics and Computer Science.

Prof. Dr. Billur KAYMAKÇALAN
Head of Department

This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis of degree Master of Science (M.S.) in Mathematics and Computer Science

Asst. Prof. Dr. Reza HASSANPOUR
Supervisor

Examination Date: 17-05-2013

Examining Committee Members

Asst. Prof. Dr. Reza HASSANPOUR   (Cankaya University)

Assist.Prof. Dr. Fahd JARAD   (Cankaya University)

Assist. Prof. Dr. Tunç MEDENİ   (Yıldırım Beyazıt University)

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Name, Last Name　: Ali ADIL ALI

Signature　　　　:

Date　　　　　　: 17/05/2013

ACKNOWLEDGEMENT

ABSTRACT

TOUCH SCREEN IN RESTAURANT

ALI, Ali ADIL

M.S. Department of Mathematics and Computer Science

Supervisor: Asst. Prof. Dr.Reza HASSANPOUR

May 17, 64 Pages

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" are probability of paper lost high and misinterpret the handwriting of order.

"TSIR" 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 project 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.

ÖZET

TOUCH SCREEN IN RESTAURANT

ALI, ALI ADIL

M.S. Department of Mathematics and Computer Science

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Kablosuz teknolojileri ve tablet bilgisayarlardaki gelişmele, yaşamlarımız üzerinde büyük bir etki yaratmaktadır. Daha önceleri bu teknolojiler bir araya getirilmiş ve otelcilik sektörünün ilerlemesi için hazırlanmıştır. Günümüzde, restoranların çoğunluğu halen eski yöntemlerle faaliyet gösteriyor, kalem ve kağıt ile müşteri siparişlerinin kayıtları alınmakta. Bu "geleneksel menü" yönteminde sipariş kağıdının kaybolma ve el yazısının yanlış anlaşılması ihtimali yüksektir. "TSIR" bu problemin üstesinden gelebilmek için tasarlanmıştır. Tablet Bilgisayar kullanılarak, müşteri siparişini pişirme odasına ve kasiyere kolay ve hızlı şekilde ulaştırabilir. Ayrıca TSIR müşteri geribildirimlerini restoran elemanlarına iletebilmektedir. Bu projedeki metodoloji kablosuz ağ bağlantısına(Wi-Fi) dayanmaktadır. Bu sistem (visual basic 6.0 ve SQL server 2000)kullanılarak geliştirilmiştir. Bu sistem yemek sipariş işlemlerini daha kolaylaştırmaktadır.

Bu sistem, SQL sunucusuna kablosuz veri erişimi uygular. Müşteri tablet bilgisayarındaki Windows 7 uygulaması, bütün menü ayrıntılarına sahip olacaktır. Restoran yöneticisi menü değişikliklerini kolayca yönetebilecekler, öğeleri ekleme ve çıkarma yoluyla. Kablosuz teknolojileri ve tablet bilgisayarlardaki gelişmeler, yaşamlarımız üzerinde büyük bir etki yaratmaktadır. Daha önceleri bu teknolojiler bir araya getirilmiş ve otelcilik sektörünün ilerlemesi için hazırlanmıştır. Günümüzde, restoranların çoğunluğu halen eski yöntemlerle faaliyet gösteriyor, kalem ve kağıt ile

müşteri siparişlerinin kayıtları alınmakta. Bu "geleneksel menü" yönteminde sipariş kağıdının kaybolma ve el yazısının yanlış anlaşılması ihtimali yüksektir. "TSIR" bu problemin üstesinden gelebilmek için tasarlanmıştır. Tablet Bilgisayar kullanılarak, müşteri siparişini pişirme odasına ve kasiyere kolay ve hızlı şekilde ulaştırabilir. Ayrıca TSIR müşteri geribildirimlerini restoran elemanlarına iletebilmektedir. Bu projedeki metodoloji kablosuz ağ bağlantısına(Wi-Fi) dayanmaktadır. Bu sistem (visual basic 6.0 ve SQL server 2000)kullanılarak geliştirilmiştir. Bu sistem yemek sipariş işlemlerini daha kolaylaştırmaktadır. Bu sistem, SQL sunucusuna kablosuz veri erişimi uygular. Müşteri tablet bilgisayarındaki Windows 7 uygulaması, bütün menu ayrıntılarına sahip olacaktır. Restoran yöneticisi menü değişikliklerini kolayca yönetebilecekler, öğeleri ekleme ve çıkarma yoluyla.

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

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LIST OF SYMBOLS / ABBREVIATIONS

TS	Touch Screen
DB	Database
AP	Access Point
ERD	Entity Relationship Diagram
SQL	Structure Query Language
ATM	Automated Teller Machine
GI	Graphical Interface
WOS	Wireless Ordering System
PDA	Personal Digital Assistant
GPS	Global Positioning Satellite System
S\W	Software
H\W	Hardware
OP	Operating System
DML	Data Manipulation Language
DDL	Data Definition Language

INTRODUCTION

Some restaurants, especially those which use traditional menu systems, do not provide enough information about food. The customer usually wants to know more details about the food, such as the contents and the calories of the food, before order.

Today, people getting busy and tension when facing their daily work, further more when they are required to queue up so long just to order a food in the food court. Although the food ordering system in the most court was successfully improve the food ordering process, but this should not mean it is the most efficient way of solution. Especially in this (Information technology) world, every industries and every single work has been computerized to improve the services and productivity. The information about the meal or drink offer in the food court was not stated clearly in the menu. Other than that, the food court does not update their menu from time to time [6]. For example, in Turkey during the break time, or lunchtime, to the employees, they go to restaurant to ordering food, Lunch time just one hour, the customer, who wants to know times that preparation of food, this information about time is not available in the Paper menu, for this reason, the customer calls the waiter to determine time to food done, So the customer can choose the dish that are appropriate with his time [23].

The majority of restaurants are still using manual menu, to prepare meals and fast food for customers, after recording the customer's meals, the waiter delivers it to the room cooking, the waiter then has to continuously check to find when the meals are ready

when the ends of preparing meals for customers, the bill is keep for proper record keeping by the management, this old way of work, followed by some restaurants, it need to make sure that all bills have been saved via archiving papers, keep and organized, this process is not easy, every day, to sort and organizing bills, this requires a great deal of time and attention from the managers [1].

The restaurants, which use traditional menus, have difficulties when dealing with a person with particular dietary needs. For example, some customers with food allergy need to know whether the food they are ordering contains any traces of the food that causes the allergic reaction. Waiters usually cannot assist customers who have special needs and specific requirements, therefore, in many cases, the waiter cannot keep enough information about contents food [20].

CHAPTER I

1.1 WHAT RESTAURANT HAS?

- Hall customers.

- Room cooking.

-The waiter.

- Cashier.

- Delivery

The relationship between points, above, customer requests, meal via the paper menu, after that waiter comes to take order to room cooking, then take order to cashier to calculate the total meal and delivery bill to customer to pay it to cashier, this process, we will transfer it to the new technique, using a E-menu will explain this in next chapters.

1.2 STAGES OF THE MEAL REQUEST

- First, customer.

- Second, the Waiter.

- Third, the Cook.

-Fourth, Cashier.

1.3 ACTION SEQUENCES TO COMPLETE THE MEAL

Tasks of each person listed above, first customer sits, to request his meal, after view the list, and choosing meal, second, the waiter comes to deliver meal to room cooking for prepare meal, third, when the cook finishes or prepare meal he calls waiter to deliver it to customer, when the meal is done, the piece of paper is kept for proper record keeping by the cashier.

1.4 THE PROCESS STARTS WITH THE WAITER

The process starts with the waiter:

Waiter -> Takes order -> Goes to room cooking to prepare meal -> Goes to cashier for Record bill -> the waiter Waiting -> Gets the food to customer-> Delivery the food -> The waiter Waits to take money from customer -> Goes back to cashier [2].

Cooks will be waiting until a waiter brings in an order from customers, during busy hours, waiter cannot go to the kitchen, after he to take set of orders and collected them at once, sometimes cooks take a more time to read all of the waiter's orders and to prepare meals, often they interpret orders incorrectly [2].

Some time, the restaurant becomes buys with customers (Peak time), Will happen effort to cook and waiters, high probability will happen loss orders, recorded it on papers [2].

1.5 PROBLEM STATEMENT

The traditional restaurants only provide passive service, where waiters can only deal with customers orders by asking for customer's needs and then wait for answers [3].

The old system, which followed by restaurant owners, using pencil and paper, this system, faces set of problems, mistakes facing the old system, the first, customer will waiting for to attend the waiter to provide a service to him, the second problem, added difficult to meal, only to call the waiter for update meal, The third problem, when customer pay the bill to cashier where keep it? The fourth problem, difficulty Account Restaurant sales by hands, to face for accounting problems.

Sometimes, some customers have diabetes visiting the restaurant, the customer wanted to know what foods content, these details are no part of the list, this requires to call the waiter, the customer to tell him, he wants special food to his health, All this loss of time for the customer and the restaurant.

1.5.1 Disadvantages to The Current System

  - No digital recording, employee can steal money after trashing orders paper [4].

  - Lack of Statistics data for sales, where the manager does not know when and exact amount of food materials to order from suppliers.

  - Using the traditional method, the difficulty of determine, the amount of foods sold.

  - The difficulty of determining the profits of the restaurant.

1.5.2 What Is Problem to Face Restaurant Management Work

We can divide the problems in two categories:

 A-First, problems with customers and food providers:

 - Customer wanted good services and fast.

B-Second, problems with waiters and manager:

-Calculation mistakes by waiters and delay to deliver food to customer.

How can the organization, and solve the problems mentioned above?

Work study, about the possibility of the development of restaurants managements using modern technology use (E-Menu).

1.5.3 Paper or Traditional Menu

  Paper menu used by traditional restaurants, lacks many details about food components and food price, for this reason make customer asking waiter about meal more time. Update paper menu, manager when he wants to added new items to menu must collect all menu and return printed, this costly.

1.5.4 What Contents Paper Menu

  Traditional menu contents usually on type of food, price food, image food and some details about content food, in coming chapters will compare it with E-menu.

1.6 AIM OF THESIS

- Improve customer service.

- Seeped up service.

- Promotes up-selling.

- Increases customer interaction.

- Accurate bills (no missed order).

- Grows your business.

DIVIDED THE MENU INTO THREE SECTIONS

TRADITIONAL MENU   HAND–HELD MENU   TOUCH SCREEN
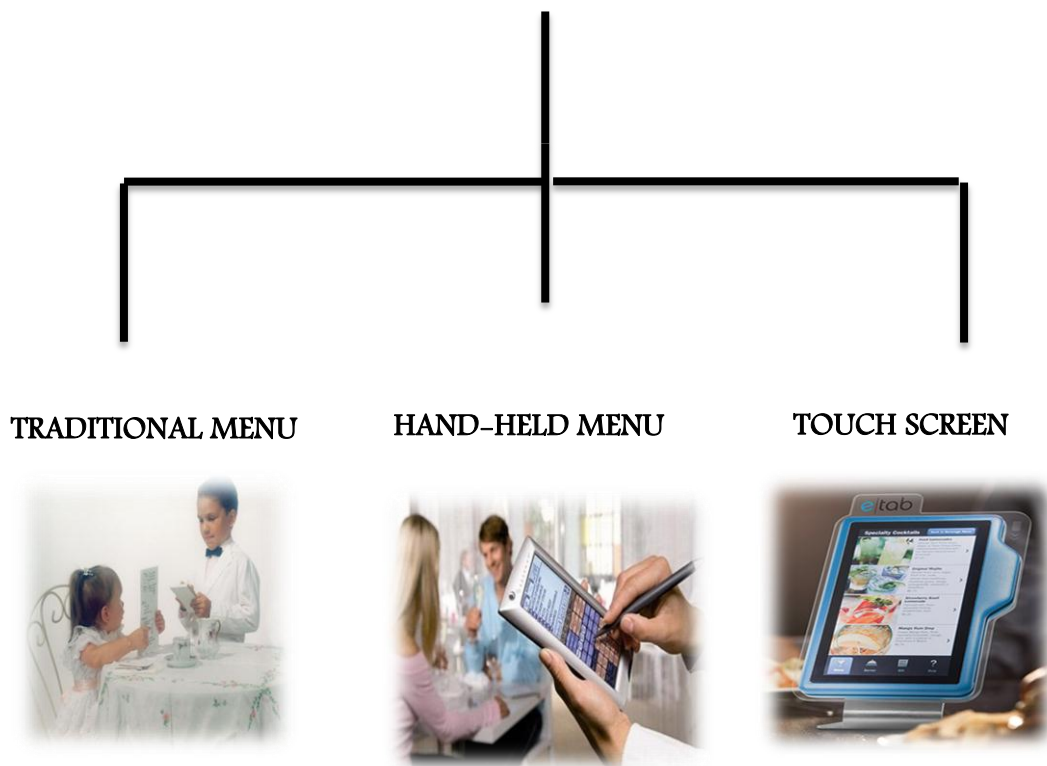
Figure 1.7 Types of restaurant Menu

1.8 CONCLUSION

The purpose of this study, to explain the difference between E-menus and traditional menu and develop it of the speed to send the order to the kitchen in real time without loss the order. When use E-menus provide better services than use traditional paper menus. And we will explain characteristics of touch screen interfaces. Then used in restaurant.

CHAPTER II

CHARACTERISTICS OF TOUCH SCREEN INTERFACES

Today in the world, need to technology highly responsive, to provide good service to people with keep time to them. One of these techniques is touch screen (TS).

2.1 INTRODUCTION ABOUT TOUCH SCREENS

A touch screen is one of the computer display screens which is touch-sensitive human allowing the customer or users to deal with the Environment of computer by touching text, video, images and another application, on the screen. And use the touch screen with information booths (interactive computer station available for public use, as one with access to the Internet or specific location information), based on computer training devices, and a system designed to help individuals who have difficulty in manipulate devices like a mouse or keyboard and another input device. And can use the touch screen technology as an alternative user interface with applications that normally require a mouse, such as a web browser. Nowadays many applications are specifically designed for the technology touch screen, and it was often more code and link from the application of a typical PC. [18].

The T.S contain from panel, option controller, software driver and another S/W driver. The panel boards are attached to the monitors plug in the serial or Universal Serial Bus (USB). The port card is installed in the bus pc. The function of touch panel is the registration of the touch event and passes them to console. Then the controller handles the signals and transfers the data to processor. Software driver will translate the events to connection mouse events.

The driver is available for each windows and Mac OS. Internal groups touch screen must be installed inside Observers. [18].

2.2 DEFINITION

The touch screen is known as user-friendly device since it 'deals ' with the user when the user is working on the screen. TS 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 touch screen (TS) are defined as "Buttons" that the operator choose easy to touch them. The advantages of touch screen applications are that each screen is customized to reflect only the valid options for each space of an operation [18].

A touchscreen (TS) is a display unit that also serves in the same time as an input device. Some TS require a proprietary pen for input, though most modern TS detect about human touch. Since touchscreen devices accept input directly through the screen, they do not need external input devices, such as mouse and keyboard. This makes TS perfect for computer and laptop, as well as portable devices, such as tablets and smartphones [17]. In addition, the signature on the touch screens using a special pen.

2.3 HISTORY OF TOUCH SCREEN

Back to the   1971, a touch sensor was invented and developed by Dr.Sam Hurst (founder of Elographics) who was an instructor at the University of Kentucky (UK). This sensor called the "Elograph" and received a patent by the University of Kentucky Research Foundation. The "Elograph" was not simmiler to the recent TS. The "Elograph" was chosen by Industrial Research as one of the 100 Most Significant New Technical Products (TP) in the 1973 [10].

Later, in year 2002, Microsoft entered in the field of touch screen (TS) technology and introduced New Product the Windows XP Tablet edition. However, you could say that the increase in the popularity of touch screen smart phones defined the
2000s. In 2007, Apple introduced the king of smart phones, the iPhone, with nothing but touch screen technology [9].

Figure 2.1 Dr. Sam Hurst

2.4 COMPONENTS A BASIC TOUCH SCREEN HAS THREE MAIN COMPONENTS

- Touch sensor
- Controller
- Software driver [19]

2.5 WHY TOUCH SCREEN

A main factor to spread in the regions of the world the touchscreens is ease of use. Allow to customers to use it without Input devices same keyboard and mouse [12]. Also use micro office word (M.O.W) writing by finger. Most touch screen or tablets on the computing market today allow to customers to simply use finger to select items or open applications by simply click them, with a some actions may vary from tablet to tablet [13].

Figure 2.2 Touch screen

In addition to providing the touchscreen (TS) so you can select items onscreen, tablets provide an onscreen keyboard for customer enter text and numbers. Typically the keyboard appears when the customer tap in a field or area where data entry makes sense, such as the Search field in a web browser [13]. Onscreen keyboards are pretty easy to use. But if customer chooses for a smaller tablet, for example one with a 7.inch screen, customer might find using it difficulty. For this reason, he/she can connect tablet to Bluetooth keyboard or a wireless.

Figure 2.3 Touch Screen with Bluetooth Keyboard & Mouse

2.5.1 Design Flexibility

Advanced design allows flat and spherical design.

Touch screens are speed responding and interactive units, touch screens draw an operator "into" the application, improving accuracy attention extension and speed of response. Although the (TS) system for the riggers of everyday life, the best solution for your application [18].

2.6 TOUCH SCREEN CHARACTERISTICS

1. Speed: high.

2. Accuracy: low (finger), high (pen),

3. Speed control: yes.

4. Continuous movement: yes.

5. Directness: direction, distance, speed.

6. Best uses: point, select [20]

2.7 THE BENEFITS OF TOUCH SCREEN

Touch screen have a set of characteristics and advantages, making the user to use it.

2.7.1 Reduce Training Expense

Working system to Touch screen (TS) easy to learn then traditional mouse and keyboard based. Everyday retail function for example editing and voiding line items, choose tender and capturing customer demographic information are made intuitive by virtue of the touch screen and the right (TS) software. Many retailers, especially those in the field of service sector, sell materials or items that cannot be easily bar coded (BC). Using touch system make is easy dealing with bar coded technologies of items [18].

Point of sale software (POS) function can be added with the knowledge that employees will be able to utilize them quickly and easily [18].

Figure 2.4 POS

2.7.2 Improve Customer Service

Touch screen system (TSS) eliminate all common problem. Today's need to learn much about what customer needs and buying. Save or capturing customer information is a snap with touch screen point of sale (POS) systems [18].

Figure 2.5 POS for clothes

2.7.3 Reduce Transaction Times

Studies show touch screen (TS) systems process transactions up to 60% faster than traditional keyboard point of sale (POS) systems [18]. The movement or touching of the fingers on the screen faster than use traditional keyboard POS systems.

2.7.4 Decrease Cost

In a touch screen sales point (POS) system, the lay out of the color coded (keys) is stored in file on hard drive. Change to the style or layout can be accomplished during the nightly poll of store data the time and expense of changing hardware key caps is eliminated [18].

Figure2.6 Decrease Cost

2.8 HOW DOES A TOUCH SCREEN WORK?

A basic touch screen (TS) contain three main parts: First part is the touch sensor Second is the controller and third is the software (S/W) driver. The (TS) is an input device, so it needs to be combined with a display and a computer or other device to make a complete touch input system [18].
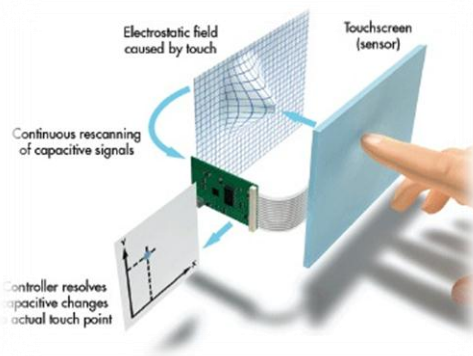
Figure 2.7 Devices used in Touch Screen Technology

2.9 Touch Sensor

The TS is a device with a sensitive or a touch responsive plate. The system is built based on variety of sensors types, most common type is the surface acoustic wave and the smart phones. Furthermore touching the screen causes a voltage changes in the sensors which have an electrical current running through them. These voltage changes make signals in the location of touching. [9].

2.9.1 Controller

The hardware is the controller (H/W) that converts the voltage changes on the sensor into signals to the computer or any device can receive [9].

2.9.2 Software Driver

Software(S/W) informs the computer, game device, smartphone, what is the sensor is processing and the information coming from the controller. Who is touching what and where, then allows the computer or smart phone to respond accordingly [9].

2.10 TYPES OF TOUCH SCREEN

There are different types of touch screens (TS) according to the different feature, characteristics and differences. These differences are resulted in different qualities of touch screen [20].

1-Resistive Touch screen

2-Capacitive Touch screen.

3-Surface acoustic Wave Touch screen.

2.11 WHAT IS TOUCH SCREEN USED FOR?

The touch screen is one of the easiest PC interfaces to use, making it the interface of choice for a wide variety of applications. Here are a few examples of how touch input system are being used today:

2.11.1 Public Information Displays

Information kiosks (IK) are trade show displays, tourism displays and other E-displays which used by group of people that have limited or no information about computing. The (user-friendly) TS interface can be less intimidating and easier to use than other input devices likes keyboard and mouse, especially for beginner users [18].

A touch screen (TS) may help make your information more easily accessible by allowing users to navigate your information by simply hit or touching the display screen [18].

Figure 2.8 Public Information Displays

2.11.2 Retail and Restaurant Systems

Restaurants, used touch screen to provide fast service to their customer, without wasting time. Touch screens (TS) have much potential, they may be used in cash registers, order entry stations, seating and reservation systems, etc. [18].

Figure 2.9 Retail and Restaurant Systems

2.10.3 Customer Self-Services

At this time, to provide modern technology, the restaurants owners and banks owners provide to customers speed service, and not wait a long time in the lines or queue, can use touch screen and saving time. Customers can touching place their own orders or check information, this technique, to organization of customers queue, automated bank teller (ATM) and airline e-ticket terminals are examples of self-service stations that can benefit from touch screen input [18].

Figure 2.10 Customer self-services

2.11.4 Control and Automation Systems

Improve performance by use, the (TS) interfaces are useful in systems ranging from industrial process control to home automation. By integrating the input device with the display, Valuable workspace can be saved. And with a clear graphical interface (GI), workers or operators can control and monitor this operation by ease select or touching the screen. This process provides time and efforts saving. [18].

Figure 2.11 Control and Automation Systems

2.11.5 Tablet PC Based Training

To develop human staff, use touch screen interface, the touchscreen friendly to users, It contains a beautiful graphical interface, especially when overall training time for computer novices, it can also help to make learning more fun and advanced, which can lead to a more beneficial training experience for both students and staff educators, because the (TS) is lightweight and it without mouse and keyboard devices [18].

Student interactive with touch screen interface, because it have perfect Graphical interface, without mouse and keyboard. Student can add note on paragraph, image and etc. Just he/she draws or select use his/her finger on (TS).

Figure 2.12 Computer Based Training

2.11.6 Assistive Technology

The touch screen interface can be beneficial to those that have difficulty using other input devices like a mouse or keyboards. When used in conjunction with (S/W) such as (on-screen), (Key-boards), or other assistive technology, they can help make computing resources more available to people that have difficulty using computers, making on buying touchscreen [18].

Figure 2.13 Assistive Technology

2.11.7 and Many More Uses

The touch screen interface (TS) is being used, more fields, of applications to improve human-computer interaction, other applications include digital jukeboxes, computerized gaming, Student registration systems, multimedia software, financial and scientific applications, and more [18].

Can connect between (TS) same ipad and wireless projection, we can use this Technical in more fields.

Figure 2.14 ipad and wireless projection

2.11.8 Use Touch Screen Interface in Clothes Shop and Market

Today in market, sale process is fast by use (TS), the movement of the fingers easy on screen, just worker touch it what customer want with keep time to he/she. The insert of materials and output it is easy.

In clothes shop, the customer, when he/she comes to clothes shop comes to buy some clothes, but now is different because customer uses (TS) to know size of clothes, colors of clothes and origin of clothes with Graphical interface.

2.11.9 Use Touch Screen Interface in Education

For example at (Cankaya University), student use touch screen, to follow teacher, to add some notes and draw circle or anther shape around important points, teacher refers to it. Because (TS) meet these requirements to students, and battery time up to 6-8 hours.

To other reasons to use (TS) is lightweight and it has internal keyboard. And can install Application program like (Microsoft office) and (PDF) useful to students. Teacher can explain lecture use (TS) as in (figure 14). The students do not lose more papers and keep money, when uses these tablets because it has more applications are Useful to them.

Figure 2.15 Use touch screen interface in education

Figure 2.16 Tablet in classroom

2.12 VIEW SONIC TABLET (TOUCH SCREEN)

View Sonic is one of touch screen, it has two types of operating systems (Windows 7 Operating System and Android 2.3), and the tablet seems to have best specs, for example (connect device via Bluetooth and 802.11 b/g/n Wi-Fi connection, camera, battery allowing up to 4 hours).

More Specifications with this tablet, the system easy to use by movements of your fingertips, photo editing, webpage browsing, games, handwriting input and zooming in/out of images [39].

2.12.1 View Sonic Tablet Price & Availability

This tablet is good for professionals and business usage. if you are working in a company and your manager provide this tablet to do some homework such as take notes during the meeting, replying to emails, workout in excel sheets and charts, because it is lightweight and easy to touching it, and can use this tablet in more fields in education, learn childe and etc.[39].

2.13 DIFFERENT BETWEEN TABLETS & LAPTOPS [40]

1- Input device: With tablet there is no keyboard and no mouse. If you like can connect a wireless mouse and keyboard with tablet.

2- Outside connection: Tablet can connect with internet via Wi-Fi or 3G technologies (3G is what your cellphone uses to connect virtually anywhere).

3- Primary function: Tablets were first designed as devices for consuming media e-books, movies, and music and for playing games, browsing the Internet, or retrieving e-mail.

4- Operating system: Desktops, laptops, and netbooks use computer operating systems, tablets use smartphone operating systems and it can use computer operating system (OS) like view sonic tablet, so they work differently.

5- Size and weight: Tablets are different sizes such as (7) inch or (10) inch and weigh far less than a laptop.

6- Screen resolution and processing speed: As with a laptop, tablet screens have different resolutions, tablet memory capacity will almost always be smaller than a laptop and can range from 8 GB to 64 GB; and their battery life is typically longer than most laptops.

2.14 CONCLUSION

Though the touch screen technology contains some limitations its very user Friendly, fast, accurate, easy for the novices & fun to operate. It has been widely accepted. And now by just modifying a little it can replace the mouse and key board completely in near future.

CHAPTER III
LITERATURE REVIEW

In this chapter we will talk about two parts first, use E-Menu waiter in restaurant, and what service provide this technical or (E-Menu waiter) to restaurant management and customers. And develop a wireless ordering system (WOS). Second use touch screen to shopping in supermarket.

3. 1 INTRODUCTION

Firstly, we'll talk about kind of touch screen is electronic menu (E-Menu) waiter which used it alternative traditional menu, in some restaurant management, to investigate speed of order.

3.2 HAND-HELD WAITER TERMINALS (E-Menu)

All waiter carry electronic menu devices which they will feed with customer orders. It will directly be transferred the orders to the concerned department, be it the kitchen or the coffee shop. This (E-menu) has more information about foods, for example food types, food price and food time (time food preparation).

The process to provide order use (E-men), will be processed or send order in real time to the kitchen printer and coffee shop printer, this order bill has more details about waiter name, table number, date and order time, and the customer is also left with a full copy [17].

The Waiter E-menu (W.E.M) solution is an advanced restaurant management, use this system or electronic menu (E-menu) to successfully in 17 countries.

The system uses both software and radio frequency (RF) or (Wi-Fi) technology to enable staff to wirelessly receive and send orders, access menu information such as tasting notes and add and update back office inventory in real time. This no loss time, both for the waiter and for the customer, this technology, provide comfort to customer and employee [15].

Figure 3.1 E-Menu

3.3 PROCESS OF REQUEST MEAL USE TRADITIONAL MENU

In case use paper menu to order meal, writes order and keep it on paper, the waiter deliver the order to room cooking to prepare the meal to customer, after that the waiter give order copy to manager or cashier to save it, in archiving. This process, between the customer and the waiter, kept on paper. Happen some mistakes and delay to prepare the meal to customer in this case, for example when the waiter writing order to customer maybe forgets write some food type and he forget writing Incorrectly price. Account payment process between the customer and the cashier.
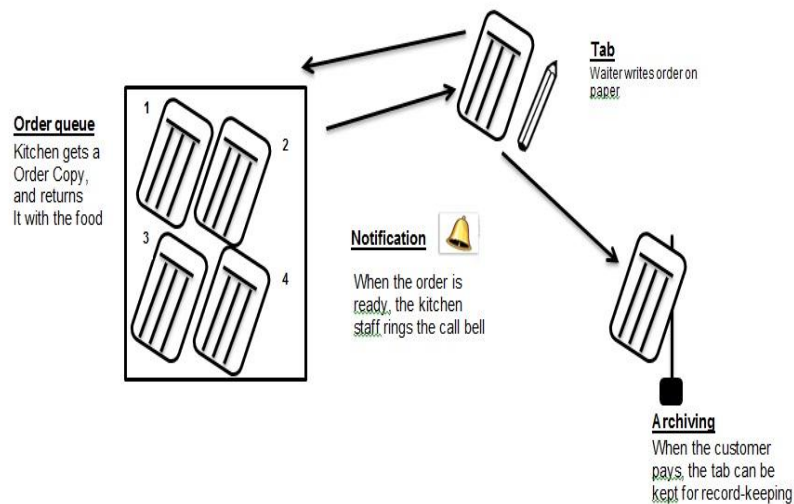
Figure 3.2 Traditional Menu

In the next topic will explain about develop paper menu, to menu work by touching and Wi-Fi. Leave work by paper and pen, without loss more time or make the customers waiting a long time. By using (E-Menu) Improved job performance. Hand-held waiter terminal has more information about food type and price, any change in the database directly hand-held waiter terminal is update. Use this technique restaurant owner, can save bills in computer.

3.4 PROCESS OF REQUEST MEAL USE (PDA) or (E-Menu)

In this part explain how the waiter can choose food and Fruit drink to customer via (E-menu). From the wireless personal digital assistant (PDA) or (E-menu), the waiter can do the following tasks

1- Open new table number.
2- Take order form customer.
3- At any time while the table is opened the waiter can edit, delete and add new items to that table.
4- Click "Done" button for send to room cooking and cashier.
5- Food items will be sent to the room cooking or kitchen printer.
6- Drink items will be sent to the bar printer.

7- Finally the wait close order table and customer pay to cashier. [19]

Figure 3.3 Process of request meal

3.4.1 Order bill

The printed order bill important in formation such as the waiters:

1. Waiters name.
2. Time of order.
3. Table number.
4. Prices.
5. Notes. [22]

3.5 ARCHITECTURE FOR ELECTRONIC MENU (E-menu)

The waiter has to do is enter the details of the order in to the E-menu or handheld and press Ok to send this order to room cooking, to prepare this meal (order). This process needs some devices:

1- Wireless Access point (AP).
2- Server (Computer or Software Application).
3- Waiter handheld (E-menu).
4- Manager touch screen.
5- Printer at kitchen.

6- Printer at par.
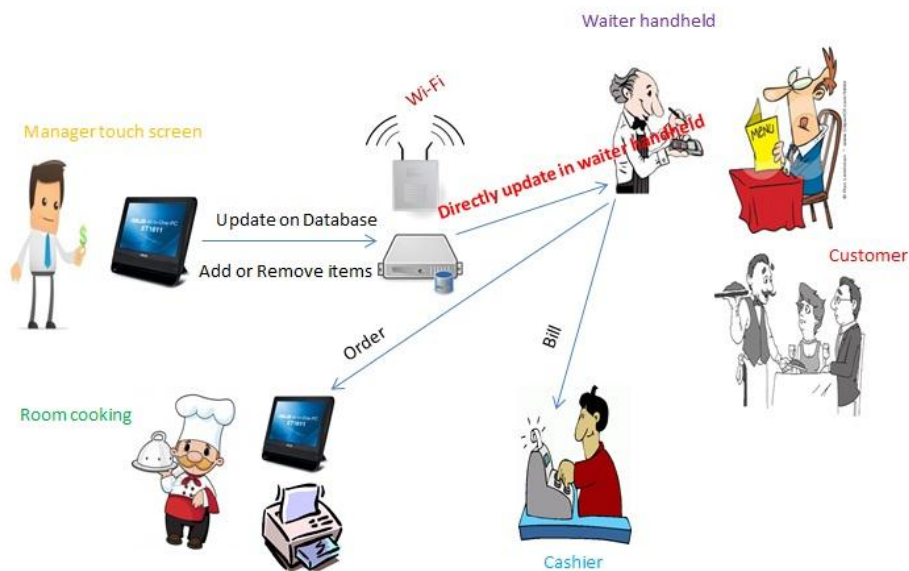
Figure 3.4 Architectural Wireless System Use (E-Menu)

3.6 USE TOUCH SCREEN TO GROCERY (SMART CART)

Home-shopping at this time is very important, from time to time, consumer goes to shopping from supermarket. Consumer can't always get complete information on food products. Consumer comes to shopping and search about healthy food, he/she tend to this food. The consumer wants gaining or losing weight. Sometimes the consumer who has diabetes, err in choosing a healthy food [25].

After the customer, finished shopping and go to cashier to pay bill, cashier select item after item, to taking barcode to each item In order to calculate the total of food (prices). This process takes a long time, and delay each of the consumer and cashier. For this reason the SK telecom found solution to this problem in supermarket, and help the consumer to keep money and choose healthy food and find what he wants [26].

3.6.1 How touch screen work in supermarket use (Smart cart)

This system uses some device such as:

1- Smart cart Application.

2- Touch screen Installed on cart.

3- Global Positioning Satellite system (GPS).

4- Wireless device.

5- Database.

6- Smart Phone.

Shopping by cart smart is not difficult, first we download smart cart App, then inserting access key into the touchscreen display, after that connects this unit or touch screen with database via wireless. This touch screen has GPS system, it guides the customer to products and when he/she arrived to products display advertise discount about this product. The customer can add and remove from list.

When customer takes some products, put it front touch screen sensor, (TS) takes barcode and add to customer list, finally customer puts the products inside cart. This touch screen has specifications like (Chat, Music and video) [44].

Figure 3.5 Smart carts with touch screen

3.6.2 Use tablet and smartphone to shopping

In this section we will explain use tablet to shopping, any person has tablet can shopping by takes or put a tablet camera front item to read barcode to this item and add item to list, same this process to uses smartphone.

Figure 3.6 Use tablet to shopping

3.7 USE TOUCH SCREEN TO REQUEST ORDER IN RESTAURANT (TS)

In next chapter will be explain about use touch screen via customer without need to waiters, Use wireless ordering system to provide good service to customer with put on each table restaurant, touch screen (TS) contains and displays the taste and prices of the food for customers to input their orders directly by touching [24].

Touch screen has photos about all each food type, the customer can choose favorite meal, only touching on screen. The wireless system automatically completes data receiving, storage, display, and analysis. It's provided with many advantages as great flexibility and portability, touch screen has a widely spread of many restaurants in the world [24].

CHAPTER IV

IMPLEMENTATIONS AND EXPERIMENTATION RESULTS

The customer, use touch screen to make his/her order in restaurant, first must we will explain, what we needed to build this system uses hardware and software (H/w & S/W) requirement, and explain how we will design customer interface, then how system works, uses touch screen.

4.1 SOFTWARE REQUIREMENT

Software (S/W) requirement involved operating system (OS), application and tools. Those components has been installed and used for producing new (S/W). The following topics will explain on the (S/W) required to develop the wireless food ordering system (WFOS).

4.2 MICROSOFT SQL SERVER 2000

(RDBMS) Is a featured relational database management system that offers a variety of administrative tools to facilitate loads of database development, maintenance and administration. Six of the more frequently used tools in SQL server: [31]

1- **Enterprise Manager** Enterprise Manager "is the main administrative console for "SQL Server" installations. It provides you with good services and a "graphical view" of all of the "SQL Server" installations on your network. You can execute high-level administrative functions that impact one or more servers, schedule common maintenance tasks or modify and create the structure of individual databases (DB)".

2- **Query Analyzer** "Query Analyzer "offers a quick method for performing queries against any of your SQL Server databases. It's a great way to quickly pull information out of a database in response to a user request, test queries before

execute them in other applications, "create/modify" stored procedures and execute administrative tasks".

3- **SQL Profiler** "provides a window into the inner workings of your database. You can monitor many different event types and observe database performance in real time. SQL Profiler allows you to capture and replay system "traces" that log various activities. It's a great tool for optimizing databases with performance issues or troubleshooting particular problems".

4- **Service Manager** "is used to control the Micro Soft SQL Server (the main SQL Server process), MSDTC (Microsoft Distributed Transaction Coordinator) and SQL Server Agent processes. An icon for this service normally resides in the system tray of machines running SQL Server. You can use Service Manager to (start, stop or pause) any one of these services".

5- **Data Transformation Services (DTS)** "provide an extremely flexible method for importing and exporting data between a Microsoft SQL Server installation and a large variety of other formats. The most commonly used DTS application is the "Import and Export Data" wizard found in the SQL Server program group".

6- **Books Online** "is an often overlooked resource provided with SQL Server that contains answers to a variety of administrative, development and installation issues. It's a great resource to consult before turning to the Internet or technical support".

4.2.1 Sql Database (Structure Queue Language)

"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" [42].

SQL SERVER is a client side and server side, based relational database management system (RDBMS) **[30].** SQL SERVER is supports and implements the SQL language (DDL and DML), and all data store in on location (central data).

4.2.2 What Can SQL Do?

- SQL can execute queries against a DB.

- SQL can retrieve data from a DB.

- SQL can insert records in a DB.

- SQL can update records in a DB.

- SQL can delete records from a DB.

- SQL can create new DB.

- SQL can create new tables in a DB.

- SQL can create stored procedures in a DB.

- SQL can create views in a DB. [42]

4.2.3 There Are Two Types Of Sql

 - Data Manipulation Language (DML) statements are used for managing data within schema objects. Some examples:

   In this type of SQL, we can run more commands on DB, like select command used to retrieve data from the DB, insert command used to insert data into a table, and delete command used to deletes all records from a table.

- Data Definition Language (DDL) statements are used to define the DB structure or schema. Some examples:

   In type of SQL, We can run more commands on DB, like CREATE to create objects in the database, ALTER commands, alters the structure of the database, DROP command delete objects from the database. [32]

4.2.4 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 [47].

Real World

1- Manager. 2- Chef. 3- Waiter. 4- Cashier.
5- Menus. 6- Customer. 7- Customer Tables.
8- Orders. 9- Food Items. 10- Sales. 11- Bills.

Conversion To ...

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)

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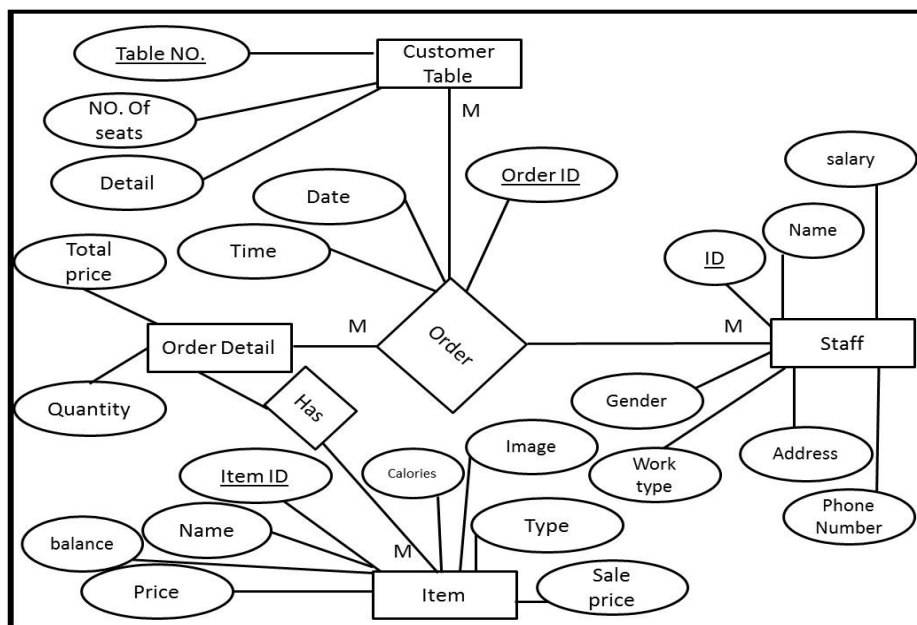

Figure 4.1 ER Diagram

4.2.5 Build Tables Use SQL Server 2000

In this section we will create tables used commands SQL, to create table use (CREATE), as shown in (Figure 19).
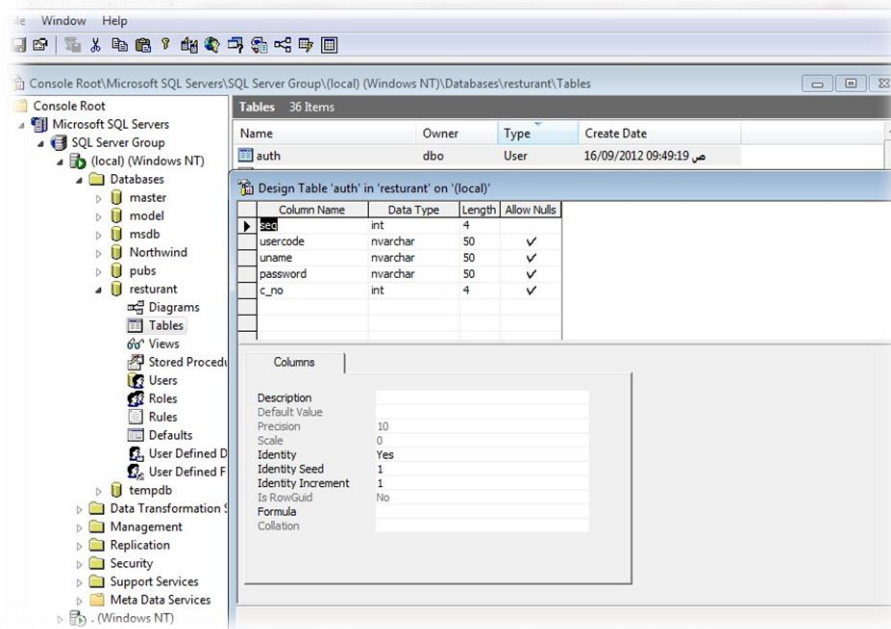

Figure 4.2 CREATE TABLE

After create table, we can use implementation of all command SQL on this table for example, the commands (Insert, delete, select and update) on the table.
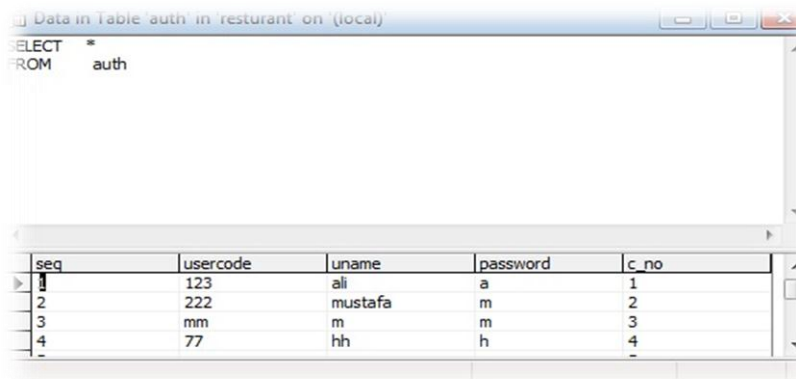

Figure 4.3 Select Colums From Table

In (Figure 20) used the command SELECT, this command use to create a query and retrieves the specified data from the tables. The result maybe one column or all data in the table.

4.2.6 SQL Create View Statement

"In SQL, a view is a virtual table based on the (result-set) of an SQL statement. A view includes rows and columns (just like a real table). "The fields in a view are group fields from one or more real tables in the database. We can add SQL functions, like WHERE and JOIN statements to a view and show the data result as if the data were coming from one single table". [42].
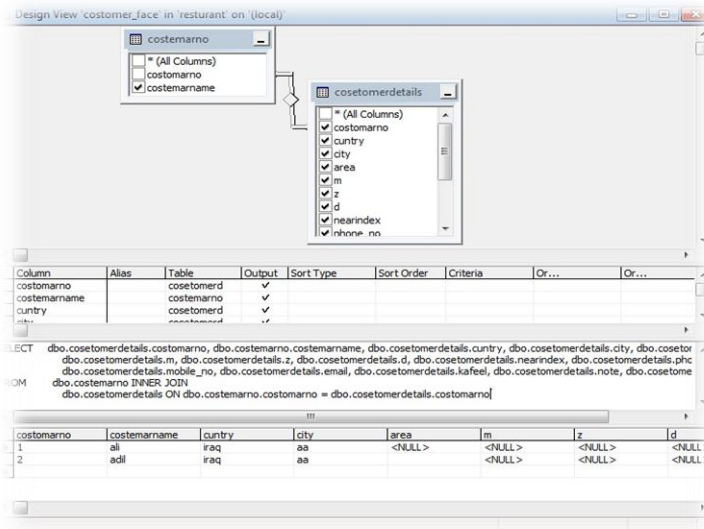

Figure 4.4 CREATE VIEW

A view is used to do any or all of these functions

- Restrict a user to specific or select rows in a table.
- Restrict a user to specific or select columns.
- Join columns from multiple tables so that they look like a single table.
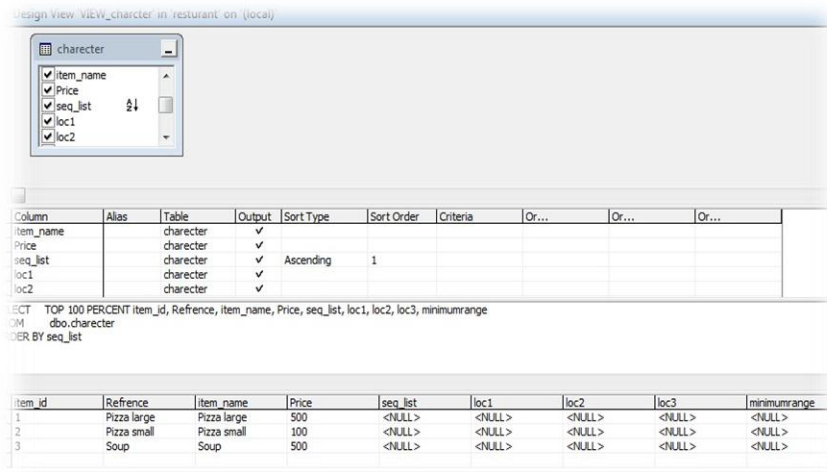- Aggregate information instead of supplying details. [33]

Figure 4.5 CREATE VIEW To Choose Columns From Table

4.2.7 Sql Server Security

SQL Server has a number of security features that assist database administrators in maintaining their database in a secure way. You can see the areas of security by expanding the "Security" folder within Enterprise Manager [34].

- Logins.
- Server Roles.
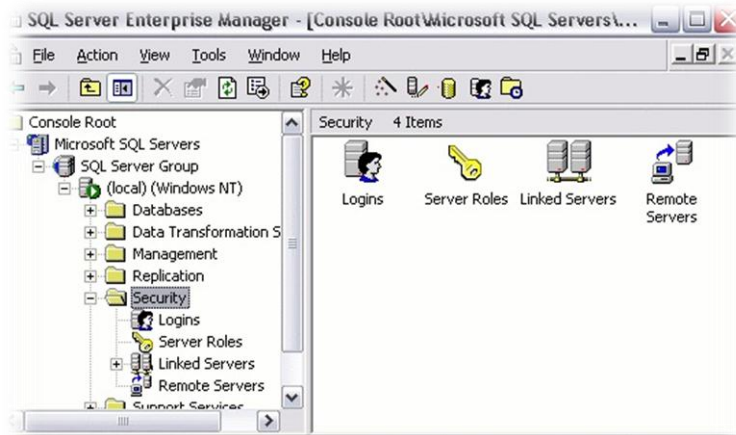- Linked Servers.
- Remote Servers.

Figure 4.6 SQL Server Security

4.2.8 SQL Server 2000 S/W System Requirements

Table 4.1 SQL server 2000 S/W System Requirement

Software	Requirement
Operating System	Microsoft Windows® 2000 SP2 , Windows XP Professional OR Higher

4.2.9 A database server offers several niche advantages

- "When we use a database server, all the data of your organization is stored in one location, then easy to access to it".
- "A database server allows you to take measures to increase the security of your data".
- "A database server offers you database management services. The data is arranged in a way that speeds up searches and retrievals".

- "It is easier to search, request, response and retrieve data on a database server. The client side and server side interactions are fast and smooth with a database server".
- "Use database server, allows several clients can access the data stored in the at one time, without any confusion and access to data fast". [36]

4.2.10 Visual Basic 6.0 software

"Is a programming language and software development environment created by Microsoft in the 1990s, first rank to make it easy for developers to create client applications on Windows operating system". "It featured an way to easily create graphical user interfaces by drawing windows and controls on the screen and it interactive with users, and an event driven paradigm that made it easy to attach code to meaningful events in the lifetime of an application (button click)" [41].

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, delete and etc. [35].

4.2.10.1 Visual Basic 6.0 Software System Requirement

- Windows XP (Any Service Pack).
- MS Access 2003 or Higher.
- SQL server 2000 0r Higher.

4.3 Hardware Requirement

In this section we will explain what needed to hardware to build the System Architecture.

4.3.1 Server

Is a computer program that provides services to other computer programs (and their users) in the same or other computers. To building a complete database to the system we needed to server system requirement.

4.3.2 Sql Server 2000 H/W System Requirement

Table 4.2 Sql Server 2000 H/W System Requirement

Hardware	Requirement
CPU	"166 (MHz) or higher processor"
RAM	"128 (MB) of RAM (Windows XP), 64 MB of RAM (Windows 2000), and 32MB of RAM for all other operating systems"
Hard disk space	44 MB of available hard disk space

4.3.3 Visual Basic 6.0 hardware requirement

200 MHz Processor.

- 128 Mb RAM or Higher.
- 2 GB SATA (Serial Advanced Technology Attachment) Hard Drive.
- 5400 RPM hard disk drive.
- DVD-ROM Drive. [37]

4.3.4 View Sonic Tablet (Technical Specifications)

"This touch screen (TS) we will use in this system, it has more specifications for example (two operating system win 7, android and etc.)" [38].

Figure 4.7 View Sonic Tablet (Technical Specifications)

4.3.5 What Is Arduino Hardware?

"Arduino is an (open-source) electronics prototyping platform based on flexible, easy-to-use software and hardware (H/W, S/W) [28]. "Arduino H/W is an open-source circuit board with a microprocessor and input/output pins for communication and controlling physical objects (LED, servos, and buttons)".

"The board will typically be powered via USB or an external power supply which in turn allows it to power other H/W and sensors. To use this device, making life a lot easier I wrote an Arduino library that takes care of converting or change strings and calculating the checksum of all commands sent to the (LED) Message Display. Can

connect this device with computer by (USB) with (LED) after that give command by computer to Arduino to display on (LED)" [29].

"Restaurant owner can take advantage to use Arduino hardware and LED, to display delivery order number, on this LED, and any text he display" [28].
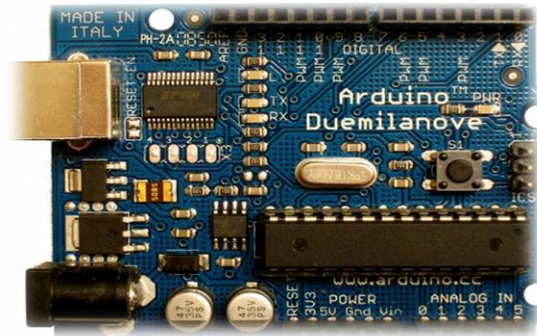
Figure 4.8 Arduino Hardware
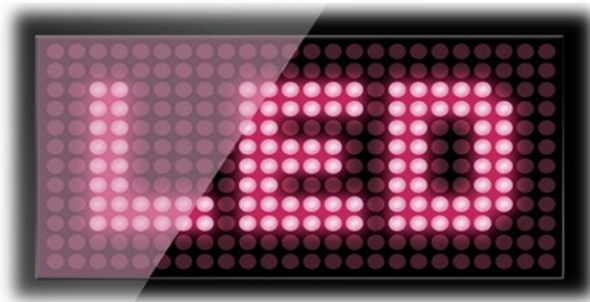
Figure 4.9 LED

4.4 SYSTEM ARCHITECTURE DESIGN IN RESTAURANT

To architectural design, requires use the following

1- Client/Server: is a computer architecture that divides functions into client (Requester) and server (Provider) subsystems [46], with standard communication methods (TCP/IP wireless and wired) to easy the sharing of information between them [21]. Work on a server, responding to each client in line.
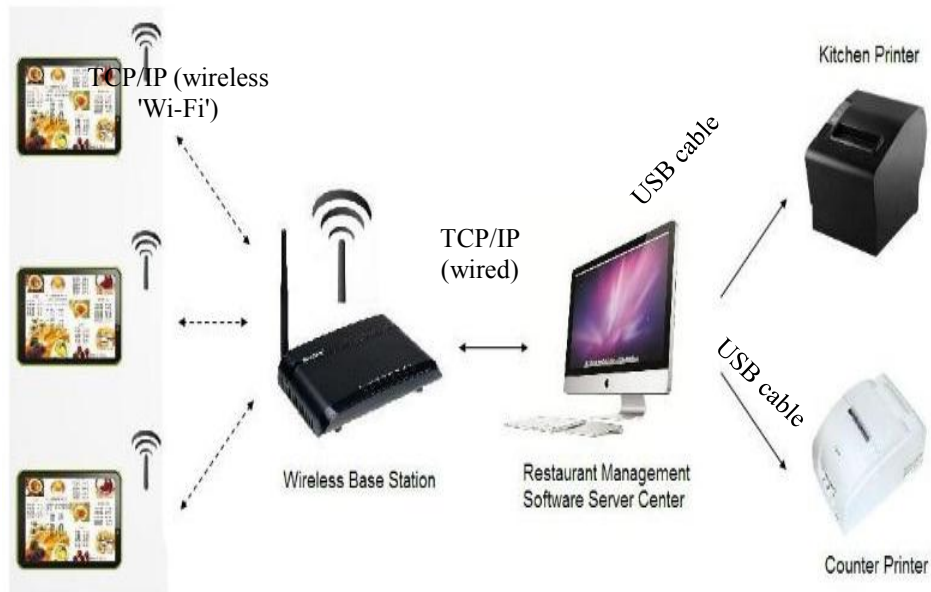
Figure 4.10 Architectural Wireless System Use (Touch Screen)

2- Access point (AP): "is a device that allows wireless devices to connect to a wired network using (Wi-Fi) [27]. (Wi-Fi) enables the user to deploy a computer network without needing to run cable throughout the facility" [27].

3- Customer touch screen (TS): connect it with server by (AP), by protocol (TCP/IP wireless IEEE 802.11), after that can customer choose meal to touching on screen and goes order to room cooking and cashier [43].

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. in table 3 has commands [45].

Command	DATA	END STRING

Package Pattern

Table 4.3 Command Table

Command	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)

4.5 IMPLEMENTATION AND DESIGNED INTERFACES (RESULT)

In this part will design graphical interfaces on touch screen, easy and interactive to use by customer, manager, cashier and staff kitchen.

4.5.1 Main Interface

The interface Containing all sub interfaces, for example Kitchen interface, Items interface, Staff interface. Etc.
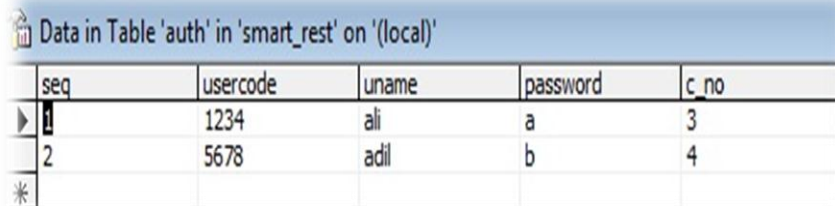
Figure 4.11 Main Interface

By this interface just the admin can enters to all sub interfaces, the admin gives authorities to staff in restaurant, for example in room cooking, the cook can see kitchen interface and the cashier can see bills to each table by cashier interface. Each worker according to authority. The restaurant owner or the manager easy to use these interfaces by touch screen. The manager can see all sales process and can input new items or remove it by use item interface. In the main interface each button when press it, opens new interface or window.

4.5.2 Authorized To Enter To The System

The manager gives to each employee, authorized to enter to the system username and Password.

Figure 4.12 Authorized
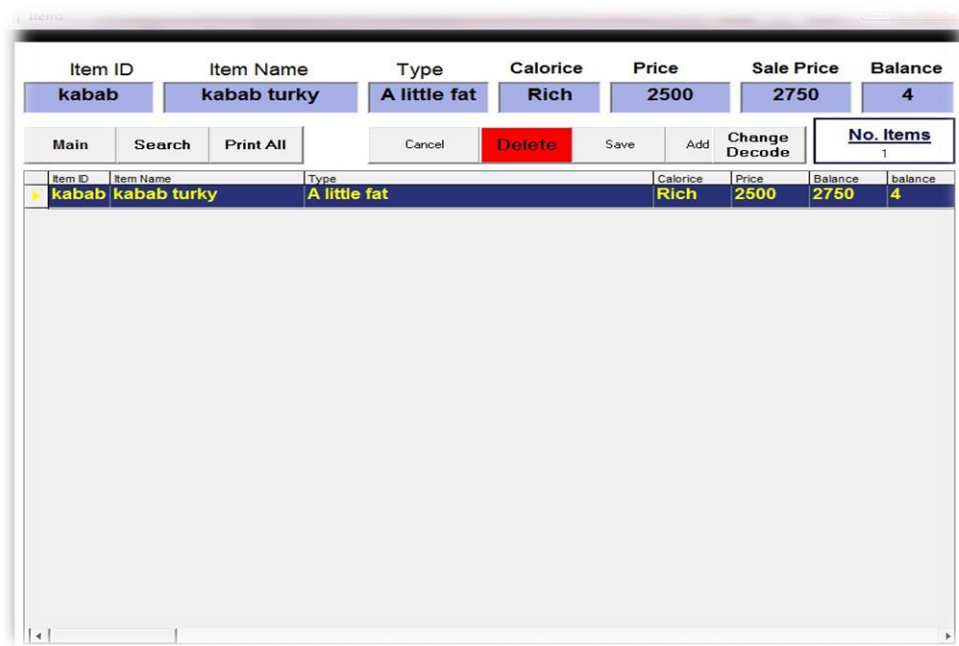
Figure 4.13 Login Interface

4.5.3 Login Interface

After the administrate gave authorize (Username/Password) to employee, after that can employee enters to the system, in same time the administrate can monitoring the user. This procedure gives to manager high security to system.

4.5.4 Item Interface

In this interface manager or waiter will insert in the item interface, item id, item name, type, calories, price, sale price and balance. When the waiter finishes insert all food type in the list, immediately this list displays in customer touch screen (TS). Any add, remove and modify in this list will appear in customer (TS), we can modify on this item add, remove and amend.

Figure 4.14 Item Interface

4.5.5 Item Interface With Add And Remove Items

This interface linked with customer interface, by (Type attribute) we can display and sort items in customer interface. When we added new item or remove it from item interface immediately update in customer interface.

Figure 4.15 Add and Remove Items

4.5.6 Staff

This interface to add, edit and remove employee. It has information about all employees.
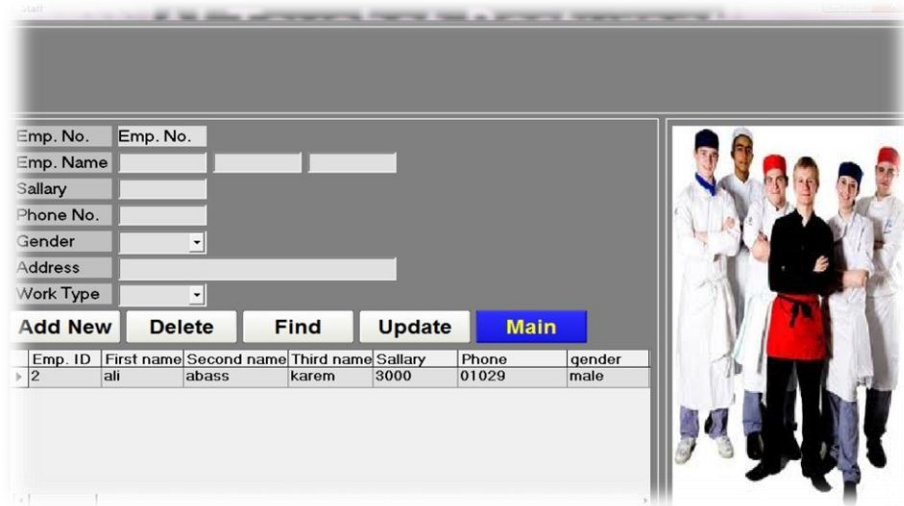
Figure 4.16 Employees Interface

4.5.7 Customers Tables Interface

This interface has information about each table has tablet. About this interface we can know where from order is come.
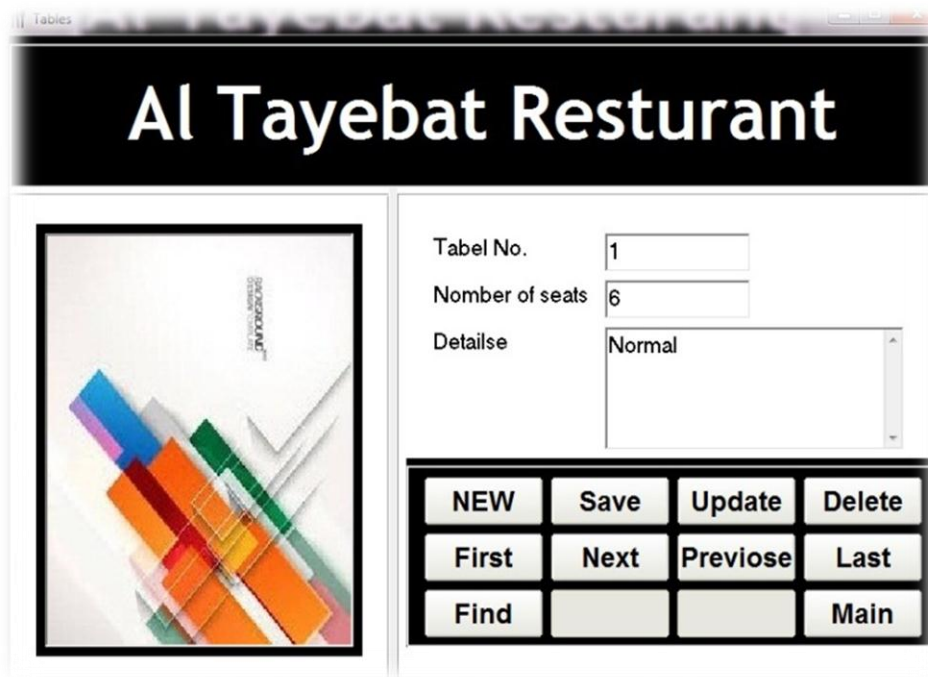
Figure 4.17 Tables Interface

4.5.8 Order Interface

In this interface we keep all information about order, order id, item id, table NO., date, time, quantity price and total. It is linked between all sub interfaces.

Figure 4.18 Order Interface

4.5.9 Scheme How Customer Choose Meal

In this part we will explain, how can customer choose order via touchscreen without need to waiter help. Will explain selection order process by scheme.

```
                          ┌─────────────┐
                          │    Start    │
                          └─────────────┘
                                 ↓
                          ┌─────────────┐
                          │   New List   │
                          └─────────────┘
        Help                     ↓
┌──────────┐             ┌─────────────┐
│  Waiter  │ ───────────→│ Choose Order │
└──────────┘             └─────────────┘
                                 ↓
                          ┌─────────────┐
                          │     OK      │
                          └─────────────┘                    No      ┌──────────┐
                                 ↓                        ───────────→│  Cancel  │
                          ┌─────────────────────┐                    └──────────┘
                          │ Order Confirmation  │──
                          └─────────────────────┘
                                 ↓ Yes
                          ┌───────────────────────────────┐
                          │ Delivery Order to kitchen & Cashier │
                          └───────────────────────────────┘
                                 ↓
                          ┌─────────────┐
                          │ Payment Bill │
                          └─────────────┘
                                 ↓
                          ┌───────────────────────────┐
                          │ Customer Leaves Restaurant │
                          └───────────────────────────┘
                                 ↓
                          ┌─────────────┐
                          │     End     │←──────────────────────────
                          └─────────────┘
```
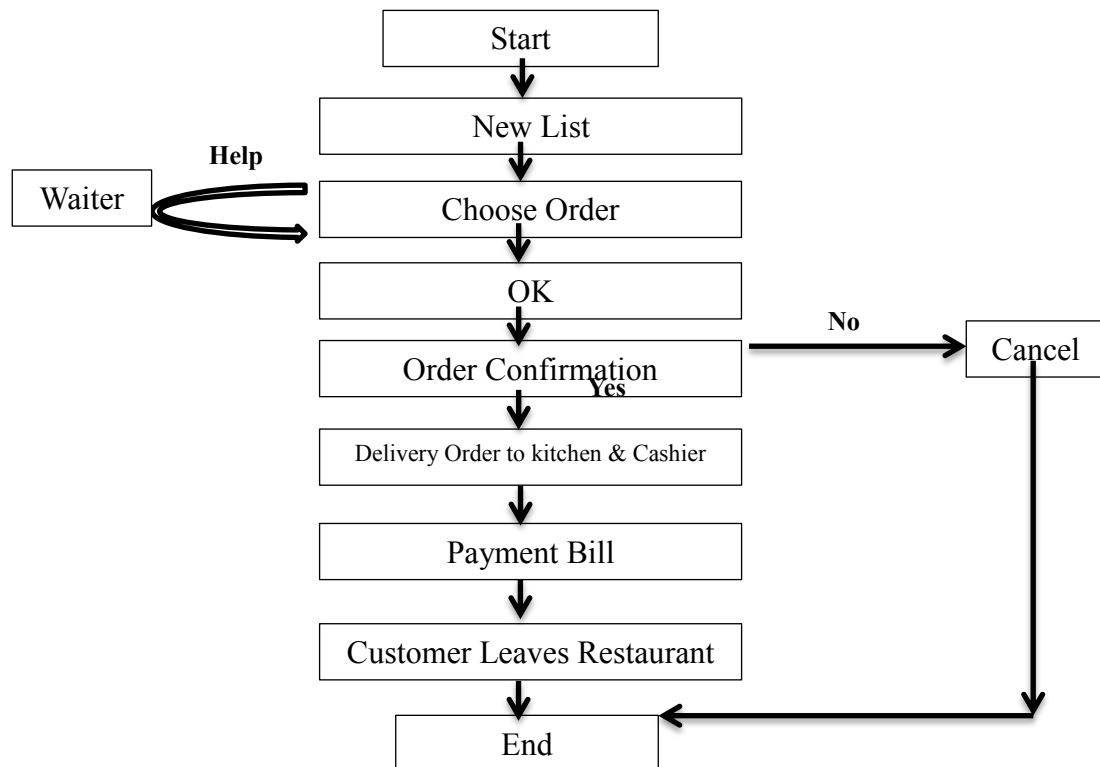
Figure 4.19 Selection Order Process Use (TS)

4.5.10 Customer Interface

Through this interface, customer can see all food type, price, price and calories via (TS) customer becomes interactive with it, because (TS) Easy to use. with details about what food contents this option is useful for persons infected from diseases for some kinds of food, such as allergies, diabetes, high blood pressure, he/she can choose food appropriate for them.

Figure 4.20 Cusomert Interface

4.5.10.1 Customer Interface With Food Item

Before customer chooses food, he/she can check everything about food, for example item name, price and calories.

Figure 4.21 Cusomert Interface with Food List

4.5.10.2 Customer Interface With Order

To request meal first step must customer click on "New List" to edit new number of list, then customer can add and remove items from list, after that customer click OK to send his/her order to kitchen and cashier.

Figure 4.22 Cusomer Interface with Order

In (figure 41) the customer chose order ,and disaply what he/she choses food type, price to each type and the total amount. After that the customer where finised chose order, then press or touching (Done) this command disaply message content two choices (accept order or Cancel). As shown in (Figure 39).

Figure 4.23 Message (Cancel or Done)

Finally when customer click "OK" displays to the customer massage to deliver his/her request for the kitchen, as shown (Figure 4.24).
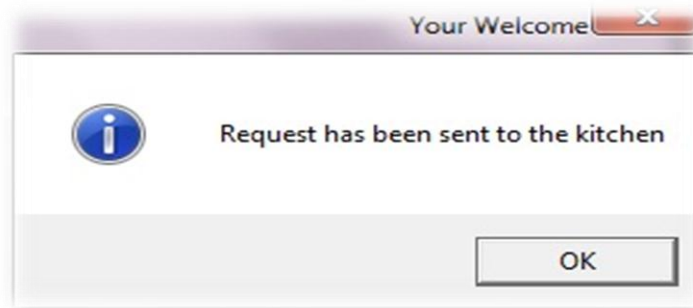
Figure 4.24 Message

4.5.11 System Sequence Diagrams
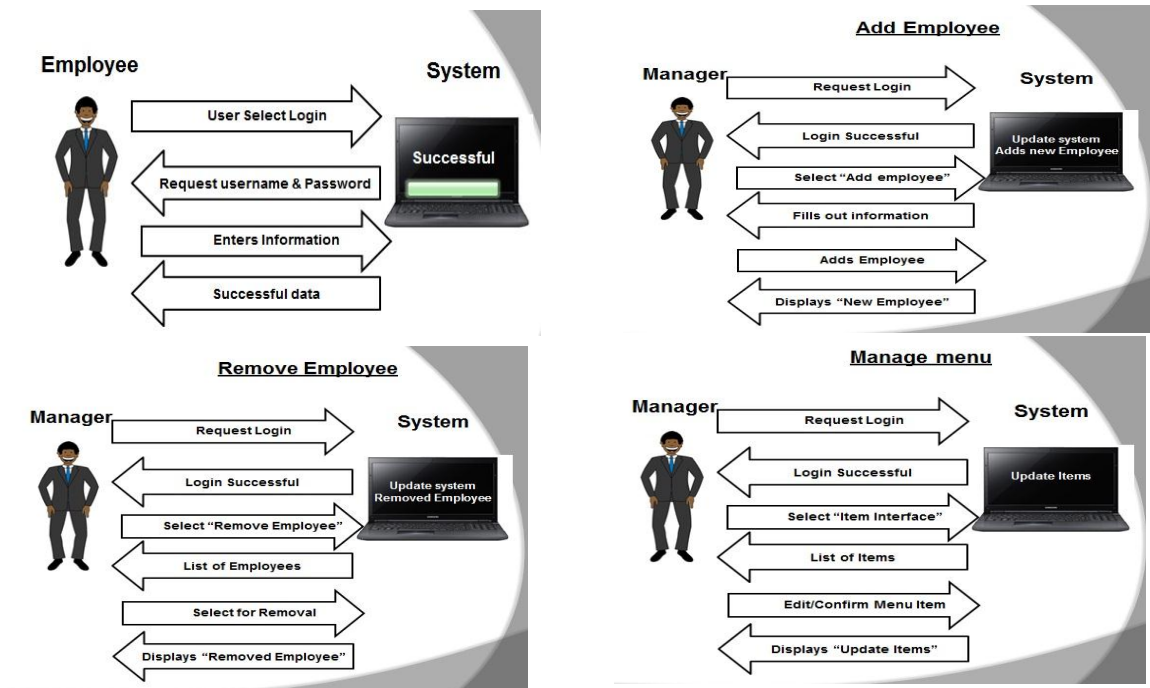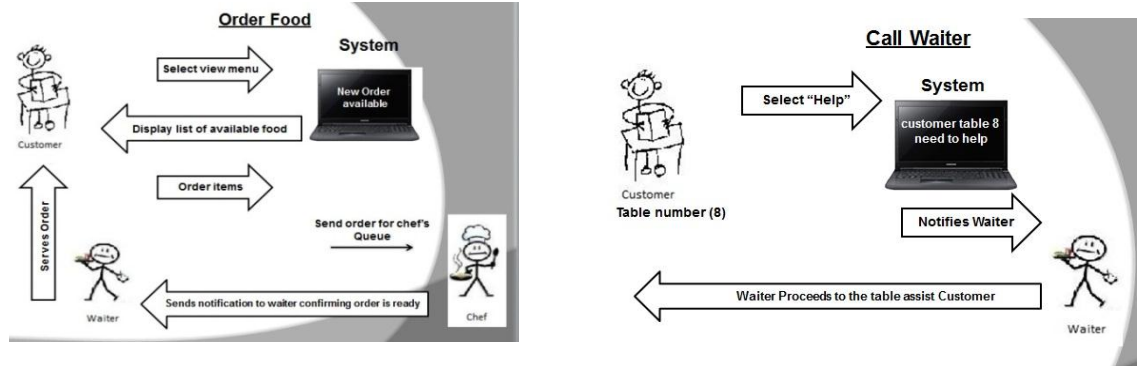
Figure 4.25 System Sequence

4.5.12 Takeaway Interface

In this interface the customer can chooses order, for service "Takeaway". When customer chooses order , then customer gets on ticket content on number, when the ticket number appear on screen, after that, customer receiving his/her meal. We can call to this Process "first in first out" (FIFO).
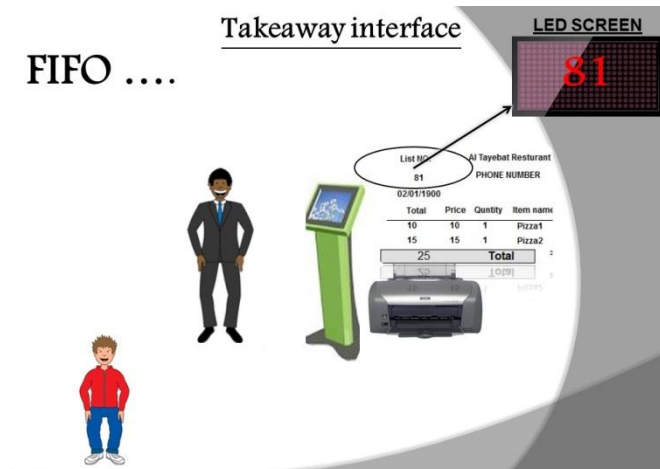
Figure 4.26 Takeaway

4.5.13 Instructions And Advertising Interface

The manager add to this interface any new meal and advertising. Directly show these additions in customer interface, As in Figure (42).
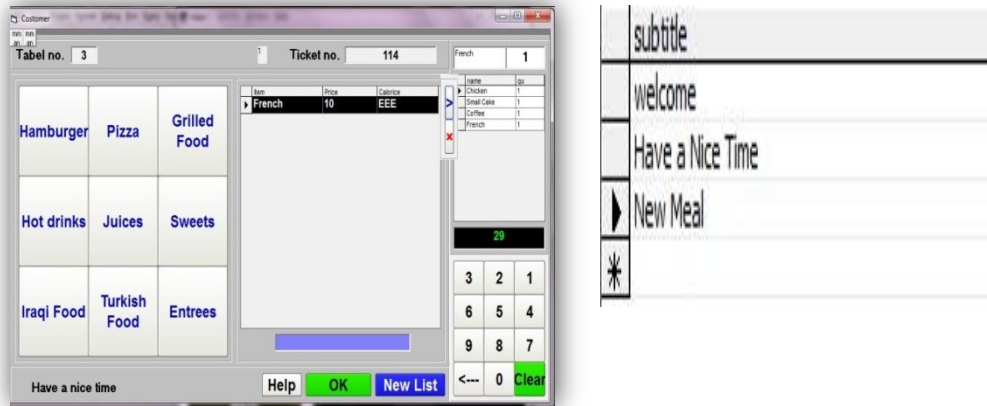
Figure 4.27 Advertising interface

CONCLUSION AND FUTURE WORK

Conclusion

The aim of this thesis 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.

This system has another service for takeaway meals. For example some people want to take food to home or another place. This service gives to each customer a ticket that include the list of ordered food and ticket number, when ticket number appear on screen then the customer can get the meal. These requests process in a queue. Other benefits of using touch screen are as below:

- Our new technology will save time and efforts (efficiency).
- Adding interactivity and creativity to the ordering procedure.
- Adding entertaining units in our restaurants (internet surfing and gaming).
- Applying the use of technology in everyday life.
- Creating a techno- friend society.
- Customers who are interesting in high –tech will prefer to go to these restaurants (having new costumers).
- The easy recording, managing and controlling for the firm (restaurant).

Future work

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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CURRICULUM VITAE (CV)

PERSONAL INFORMATION

Full Name: Ali Adil Ali

Nationality: IRAQ

Date and Place of Birth: 22 Junury 1985, DIYALA

Marital Status: Married

Phone: +90 5340722743

email: alialosh_2004@yahoo.com

EDUCATION

Degree	Institution	Year of Graduation
MS	Cankaya Univ. Computer Sciences	2013
BS	Al-Rafidain Univ. Computer Sciences	2006

WORK EXPERIENCE

Year	Place
2007	Ministry of sport and Youth
2008	Satellite channel
Now	Ministry Of Education

FOREIGN LANGUAGES: English: Good, Turkish: Beginner, Arabic: Native

SKillS: Oracle database, cisco network, Photoshop, Visual Basic.

HOBBIES: Travel, Reading, Swimming