Mobile Based Restaurant Reservation System

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DECLARATION

I declare that this thesis is my own work and has not been submitted in any form for another degree or diploma at any university or other institution of tertiary education. Information derived from the published or unpublished work of others has been acknowledged in the text and a list of references is given.

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ABSTRACT

At present, growth of Information and Communication Technology is significant all over the world. The Internet usage is gradually increasing due to the advancement of technology. WEB is available anywhere at any time. There is no limitation to access the World Wide Web through personal computers. It can be accessed by using mobile devices, such as Pocket PCs, mobile phones, and so on. Hence, the web base applications are very popular in these days. It is used in areas, such as e-learning, online banking, online order handling, shopping carts and etc…In this project it is going to implement an online order handling system for mobile users.

By using this proposed system, consumers have the ability to make reservations through the mobile devices other than personal computers. This system will provide adequate functionalities to the consumers to track the status of the order successfully from start to the end. Some of major system functionalities are selecting menu, placing orders, settling bills etc.

Now-a-days WAP is a popular, widely used technology. The implemented system uses WAP which can be easily handled by any kind of a mobile device.

The system administrators can generate MIS reports to get measurements on business status. So they will be able to identify consumer behaviors such as most consumed and popular (demanded) food items and other preferences. Even they can forecast, generate profit and loss statements, change food production chain etc.

ACKNOWLEDGEMENTS

I would like to take this opportunity to thank all those who contributed to the success of this project and it gives me a great pleasure to convey my sincere gratitude to all.

To Mr. Saminda Premaratne, my project supervisor, who guided and supported me through the entire duration of the project and keeping me on the right track. He has provided me with valuable guidance and a clear and succinct insight. My heartiest gratitude to Mr. Saminda Premaratne.

I would like to express my thanks to my friends Disala, Sudeasha for the great support given throughout the period of my project.

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Finally, I would like to thank IT Faculty and all my colleagues who helped me to carry out this study and make it a success.

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ABBREVATIONS

WAP	Wireless Application Protocol
GPRS	Global Packet Radio Service
RAM	Random Access memory
SQL	Structured Query Language
UML	Unified Modeling Language
RDBMS	Relational Database Management System
OOAD	Object Oriented Analysis & Design
WML	Wireless Mark-up Language
HTML	Hyper Text Mark-up Language
ER	Entity Relationship
HCI	Human Computer Interaction

Chapter 1

Introduction

1.1 Review of the present system

Personal computer, laptop, notebook, PDA ..., information technology is in a rapid development. Processing power of computers increases whereas the size reduces. Most people prefer tiny devices. World is being changed to hand held devices because of its easy usage. There by in the present era of mobile technology hand held devices play major roles to ease human activities. At present it is hard to think of a person without a mobile phone. Younger to adult, adult to elder all are 'mobiholics'. As the future demands on mobile devices and its applications, researchers, scientists and developers make their immense effort on the development of mobile technology.

Most business enterprises seek methods to offer their services, through mobile phones. It has become a style and people prefer its portability, accessibility, light weight and ease of use etc. Unlike computers, mobile operators do not need a sound knowledge on usage. Nowadays major marketing strategies are aimed through internet. Each and every business organization focuses their market towards e-marketing. Developers work on e-marketing solutions.

1.2 Growth of mobile web

"The U.S. mobile Web will reach nearly 100 million unique users per month in 2010, according to Millennial Media. In 2009, the U.S. mobile Web grew at an average rate of 2 percent month over month, according to Nielsen. At this rate, combined with the accelerated adoption of smart phones and mobile-specific sites, the mobile Web will reach more than one-half of the consumers on the wired Web." [1]

Nowadays the internet is available everywhere. When considering the devices which can be used to connect to the internet, it seems the PCs and laptop computers make the user uneasy when travelling. Unlike those equipments, the mobile phone had become a major

electronic device and had won the modern human desires. Nevertheless it is difficult to think of a life without a mobile phone.

Mobile phone industry and the mobile technology show vast development. Manufactures are willing to embed more facilities on the devices [1]. Truly it is no more a mobile Phone. It encapsulates all features of a computer, specially, the support for internet connectivity. All modern mobile phones have GPRS and WAP facilities.

1.3 Major issues of the current system

In an ordinary restaurant there are no well maintained communication systems from business to customer and the customer to business. Customers are willing to go to their favorite restaurant for their needs of food. They like to seek the menu and price of each food, special food items for a change. They reserve tables, meet their friend, chat with them while having favorite menu. Present restaurant system allows on things mentioned above. It is worth to discuss some issues on the present restaurant system. Suppose a customer need a specific food item, First he should go to the restaurant where it located. Then he has to wait for his turn. Make an inquiry. If food item is available he can order. If not, he would have to move to the next known restaurant. This process is a tedious task. Imagine you visit a restaurant with one of your friend for a dinner, when there is no room (tables) available; you have to run to the next. There is no system to get the price list of each food item or menu. Customer should physically come to the restaurant and check on the paper based menu for the prices or over the phone. It makes customer hesitation.

"Highlights a number of recent studies that all seem to support the same observation — people are increasingly using their mobile phones to shop for items they may be interested in purchasing. One study, by PriceGrabber.com completed in April of this year(2010), showed a doubling of interest in shopping behavior on the mobile platform over the past year" [2].

1.4 Aim & objectives

The primary aim of the mobile based customer care service is for reservation, table management and customer management software for restaurants though web.

For customers and administrative staff, this website provides facilities to select a desired restaurant location among the available restaurants, efficient way to find available tables that meet desired criteria of customer, price and location at a specified time. Search results reflect actual, "real-time" availability and reservations are immediately recorded.

- Study the problem domain thoroughly. Study of existing system concentrating on problems and major issues of it and aims/objectives of the project are considered to make a clear, concise and informative solution to the problem.
- Study the suitable technology and find ways how this technology is used to solve the problem.
- Design & develop WAP enable web site to cater for customer requirements such as to view menu, order meal, table reservations, request new registration and to make bill payments through credit card.
- Design & develop web application to cater for restaurant management requirements such as to customer registration, set order state and update menus.
- Preparation of the final dissertation, including chapters such as introduction and background, review of other approaches to the similar application, Technology adapted, Solution to the problem, analysis and design part, implementation of the solution, evaluation, conclusion and further work.

1.5 Proposed solution

WAP enabled web based technology is used to provide facilities to both customer and restaurant management to fulfill their needs. This system provides facilities direct customers to collect their orders or having their meal at selected location where the branches exists.

Mobile and web based technology is suggested to overcome those issues. Both the customer and the business get benefits. The customers use the hand held devices while the business facilitate the technology by maintaining web based servers and supporting software and hardware solutions to get benefits on the reverse.

The following functionalities can be done through the hand held device and web based technology in customer services.

- Ability to select location of the restaurant.
- Ability to request new registration for guest.
- Ability to select desired fix set menu and reserve table.
- Ability to give a priority to registered customer.
- Customer can view and reserve availability tables.
- Ability to indicate availability of selected items use and total cost for the order.
- Ability to view order state.
- Ability to make the payment through credit card.
- Ability to inform customer satisfaction level.
- Ability to reduce the cost to maintain the call centre and the call center personal and reduce the telecommunication cost
- Transactions will be made 24 hours and 7 days from any location.

- Enhance the decision making of management staff, enhance the supply chain management system and stock maintaining. Order processing could be done in Just in time process.

- Facilitate the two way communication customer to business and the business to customer.

Both customer and restaurant management can get the benefit out of this system.

Time saving: - Customers need not to visit the place where he purchase or have meals and do not need to consider the availability of item. There is no shopping in search of specific item shop to shop. Everything could be done in one location. Benefit goes to customer reducing the travelling time.

Cost effective: - Reduce the cost of maintaining the call centre and call centre staff. Also decrease the cost of creating, storing, updating the paper based information. On the other hand customers reduce their travelling cost and their valuable time.

Increase customer satisfaction: - Customer satisfaction level could be maintained at high level due to ease of ordering and reservation of tables as well as they get benefit reducing their transportation charges and the guarantee of availability.

Enhance the business process:-Enhance the management staff decision making, ordering process and stock management as well as management can judge and predict the business situation using collected information. Improve plan the future of the business.

1.6 System requirements

- Apache – Web server
- MYSQL – DBMS
- WML/ HTML – Web pages

- WML Script, Java Script – Form validation
- PHP – Web programming
- GPRS activated and WAP enabled suitable mobile phone
- Server computer – Web hosting
- PC with at 1 GHz 32-bit or 64-bit processor with internet connection

1.7 Structure of the report

Chapter 1 – Gives brief introduction about background & motivation of the propose system. Even it described the aim & objectives of the project.

Chapter 2 – This chapter will discuss the brief description is included about traditional methods and different between traditional methods and propose system. Further it was discussed about the similar projects which are currently available.

Chapter 3 – This chapter will discuss the background study for the project and will describe the research done on Wireless Application Protocol (WAP) and Multitier Architecture and advantages of WAP.

Chapter 4 – Requirement analysis and system design for the project are detailed in chapter 4. Technical analysis such as Unified Modeling Language (UML) diagrams, class diagram and Database table structure are (Entity Relationship diagrams) included in this chapter.

Chapter 5 – This chapter will discuss the implementation of the system and it describes used software and hardware, database implementation and coding modules.

Chapter 6 – Evaluation of the system as well as the prototype is discussed in this chapter.

Chapter 7 – This chapter contains the limitations of the project, achievements, difficulties encountered by the author in carrying out the project, solutions to identified problems and author's comments on the project.

1.8 Summary

This chapter described background & motivation of the project. It was stated aims and objectives of the current project. On the next chapter, it will discuss about the traditional methods, difference between the propose project and traditional methods and also about the existing similar systems under the heading of "Related Work".

Chapter 2

Related Work

2.1 Introduction

The previous chapter gave description of motivation, aim and objectives of the project. In this chapter we discuss about the traditional methods, difference between the propose project and traditional methods and also about the existing similar systems.

2.2 Traditional systems

People are busy with their work and in modern world they have to run with the clock. Some people are used to buy and have their meals when travelling, while some visit restaurants or hotels. Present restaurant systems are arranged to facilitate the customers to those who visit their premises. Processes of customer inquiries, ordering or reservation of tables begin there.

At busy hours, customers have to join in a serving line for their turn. In this system there's no guarantee of availability of the specific food item that the customers desired until they reach to the cashier or discuss with the hotel steward. This leads to customer dissatisfaction. Customer would have to choose the item among the available items.

This ordering process is time consuming as well as people should have to visit place to place to seek availability of their requirements.

Web based ordering is another method which has developed to facilitate to order and reservation. Internet facility is widely spreading among young crowed and now most urban people are having computers. Number of web sites has developed related to this field. People can access more information and can login to different places through web. Then they can decide their requirement and place orders. There are many web sites for reservation of foods. Examples for web sites on table reservation and order meal are www.opentable.com , www.pizzahut.lk.....etc.

2.3 Proposed system

In the proposed system, it mainly focuses on introducing WAP enabled web base system for the restaurants management. It is expected to have an enormous shift to carry the goods and services towards the mobile phone uses. By providing the mobile computing facilities to the customers to those who have mobile phones, it would be able to win the large market share. Unlike the other devices mobile phone is always with the user. It is the tiny portable communication device in the world.

In the proposed system WAP enabled web base system has used. Customer is able to give the order directly to the chef and can confirm the ability of getting the order with in the short time period.

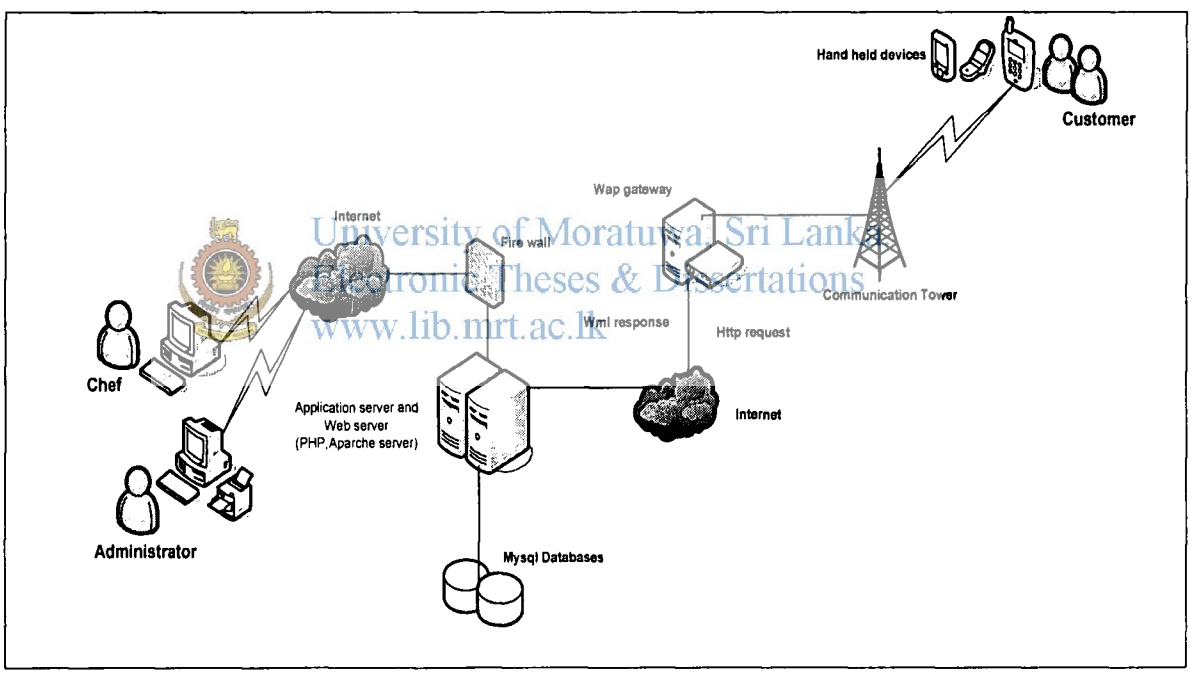


Figure 2.1 – WAP enabled web based proposed system

Comparison between the traditional systems and proposed system

Traditional systems	Proposed system
Customers must visit the restaurant to reserve or purchase at the operating time.	Customers will be able to place order or reserve from anywhere and anytime.
Customers are unaware about the availability of specific item or availability of tables until visit.	Customers will be able to check the availability very quickly.
At busy hours customers have to wait much time to order or reserve. This is time consuming.	There will be no delay in ordering or reservation.
Restaurant management has not enough time to cater customer need.	Restaurant management will be able to fulfill customer needs based on their requirement.
Difficult to achieve high customer satisfaction.	Will be able to get high customer satisfaction.
There is no better way to check the status of the customer order.	Customer will be able to check different stages of food preparation.
Customer is unable to forecast a time taken for their orders.	Customers will be able to visit the restaurant at the set time.
Customers do not have idea when to visit the restaurant to collect their order.	

Table 2.1 – Traditional systems and proposed system

2.4 Review of other systems

2.4.1 Hotel reservation system for WAP internet-enabled mobile phones

To search for hotel information, book hotel reservations and access guest loyalty programs using wireless and Internet-enabled Palm OS PDA's and WAP-enabled cellular phones there introduced software called IMScart® Voyager [3]. It is a total e-lodging

solution that and includes support for WAP (Wireless Application Protocol) mobile phones, offering customers of Hotels using efficiently [3].

'wireless guests' can access the services that ease their travel experience such as, room availability, room type, rates, creation, modification, or cancellation of reservations as well as hotels can offer 'wireless guests' and their corporate customers online bookings, instant confirmation and availability of contracted rates and build in a nice reward program as an incentive[3].

This web-based system enables travelers worldwide to make real-time booking directly from a hotel or resorts web site, online booking engine that streamlines the process of making business travel arrangements or a Reseller booking engine which allows a property's wholesale customers to check availability and book rooms online [3].

This system beneficial both customer and hotel with instant confirmation, time and money by reducing phone calls, employee time and faxing and gives the property the control to open and close inventory instantly for space-available customers, easily manages allotments and simplifies the booking process for the larger producers[3].

2.4.2 Online airline ticket reservation system

This project was developed to facilitate on line air ticketing for the normal passengers those who would like to travel by air. In addition, there is a system for comparing the fair based on their travel source and destination among various air lines.

This is basically a web based project which targets the travelers those who have internet access. By integrating the WAP technology it improves facilities in the site to accept requests from other alternative devices like PDA's and WAP-enabled browsers [4]. Apart from the ordinary PC based internet passengers, passengers using hand-held
devices are more encouraged to use the site.

2.4.3 WAP portal for mobitel mobile network

Mobitel WAP enable WAP users preview and download a variety of service on mobile phone. It includes following features and services.

- Images, ring tones, games, videos, themes etc.
- News Service, sports, entertainment.
- Configuration of top downloads for images, ring tones, videos and games etc [5].

2.4.4 WAP taxi booking system

The e-Comfort booking system was developed by taxi company comfort transportation and singtel mobile in singapore. The system is WAP base system provides facility to user to book taxies. The user has to register to the system before make a booking. Otherwise they have to do booking at several places such as international plaza, DBS tower 2, lucky plaza, marina square, republic plaza and the world trade center [6].

2.5 Summary

This chapter described difference between the propose system and traditional methods and also about the existing similar systems. On the next chapter, it will give fully description about technology uses to solve the problem under the heading of "Technology Adapted". It will give detail description about why and how technology is appropriate to solve the above stated problems.

Chapter 3

Technology Adopted

3.1 Introduction

The previous chapter described difference between the propose system and traditional methods and also about the existing similar systems. In this chapter, it will describe technologies that are going to use to solve the above stated problems and why /how technology is appropriate.

3.2 Multi tier architecture

Mobile/web based project, by nature has client server architecture. When developing this kind of a project the better approach is multi tier architecture. There, it is easily identified the logically separated processes named presentation, the application processing, and the data management which is called the three tier architecture [15] .

To implement the tiered architecture for each tier, following technologies are used.

3.2.1 Presentation tier

Here to render the screen on the mobile device it uses WML whereas the PC base uses HTML. Most of mobile devices are WAP and GPRS enabled, Delivering the content to those kind WAP is the better solution. Administrators of the restaurant system can log on to this system using their Personal Computers. Since it is easier to use HTML is used.

3.2.2 Application tier

PHP is used to carry out the function of this tier. PHP is supported both Windows and Linux based system. It has built in facility to database management especially for mysql which used as the database server on this project. PHP runs on Apache web server as well as Windows IIS server. It means the system is platform independent [7]. This makes the project easily deploy in any kind of platform. The PHP is mostly designed to run on Linux and Apache, which are both open source software which have zero upfront

costs and zero ongoing costs and even future updates can be done for free of charge. This completely removes server maintenance cost to a fraction of Windows server's maintenance and upgrade costs. The PHP language is always up to date by a team of global experts who ensure that the language is always relevant to the requirements of today's websites. The PHP has ability to work with multiple databases such as mysql, Oracle, MSSQL and IBM DB2 [7]. So in future, it is easy to migrate from one database to another without spending lot of money. Event it is very easy to lean that person has very few programming background. It can be use many deferent development tools for free of charge to develop a project. It is very reliable language as java and ASP due to its age (more than fifteen years). It is very easy to access other web base tools via the PHP [7]. Due to the configuration facilities, that provides huge security measures.

3.2.3 Date tier

Here as the database server, mysql is used. mysql database server can run on windows based and the linux based machines. To manage mysql database server there are more Free and open source application available. This server is community developed and free to use.

The mysql is used to implement a database for store and retrieve information. The following are the benefits from mysql [8].

- High availability
- High performance
- Scalability and flexibility
- Robust transactional support
- Web and data warehouse strengths
- Strong data protection
- Comprehensive application development
- Lowest total cost of ownership

3.2.4 Running web site

The Apache is used as a web server for the system. There is no need to get permission from anybody to view or edit the software. Hence it allows any programmer to create his or her solution based on the core Apache program, or extend the features of the software. Apache is constantly being updated. Even apache has set of powerful features. It supports wide range of programming languages such as Perl, PHP and Python. The "SSL" and "TLS" are supported by apache [9]. So it provides more security to hosted web sites. Apache Web Server can be installed on a wide variety of servers and operating systems due to its portability.

3.3 Why these technologies are appropriate

The project will be used mobile & web base technologies to overcome above mentioned issues. Even they are very poor to afford an internet connection due to the cost factor [10]. At present, mobile networks have rapidly spread all over the country. So the mobile phone is a very common device for every person in the country without considering economical ability. Hence most suitable device is mobile phone to convey information.

The Wireless Application Protocol (WAP) has become the standard for communication between server applications and its clients [10]. WAP layers can be explained as a set of protocols, which layers allow data exchange for mobile cellular systems and is the current world standard for the presentation and delivery of wireless information [10]. Further, it is device and network independent and design for micro browser. WAP is based on the Internet standards.

WAP is used as a standardized method so that handheld devices such as cellular phones can talk to a server among the cellular network that it belongs to. WAP technology not bound only to the services offered by the cellular networks. It has become the link of the internet to the mobile world, bride a gap between two of the top industries of the world.

WAP gateway

A WAP gateway is a server that transfer data from wireless devices (using WAP requests) to content sites (in WML format) and back again. It typically resides within the wireless carrier's network but may also reside within a corporate business environment.

WAP gives mobile phone users to access Internet or web services through mobile devices. WAP technology provides a solution to the growing demand for wireless mobile services across the world. WAP act as a bridge between the mobile world and the Internet. It offers WAP services like encoding of WML pages, end-user authentication system and WML script compiling.

WAP uses the underlying web structure to enable communication between content providers and mobile devices. This wireless protocol employs Wireless Mark-up Language (WML) for application content instead of Hypertext Mark-up Language coding (HTML).

3.3.1 WAP architecture

WAP also follows a model similar to the Internet. The Internet itself has a layered protocol stack. The portable device using WAP has browser software that connects to WAP Gateway and sends requests to receive data from web servers. Data could be a web page or email. The content is then sent back to the portable device, and depending on the capability of the portable device to receive and view data, the data is received and viewable. An overview of the WAP architecture is depicted in Figure 3.1.

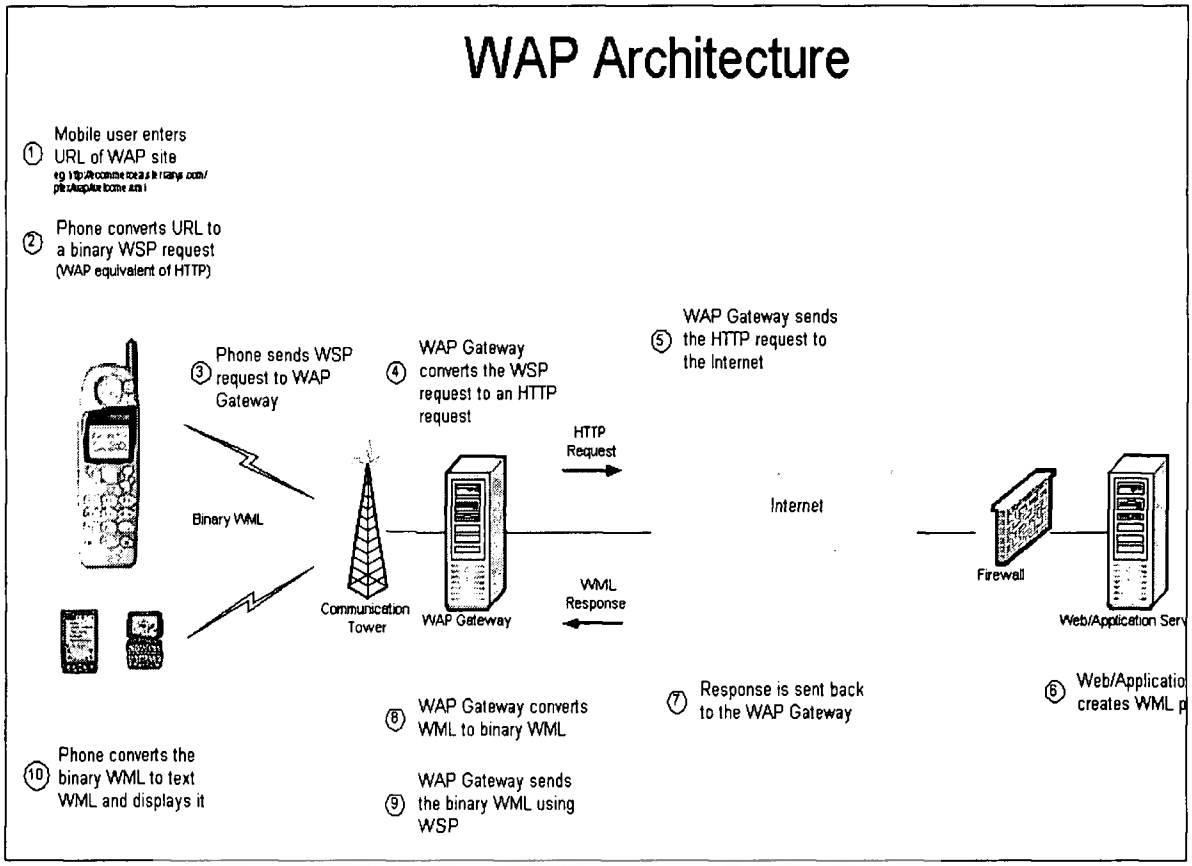


Figure 3.1 – WAP architecture [16]

Early adapter of WAP include Ericsson, Nokia, Motorola and Phone.com (formerly unwired Planet). In December 1997, these three large companies, all with strong influence on the Mobile market, formed the WAP Forum, an organization with open membership and now with over 300 members worldwide. The purpose of this forum is to make sure that the specifications of WAP do not go astray [11].

Basic specifications of WAP include micro browsing, scripting, wireless telephone applications and a layered protocol stack.

To create wireless Internet content, a Web site creates special text only or low graphic version of the site. A Web server sends the data in HTTP form to a WAP gateway. This system includes the WAP encoder, script compiler, and protocol adapter to convert the HTTP information to WML. The gateway then sends the converted data to the WAP client on wireless device.

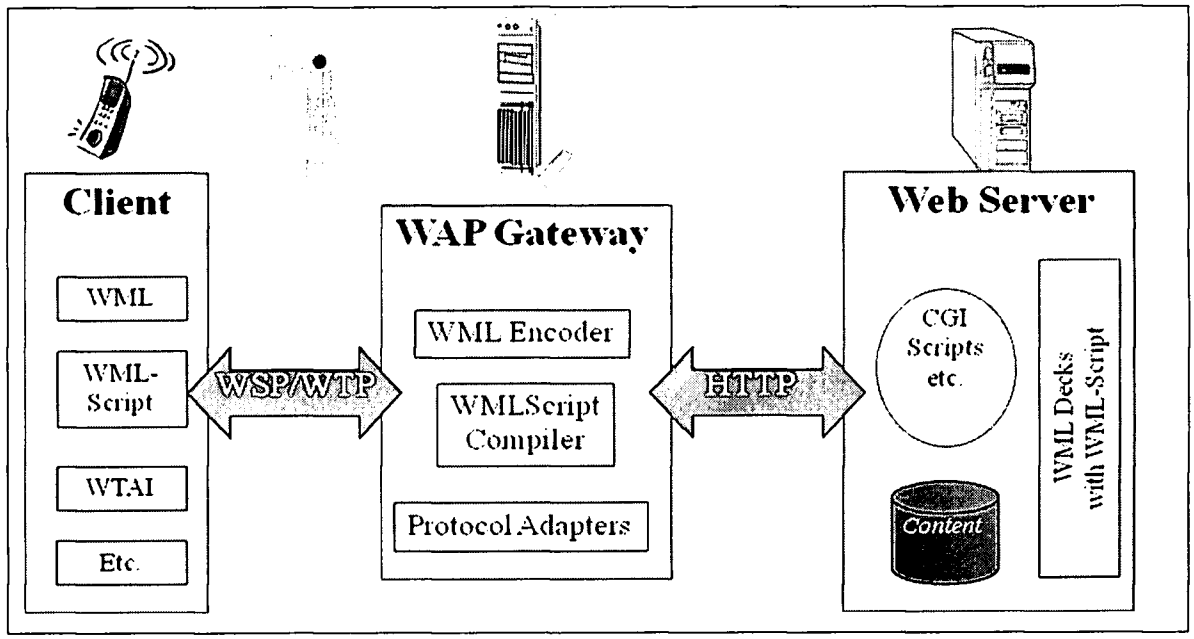


Figure 3.2 – Inside WAP [16]

The World Wide Web model follows a three-layer protocol. Referring to figure 3.2 diagrams, the WAP model follows the World Wide Web model in that there is a Web server, a Client and Gateway. The main web server is where one would fine and server side functions. The Web server also holds content that Clients will want to view.

3.3.2 WAP layers

WAP is designed in a layered fashion so that it can be extensible, flexible, and scalable. As a result, the WAP protocol stack is divided into five layers [12]. The following figure 3.3 will give an indication about the layers of WAP and the description of each layer.

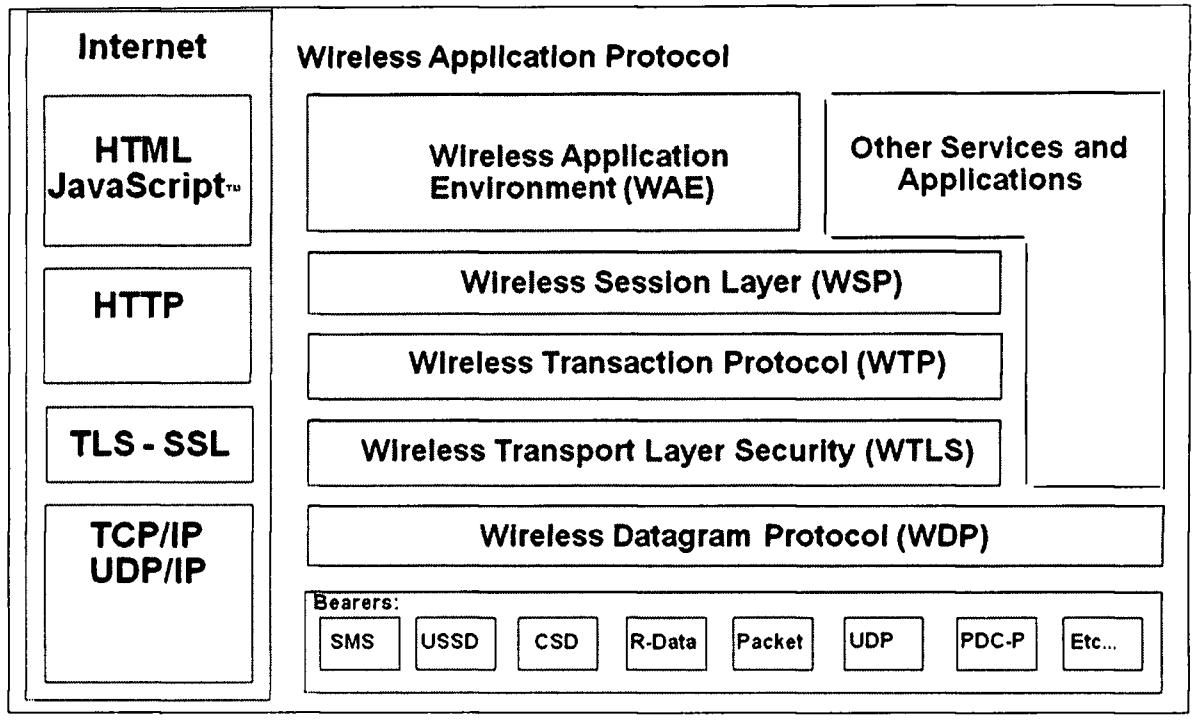


Figure 3.3 – WAP layers [16]

What is WML?

WML stands for Wireless Mark-up Language. It is a Mark-up Language inherited from HTML, but WML is based on XML, so it is much stricter than HTML. WML is used to create pages that can be displayed in a WAP browser. WML pages are called DECKS. They are constructed as a set of CARDS, related to each other with links. Structure of WML showed Figure 3.4. When a WML page is accessed from a mobile phone, all the cards in the page are downloaded from the WAP server. The phone computer-inside the phone does navigation between the cards without any extra access trips to the server.

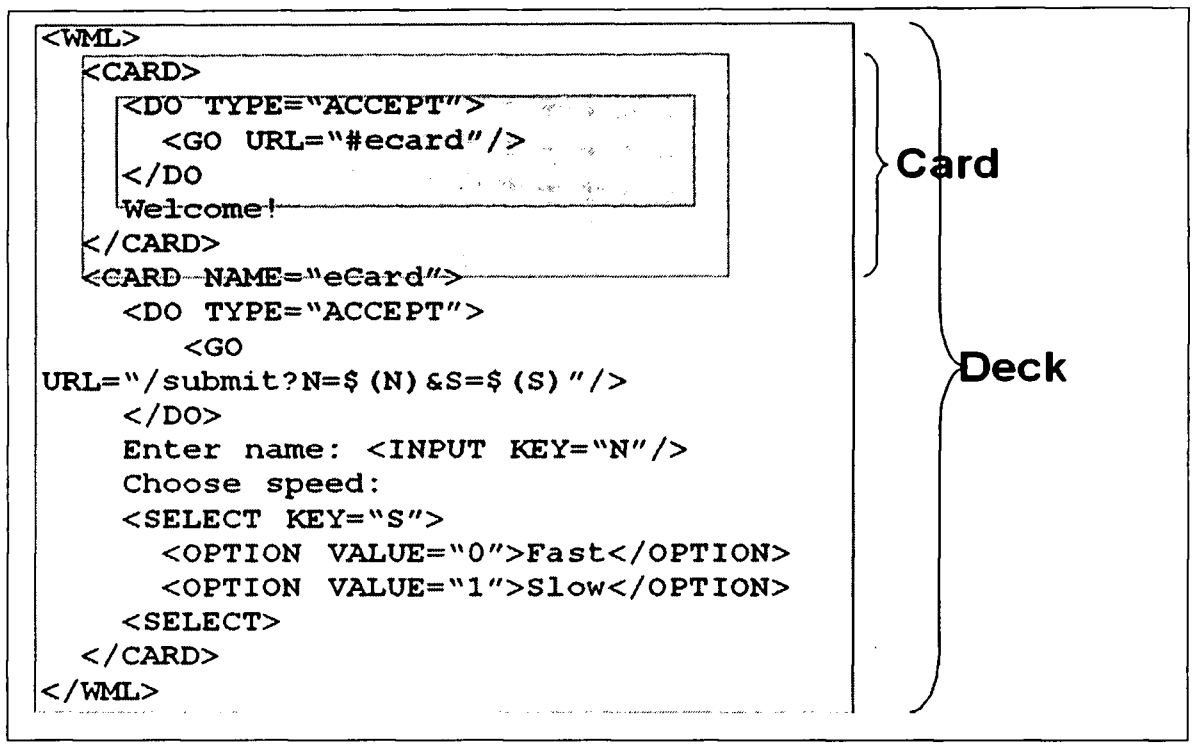


Figure 3.4 – WML coding structure [16]

3.4 Advantages of WAP

- WAP handles limited bandwidth
  - Minimizes traffic over wireless interface
  - WSP layer, too is binary encoded
  - WTP is not only designed to minimize amount of data transferred but also the number of transactions.

- WAP handles high latency
  - WAE uses scripting to avoid round trip delays eg. by validating user input locally
  - WTAI environment introduces a repository to hold services that should be started in response to an event in mobile network eg incoming call.

- WAP handles less stable connections
    - The sessions supported by WSP are assumed to be long-lived.
    - WTP layer has been kept very simple compared to TCP
- WAP handles small displays
    - WML structure its documents in 'Decks & Cards'
    - When an application is executed, user navigation through a series of cards

3.5 Summary

This chapter presented the WAP as a powerful tool in next new decades and the underlying structure of it. Mobile base customer care services will no different and non-existence of such system provided an opportunity to implement customer care services to address a real world problem. Next chapter will discuss analysis and design.

Chapter 4

Analysis and Design

4.1 Introduction

This chapter will describe problem domain for the project and the requirement elicitation. The analysis begins with a problem statement. The statement might be incomplete or informal and the analysis makes it more precise and exposes ambiguities and inconsistencies. It is important to specify the problem domain and determine the characteristics to deliver better product.

4.2 Problem domain

The problem of	Non-availability of a mobile based restaurant reservation application for customers and restaurant order and customer management system for restaurant staff.
Affects	All customers and restaurant staff
A successful solution would be	Provide mobile based restaurant reservation system for customers. Provide cost effective restaurant order and customer management system for restaurant staff. They can access information in short time A user friendly system

Table 4.1 – Problem domain

In present, people spend very busy life style. Hence there is very limited time to supply their day to day necessities. The food is one of their main necessities. It is very convenient, if they have method to make order through the online. Sometimes, order may be request in none computerize situations. The GSM network is spread significantly all over the country. Because of mobile phones and other hand held devices are very popular

in these days. The mobile based order reservation system is better solution to overcome this issue. It does not require much time and it is not an arduous task to access it. Hence any WAP enabled mobile device can access to the world wide web at anytime of the day.

4.3 Overview of the system

Scope of the project

An overview of the proposed system is depicted in figure 4.1.

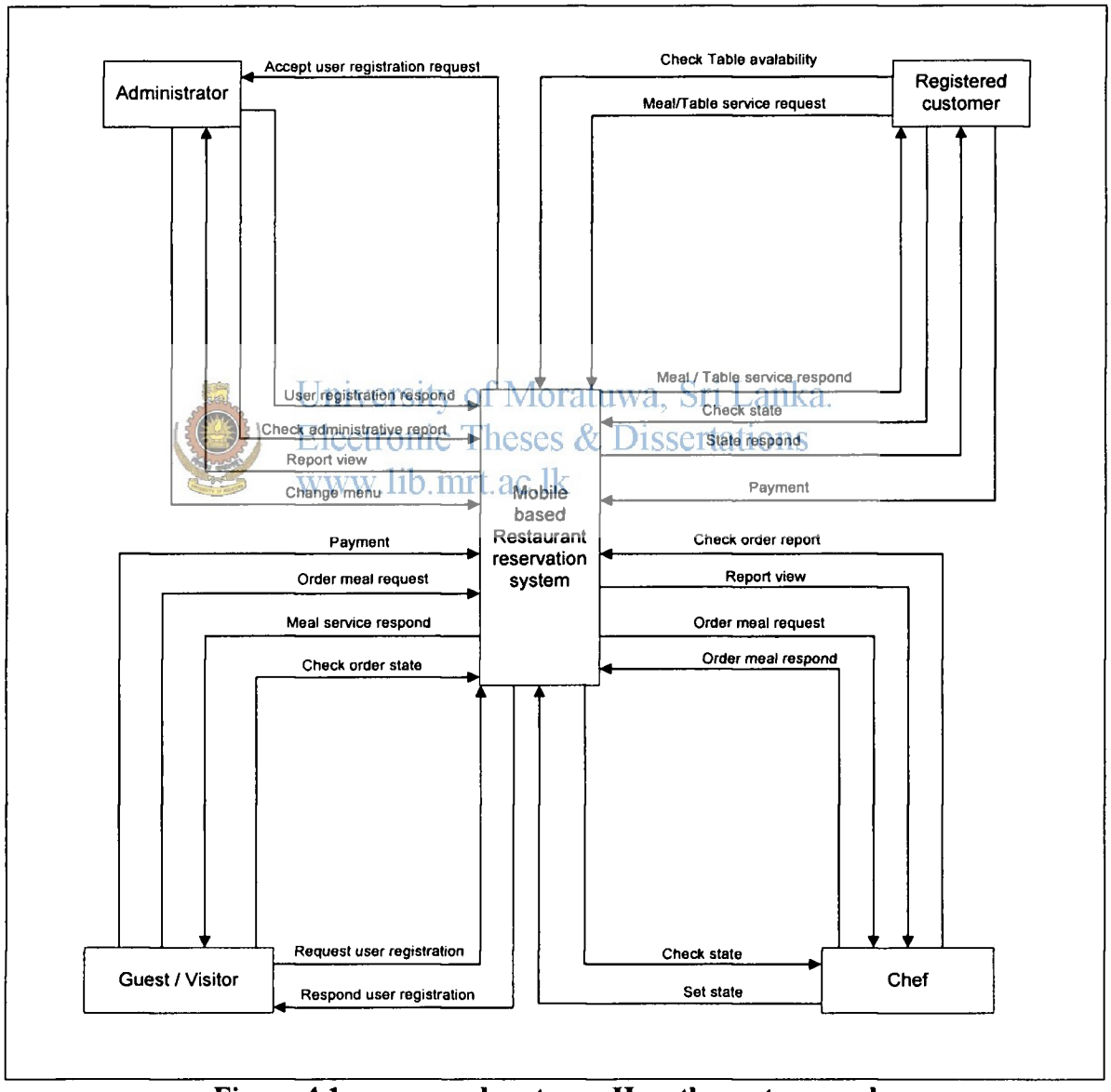


Figure 4.1 – proposed system – How the system works

As shown in the figure, the proposed system will consist of a web server which is connected to the Internet. Subscriber can browse the system via mobile or PDA which is configured to access the Internet.

4.4 Functional requirement

The followings are functional requirements for Mobile based users. The mobile based users may be register customer or visitor (Guest).

- System should provide facility to customer validation
- System should allow the user to select restaurant and select menus from catalog
- System should provide facility to check table availability and reserve table
- System should provide facility to request new registration for guest
- System should provide a method to make payment though credit cards
- System should provide facility to check order state

Manager/ Administrator and chef are internal users and as well as the web based users. The following are the functional requirements for web based users.

- System should provide facility to maintenance of user log
- System should provide facility to maintenance of web site
- System should provide facility to order handling

4.5 Flow of general process

Following are the main functions for WAP enabled web based application.

- Subscriber validate

  The subscriber can register to the system by him or herself. It will validate the subscriber, when he or she tries to logging to the system. It will be allowed to navigate into the system, if subscriber is an authenticated person. If subscriber is visitor (guest), then he or she can request to new registration to the system.

- Selected meal

  Register customer and guest can visit to the web site and choose a restaurant and menu. The menu is number of meal items. There are several menus such as menu1, menu2... etc. Its price can be varying according to the type and number of items in the meal. Customer can order number of meals according to the number of persons.

- Table reservation

  Tables can be reserved according to the no of persons, if the user is registered customer who orders the meal. Table reservation is not allowed for Guest users and they can only get meal and take a way. Table reservation is an additional facility for registered customers. Registered customers can take a way or get meal at there according to their preferences.

- Payment through credit card

  The payment can be done by credit card. If the order is rejected by chef payment is automatically canceled by the system.

- Check state of the order

  Subscriber can check state of their order. There are six states pending, processing, delaying, reject, close and ready in this system. These states are set by chef.

- Administrator's functions contain followings

  Subscriber registration

  Update and add menus to the system

  Monitor orders and customer's detail

- Chefs application contain the followings

  Accept orders

  Set order state

  Monitor orders

Product perspective

The project is based on a simple and a user-friendly graphical user interfaces that provides easy access to information. This proposed project can be easily expanded to a large system and can be provided customer care services through the mobile technology. This project can also be extended as a mobile knowledge database, which will be hold large amount of information.

Product functionalities

The system is capable to accepting user requests via GPRS enabled connection and sends result through a WAP gateway. To accomplish the task, the application will perform data manipulation on database, and transmits that data to the requested subscriber to accomplish the task. The system provides the facilities such as reservation, check states and credit card payment.

User characteristics

Users are not expected to be an expert of navigating WAP sites and who are familiar with mobile technology. The subscribers can use links on the pages and easily works.

Constraints

When developing the proposed system, the following constraints are identified.

- The user interfaces of the proposed application with related to other desktop or web based applications are being low in quality.
- The text should be understandable and less scrolling

4.6 Non functional requirements

Performance

Server requests should be minimized as much as possible to get maximum performance.

Availability

Because customers access the WAP Web site across the world, it needs to be available 24 hours a day, 7 days a week.

Reliability

Because of the need for 24*7 availability, automatic disaster recovery, backup plans and procedures must be introduced.

Setup/ installation

Setup and installation must be complete and automated so that the developers can easily deploy it on web server for development and testing.

4.7 Use case analysis

Use case model is a dialogue between an actor and the system, they represent the functionality provided by the system; that is, what capabilities will be provided to an actor by the system [14]. The collections of use cases for a system constitute all the defined ways the system may be used. The most critical part is the identification of Use cases and Actors in the system.

Actor	Description
Administrator	System Administrator/ Manager
Chef	Chef who desired order accept
Registered Customer	Registered customer who is registered in the system
Guest	Non registered customer

Table 4.2 – Main actors of the system

Use cases

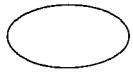
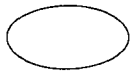
- WAP application use case

  This will describe the Mobile application use case and its main processes and communication with them.

- Web application use case

  Mobile based restaurant reservation system process is described in this use case.

Identified use case

Use Case	Function
 New registration	New registration request by guest
 Login	User login process
 Validation	Validation user against the database
 View menu	View menu to select menu item. This done by registered customer/ guest
 Order meal	Order meal from selected menu
 Tables reservation	This is separate process which can be accessed after login and done by registered customers
 Payment	Credit card payment process is done by all customers

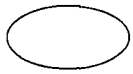
 Check state	Checking state of the process is done by all customers
 Add menu	Add menus to system is done by administrator
 Customer registration	New customer registration is done by administrator
 Monitor orders	Monitor order reservation is done by administrator or chef
 Order accept	Order accept process is done by chef
 Set order state	Set order state process is done by chef

Table 4.3 – Main processes of the system

WAP application use case

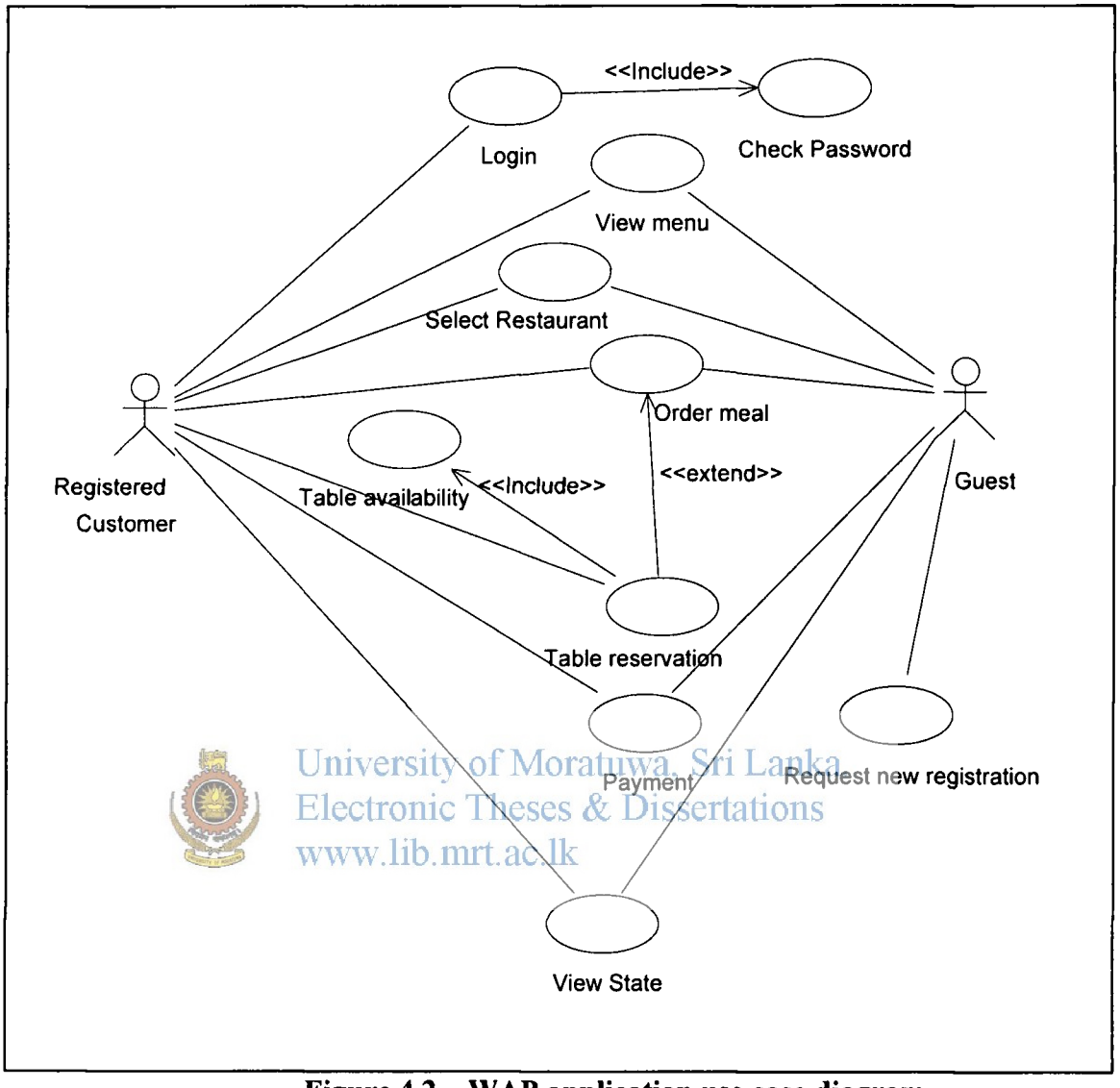


Figure 4.2 – WAP application use case diagram

- Customer must follow the login process and it included the user validation process against database except guest.
- Guest can request new registration to system.
- All customers can view menus, select restaurant, payment, select menu and check order state.
- Registered customer can view table availability and table reservation.
- Registered customer can order meal and either take a way or get meal there.

Web application use case

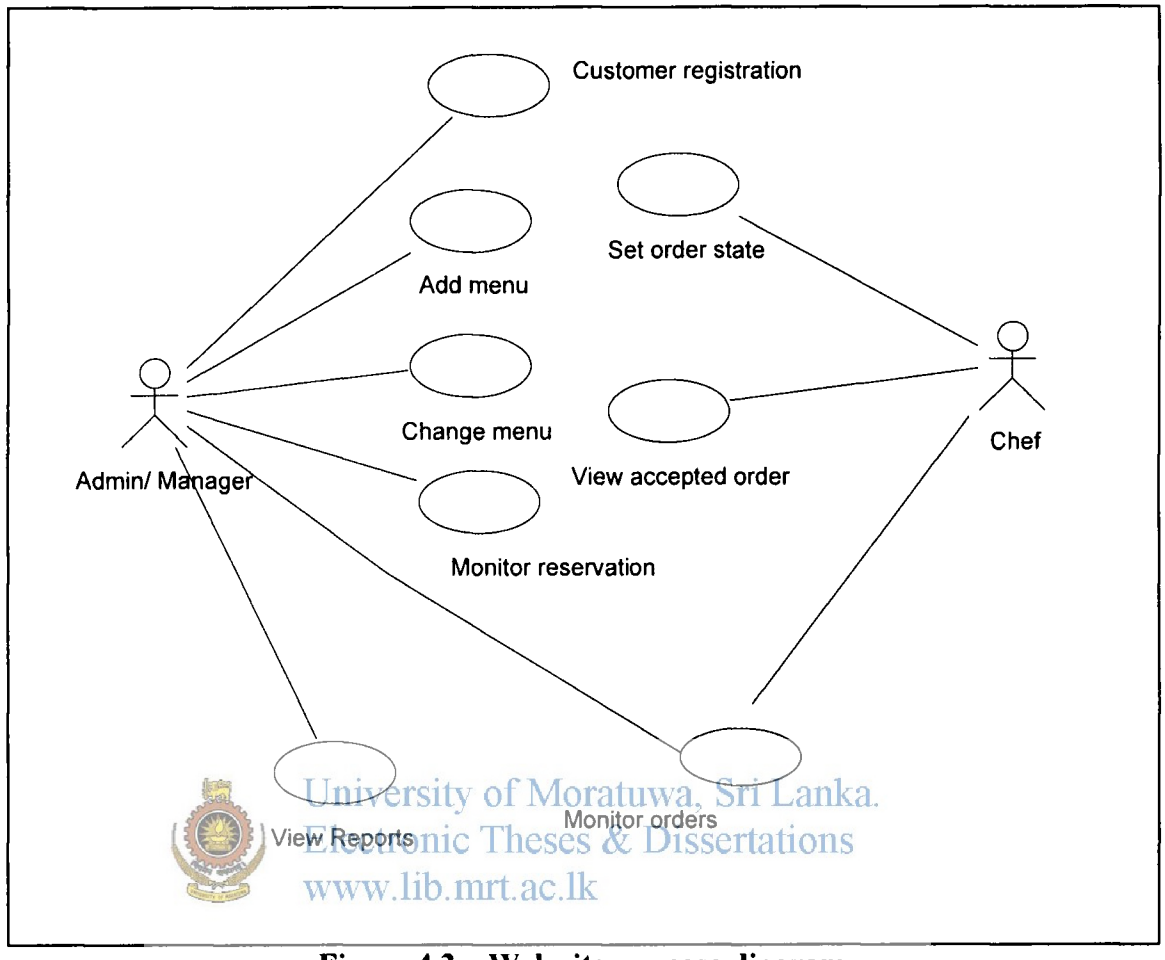


Figure 4.3 – Web site use case diagram

- New customer registration set state done by system administrator.
- Administrator can add menu and change menu.
- Administrator can monitor orders and reservations.
- Administrator must go through backup procedure, security procedure and other relevant procedure to maintain site on 24*365 hours.
- Chef can accept or reject order.
- Chef set the order state.

Class diagram

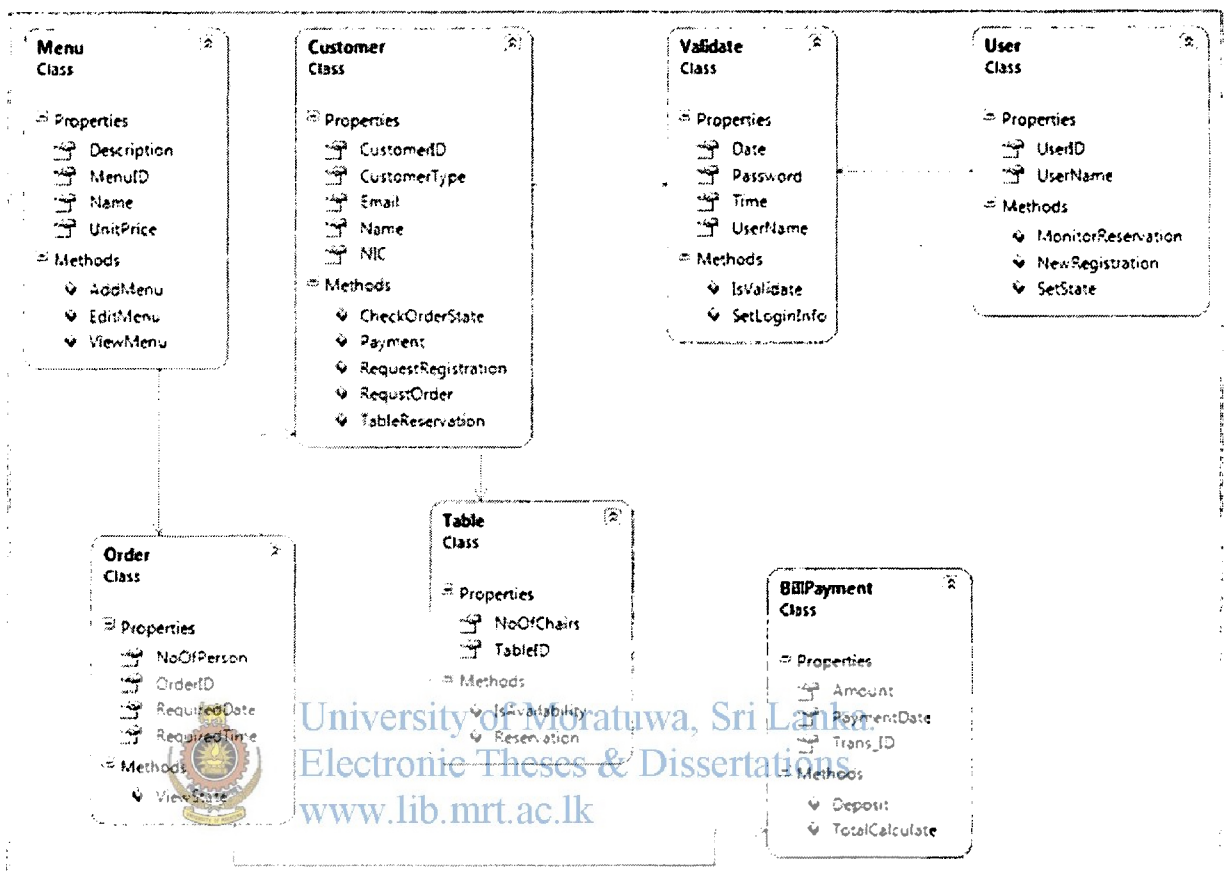


Figure 4.4 – Class diagram

A class is a description of a group of objects with common properties (attributes), common behavior (operations), common relationship to other objects, and common semantics. Thus, a class is a template to create objects. Each object is an instance of some class and objects cannot be instances of more than one class. This system will contain above properties and methods inside the identified classes.

WAP enabled process activity diagram

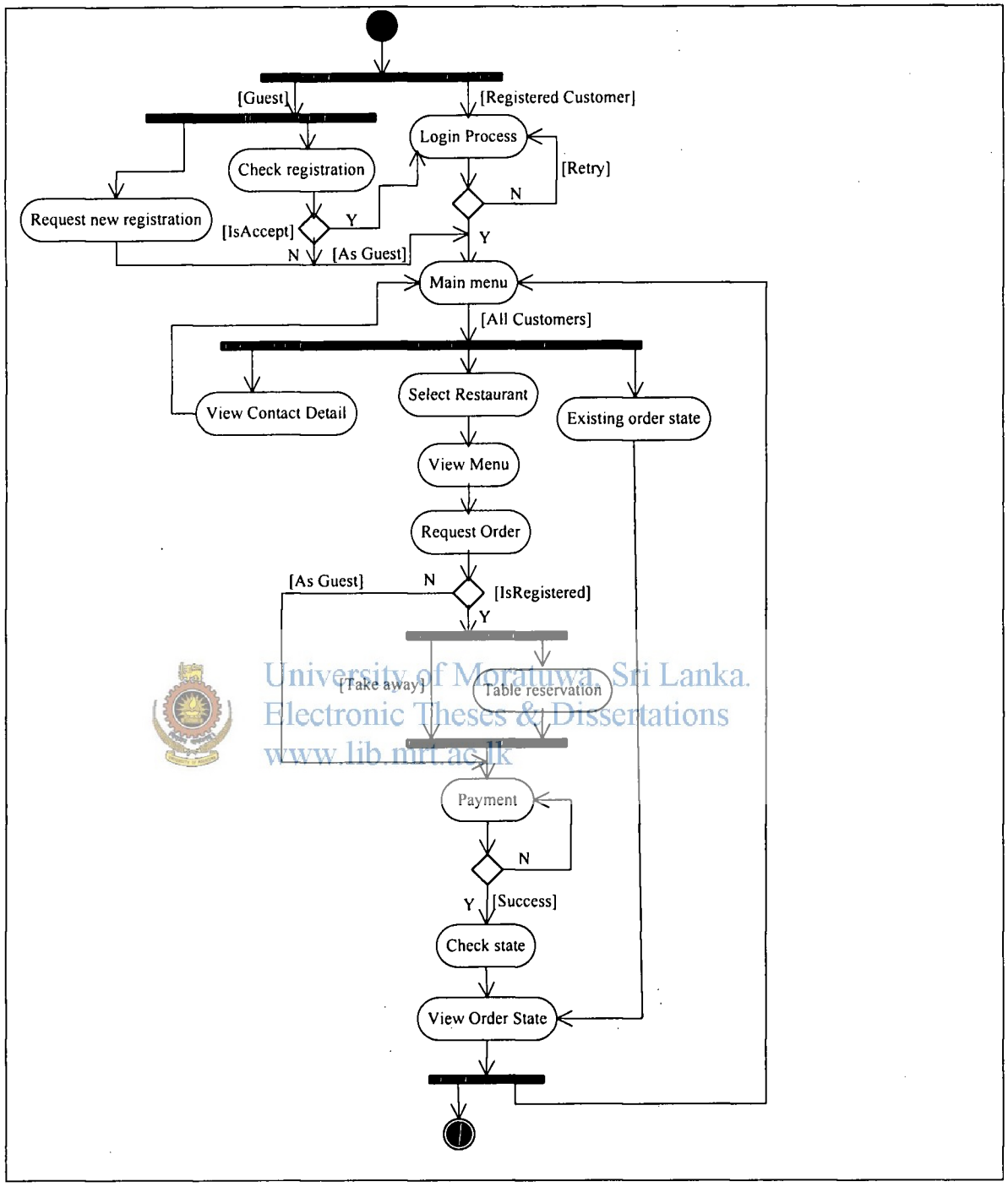


Figure 4.5 – WAP enabled process activity diagram

ER diagram

Database is developed using Entity Relationship technique and it designed in such a way that it is easy to maintain and has the facility to dynamic grow. Primary keys are defined as shown in the diagram and it will ensure the relation of the tables and consistency of data. After creating those relations the ER diagram can be expressed as in figure 4.6. Administrator has the facility to backup the database and all data handling transactions such as data user and managing users.

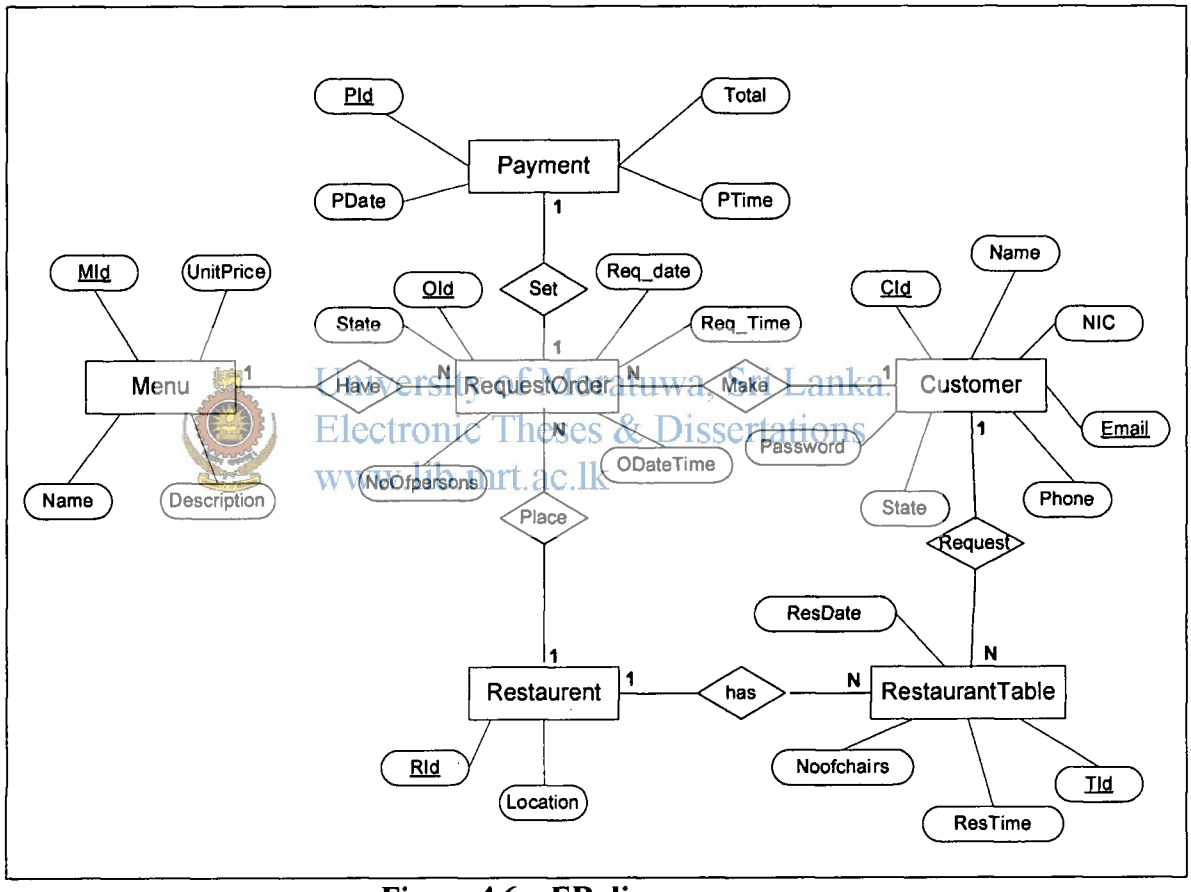


Figure 4.6 – ER diagram

4.8 Interface requirements

This is one of another important area of the project; since this is the layer communicating with the users. If it is not properly deliberated the entire project can be a mess. Because of that importance, the interface requirements were carefully analyzed under the following main categories.

Consistency

Fonts, color schema, button, wording of labels and the message are consistent throughout the system. This will help the user to use the application easily and efficiently.

Standards

Controls are used such as menus and combo boxes, check box and radio buttons in the application. Adopting these industry standards took the advantage of look and feel like approach of other application. Hence the usability of the system is improved.

Support both novices and experts

Since the messages and the wordings are simple and consistent throughout the system it is very easy for anyone to use the system.

Alignment and fields

Editing fields of the screens are left justified and the corresponding labels are right justified and placed immediately beside the field. This presents a pleasing outlook and efficient use of the screen.

Screen display

Application screens are not complex. It provides the easy accessibility and ease of use.

4.9 System design

This section provides a high-level overview of the system. System design, decisions are made about how the problem will be solved in design, the software requirements are analyzed are planned the subsequent development activities. The design of input screens and the result screens, the data storage and the process are mainly concern in this section. Selection of the software to develop the proposed system will also decide the design phase.

4.10 Input design

The design of the input mechanism is important and must be simple and easy steps to the subscriber. Carefully designed user interface will avoid the mess-ups by the subscriber and errors in processing leading to useless outputs. The objectives of input design focused are,

- Efficiency and effectiveness of input
- Reducing input volume
- Reducing input errors
- User-friendly human computer interface

4.11 Output design – Visual design

The design of the outputs is important because this is what interests the user most. They are unlikely to remember hoe elegant the input interfaces was or how quickly the system responded. What they will perceive is whether the outputs produces by the system met their requirement or not. If a system is incapable of meeting user output expectations the system is deemed be failed to meet one of its basic requirement.

4.12 Data storage design

The use case diagram and the Entity relationship diagram developed in the analysis stage identified the data elements of the system would have to deal with. In dealing with this, the efficiency of database storage design has become a key factor. The primary purpose of hardware design is to gain maximum speed to queries and take the advantage of backing up the data. Select data storage software is a vital to success of this proposed project while there are many products in the software arena such as mysql database 5.1.

Advantage of using a DBMS

- Many infrastructure feature, such as crash recovery, sharing between multiple users sharing between multiple applications, data distribution, integrity, extendibility and transaction support have already been programmed by the DBMS vendor.
- A standard access language. The structured query language (SQL) is supported by most commercial and open source RDBMS.

4.13 Process design

The processing design should be done carefully with processing productivity (Efficiency and Effectiveness) as a primary objective. The efficiency with which system resources are used and effectiveness with which the software is written to achieve this efficiency one important consideration. The methodology of the design is "Evolutionary software engineering" as indicated in chapter 1, and the process depicted in figure 4.7 [13]. These are the guiding principles followed in the design of the internal data processing of the captured data and discussed in greater detail in chapter 5 dealing with implementation.

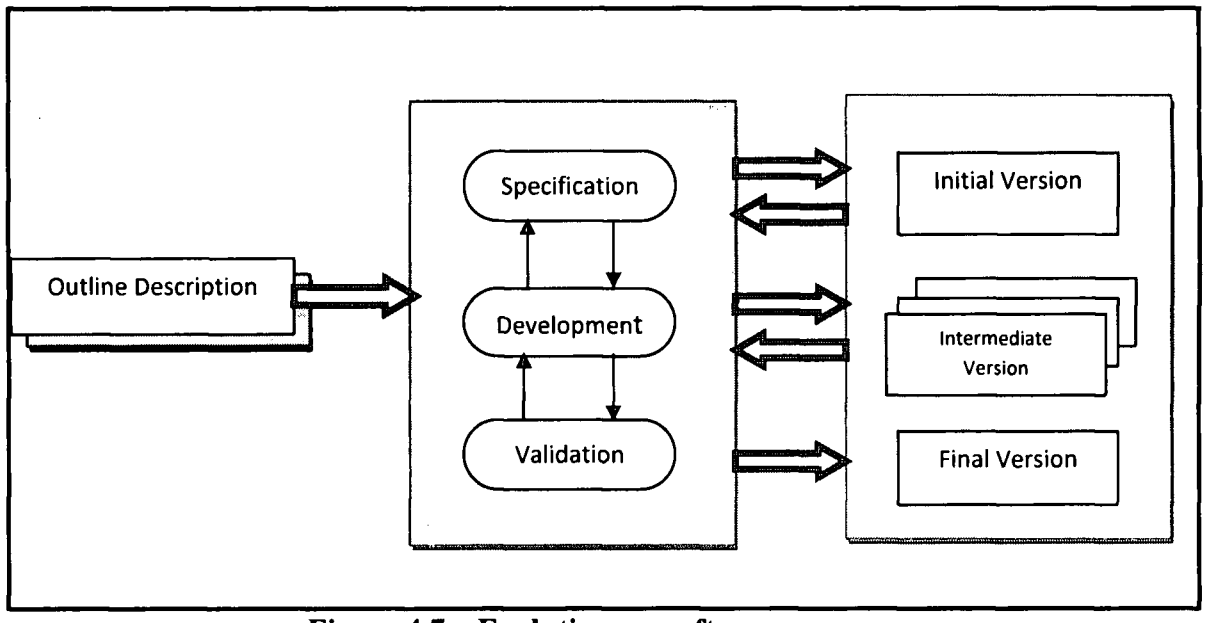


Figure 4.7 – Evolutionary software process

Figure 4.7 depicted total software implementation life cycle. It generates three versions during the software implementation process such as initial version, intermediate version and final version respectively. The initial version is comprised with software specification part as preparing interim report with system analysis and designing. The software development is undertaken for intermediate version. At this stage, designed system is translated into the source code level. The validation part is the final version of a software implementation. Here, the testing, evaluation and deployment processes are carried out.

Architecture

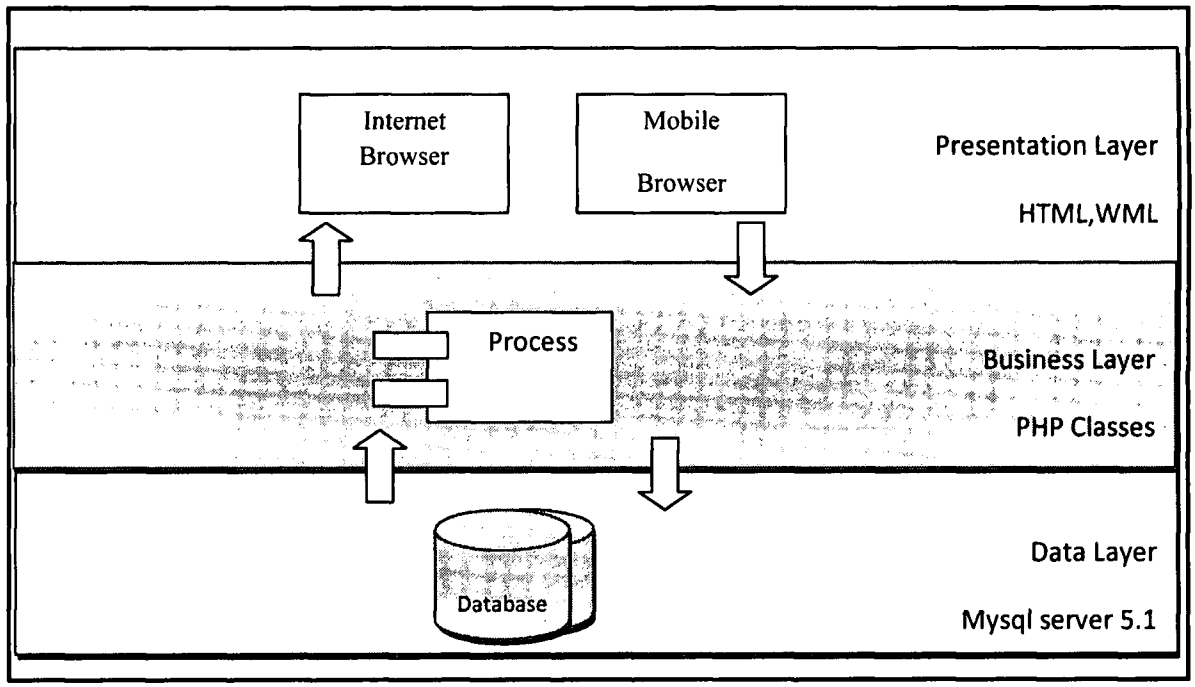


Figure 4.8 – System architecture

Figure 4.8 depicted system architecture. That contains three layers presentation layer, business layer and data access layer respectively. The presentation layer is an intimidator for system and the user. Users are able to interact with system via the internet browser on personal computer or the mobile web browser. All the system processers and logics are comprised in business layer such as calculations, validations and etc. The database is taken into the data access layer. That uses to store information according to the relational manner.

System will be built based on a three-tire software architecture where in interface/ presentation layer is consisting of three components as indicated above.

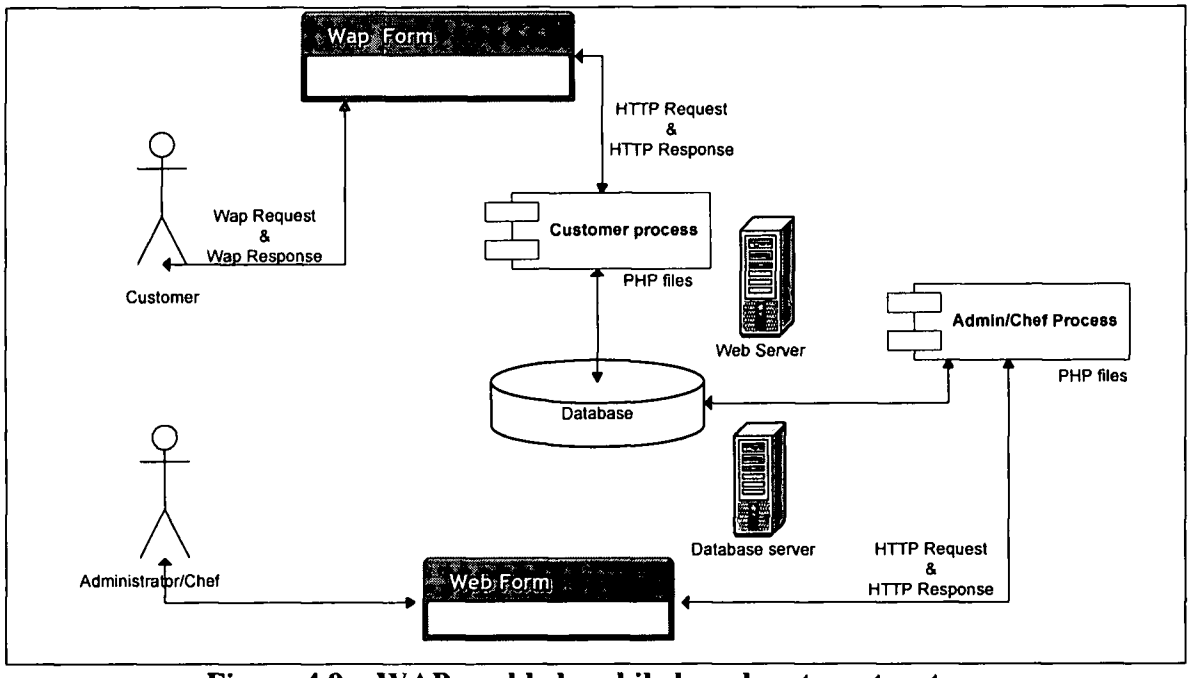


Figure 4.9 – WAP enabled mobile based system structure

As shown in the above diagram, the application consist of

- WAP enabled web based module

Registered customers can logon through his/ her mobile or PDA and the request send to a WAP Gateway. The WAP Gateway is a communication provider who can handle the WAP requests and convert in to HTTP requests. The web server takes these requests and passes them on to the database as SQL queries. The mysql processes the queries and send the results set back to the web server. This data is processed as WML/ HTML pages for display depending on the client's web browser in the device.

- Web based admin module

Web based admin module is a standard web based application. Admin module developed in such a way that he/ she can add customers to system, edit customer profile and delete customer. Admin can view reports such as orders and customers detail. Admin has the facility to add new menu and edit existing menus to the system.

- Web based chef module

Chef module is a standard web based application. Chef module developed in such a way that he/ she can accept or reject customer's orders and set order states. Chef can view reports such as accepted/rejected orders.

4.14 Summary

This chapter discussed about what was the problem and the analysis and design for the mobile based restaurant reservation system. This chapter designed part of the project and technical analysis such as Unified Modeling Language (UML) diagrams.

Also discussed system design and the inner architecture of it. Actual design of user interface and the neatness of it are the most significant functions in design of interfaces. Design of database and process is discussed more detail in chapter – 5 under implementation.

Chapter 5

Implementation

5.1 Introduction

This will discuss about implantation of the Mobile based restaurant reservation system. Implementation of code module and database are the most critically concerned sections of this chapter.

The process of choosing implementation environment and the resource requirements will also be discussed in this Chapter.

5.2 Implementation environment

This section describes the resources necessary for implementing system in categories of hardware and software utilized during implementation.

Software used

- Microsoft ® Windows XP/Vista/7
- XAMPP 1.73 for Windows
    - Apache 2.2.12 (IPv6 enabled)
    - MySQL 5.1.37
    - PHP 5.3.0
    - phpMyAdmin 3.2.0.1
    - FileZilla FTP Server 0.9.32
- XHTML MP/HTML and CSS used for create to wap/web pages
- WML Script, Java Script used for form validation
- Adobe Dreamweaver 8, Microsoft Visio 2003, Rational Rose 2000 Enterprise edition, Microsoft Paint were also used as other development tools.

- Some of the third party free software have also been used to capture mobile screen
    i. winwap_spbe-win32 - WinWAP smartphone browser emulator
    ii. wproof2008pro – Wap Proof 2008 Professional

Hardware used

- Server computer – Web hosting
- GPRS activated and WAP enabled suitable Mobile phone
- PC with at 1 GHz 32-bit or 64-bit processor with internet connection

5.3 Input/ Output design implementation

The screen output design is an important design task in the development of the human computer interfaces. The success or failure of a system development effort rests on this element of the design. Poorly designed HCI lead to user frustration and disinterest in using the system, which leads to the system being abandoned shortly after it is deployed. The output design should be flexible to provide for the adaptation of differing user requirements for display of data.

The following were taken into consideration when designing the screen outputs

- What are the contents of the screen output?
- The navigation of a page
- How to present information

Sample screen shots are provided in appendix- C

5.4 Database implementation

The Entity Relationship Database developed in the structured analysis in chapter 4 is used as a guide in designing the database diagram for the restaurant relational database schema; the primary keys are underlined. Referential integrity constraints displayed on the Restaurant relational database schema. Database implement in mysql 5.1.37.

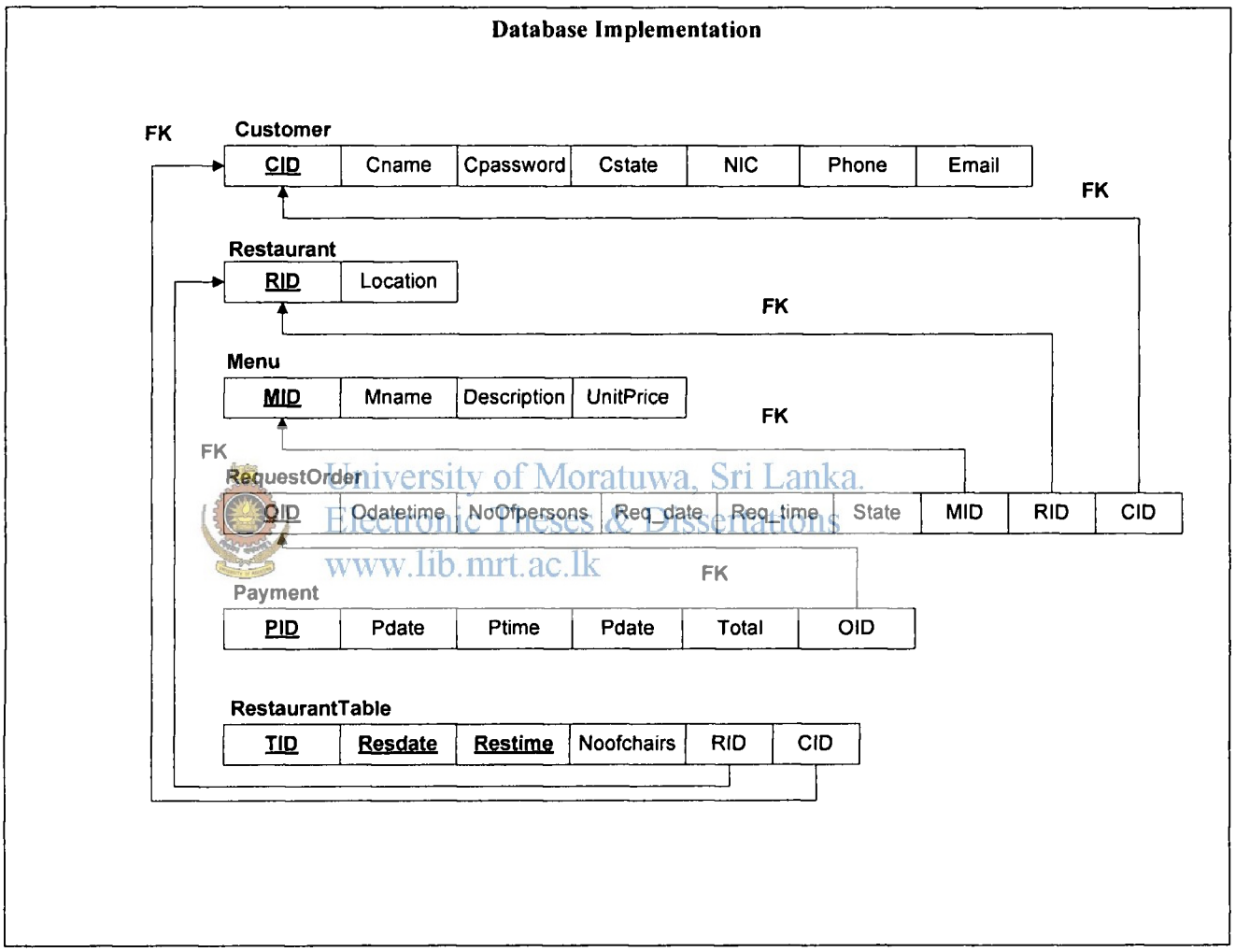


Figure 5.1 Database implementation

Used table structures are given with descriptions.

5.5 Code module

The system design used in the Mobile based restaurant reservation system is a layered model, which is the client server three-tier system architecture of a browser front-end, a web server in the middle tier and a database server at the backend shown in Figure 5.2.

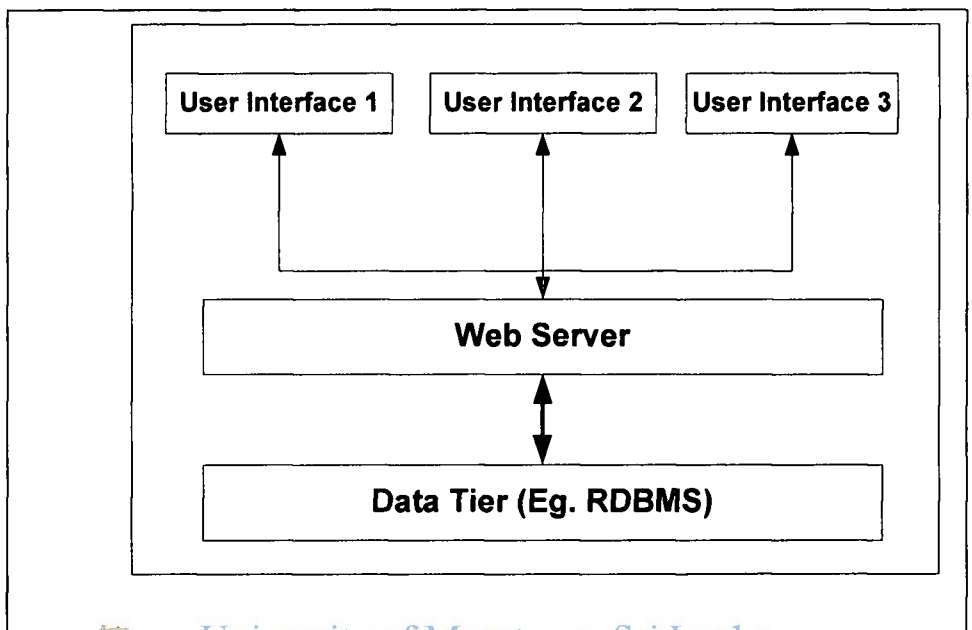


Figure 5.2- Coding structure

In the three-tier client server architecture the user, using a web browser located at the client end requests web pages from device. The web server takes these requests and passes them on to the database as SQL queries. The mysql processes the queries and sends the results set back to the web server. This data is processed as specified in the script and the results served back to the user as WML/HTML pages for display depending on the client's web browser in the device.

The PHP script is executed in the web server is called server side scripting and is not visible to the client. This protects the script from tampering by users and protects the processing functionality of the application. Sometimes it is not advisable to perform all data validations on the server as they ties up the web server system resources leading to a drop in system performance. To overcome this problem there should be a client side script, which is executed by the browser- scripting engine. The application makes use of server side script for its processing functionality.

Adobe Dreamweaver 8 used as Php IDE (editor).Dreamweaver is a powerful web page creation and web site management tool. It offers numerous easy to used user friendly working environment by supporting technology such as CSS, JavaScript, etc that can be used to create professional quality web sites. Coding environment display in Figure 5.3.

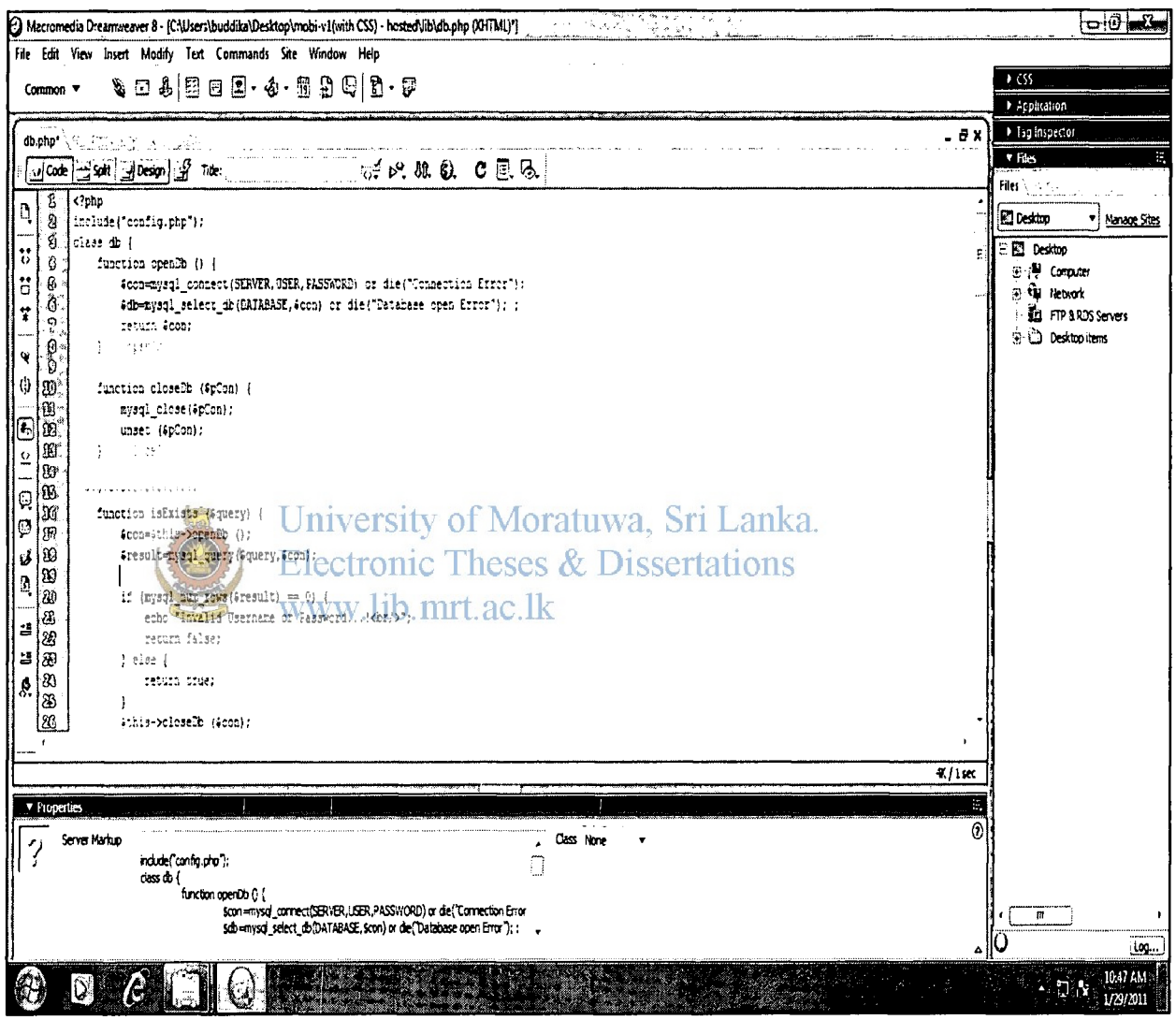


Figure 5.3 - Coding environment

One of the most valuable parts of the cording is application specific global environment data that is put into "Config.php" file. The major advantage of the "Config.php" file is data can be changed without affecting compiled code of the application.

```
<?php
        define ("SERVER","sql104.byetcluster.com");
        define ("USER","fees0_6871937");
        define ("PASSWORD","19760613");
        define ("DATABASE","fees0_6871937_Hotel");
?>
```

1. WAP enabled mobile based module

WAP enabled mobile based module is main module that provide it's functionalities to customer. The main function and flow of system operations are display following diagram.

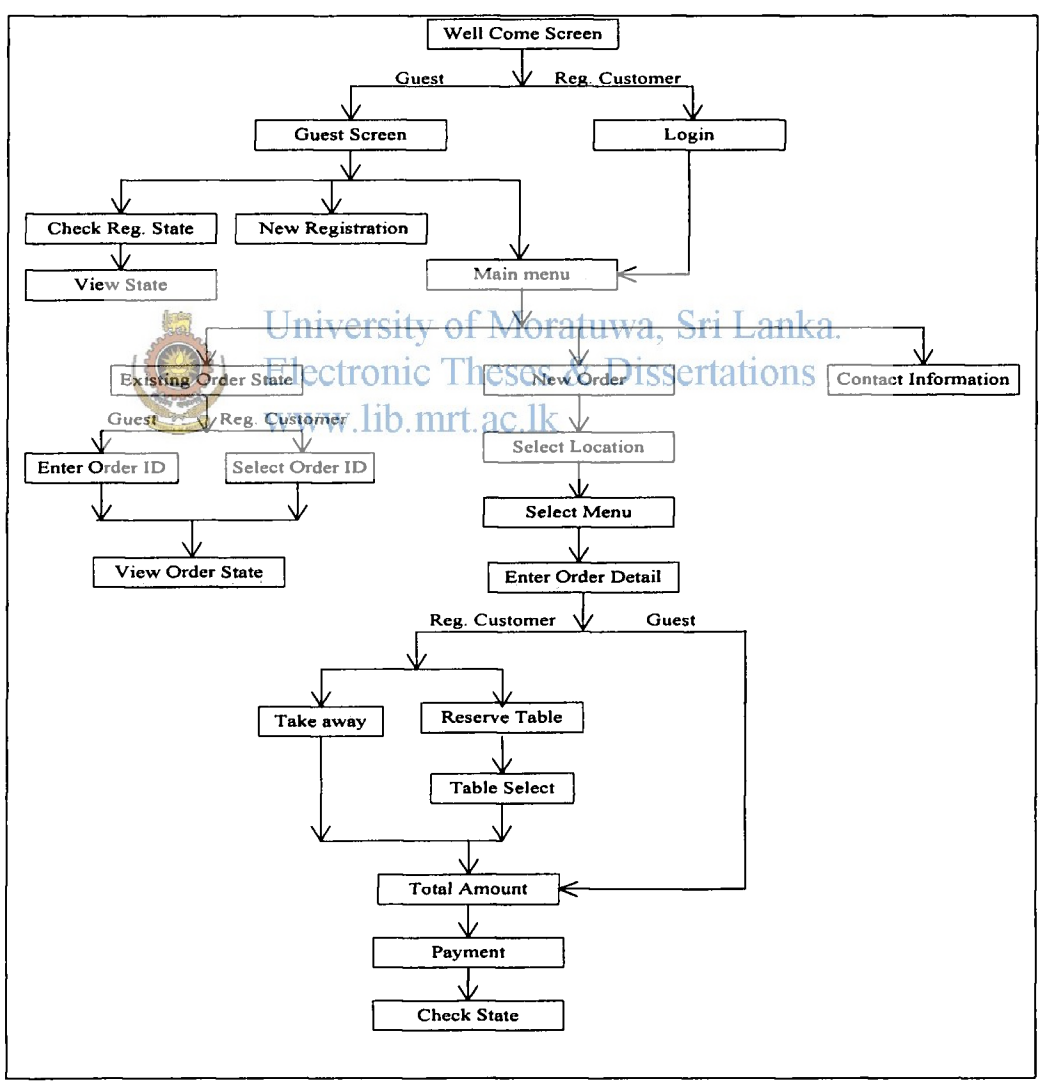


Figure 5.4 – System flow

"functions.php" and "db.php" are very essential php files. All the validations and calculations are included in "functions.php" file.

Total bill calculation is done under the function "calculateTotal" and associated code is shown below. Menuid and ordered quantity values are passed to function and return total amount.

```
Include("db.php");
function CalculateTotal ($MID,$QTY) {
        $db=new db ();  // create new object db class
        $query="SELECT UnitPrice FROM Menu WHERE Mid='$MID';";
         // Call unitprice function in "db.php" and assign value in to UPR variable
        $UPR=$db->unitPrice($query);
        $TOTAL=$UPR*$QTY;
        return $TOTAL;
}
```

WAP enabled mobile based module main part of this system. There are two type of customers type in this system registered customer and guest. Implemented main functionality of WAP enabled web application describe below.

- Request order

  All customers can have request order. Login to system and select new order link can navigate to select location page. Restaurant location and can navigate to Select menu page display all fix menu name, description and unit price. Customer selects one of fix menus customer should be enter

  - Quantity
  - Required date
  - Required time

  Above values validate by system. If the Validation is true system will generate unique OID for newly proceeded order.

  Ex : required date >= current date - validate by system

// The order date validation is done under the following code segment

```
if($Year>=$CurYear && $Month>=$CurMonth && $Date>=$CurDate ){
    return true;
}
else {
    return false;
}
```

- Table reservation

  Successfully order request system by provide table reservation facilitate for registered customers. They can desire take a way or table reservation their preference. If customer select reserve table, system will list all available tables, it's no of chairs, required date and time.

- Payment

  This function facilitates validation part in my project. Enter following detail and validate by system below

  - Select card type
  - Enter card number – validate 16 digits
  - Card code – validate 4 digits
  - Customer name

Ex- card number validation

```
function IsCARD($CARD){
        // Check value numeric and length equal 16
         if (is_numeric ($CARD) && strlen($CARD)==16)
        {
                return true;
            }
            else {
                    return false;
            }

}
```

- View order state

All customer can view own order state. Select "order id" facilitate to registered customers and enter existing "order id" facilitate to guest. View order state to customers according to set the order state by chef.

- Request new registration

  Request new registration facilitate to guest. Guest should correctly enter detail to new registration page. If the validation is true, the system will set default state as pending. The newly inserted record in to database displays view administrator control panel as new request. Enter following detail in to new registration form

  - Name
  - Password
  - Confirmed password
  - NIC
  - Phone
  - Email

2. Web application for restaurant management

Web application provides restaurant management there are main two user's administrator and chef.

Administrator

- Set state customer registration request

  Set state customer registration request following option

  - Accept
  - Reject
  - Pending (default)

- Edit existing menu

  Edit existing menus by administrator. Enter available menu id and can modify

- Description
- Unit price

➢ Add new menu

Add new menu in to restaurant enter following detail

- Menu name
- Description
- Unit price

➢ View customers and orders detail

View customers and orders list

Chef

➢ Set order state

Set order state by chef according to request by customer. Chef can update following option

- Pending (default)
- Processing
- Ready
- Closed
- Delay
- Reject

➢ View pending orders

View pending orders by online. Page refresh automatically at given time period.

➢ View all orders

View all orders list

5.6 System implementation

After completed the coding part, system was deployed on a web server. Sample screen shots are shown in figure 5.5

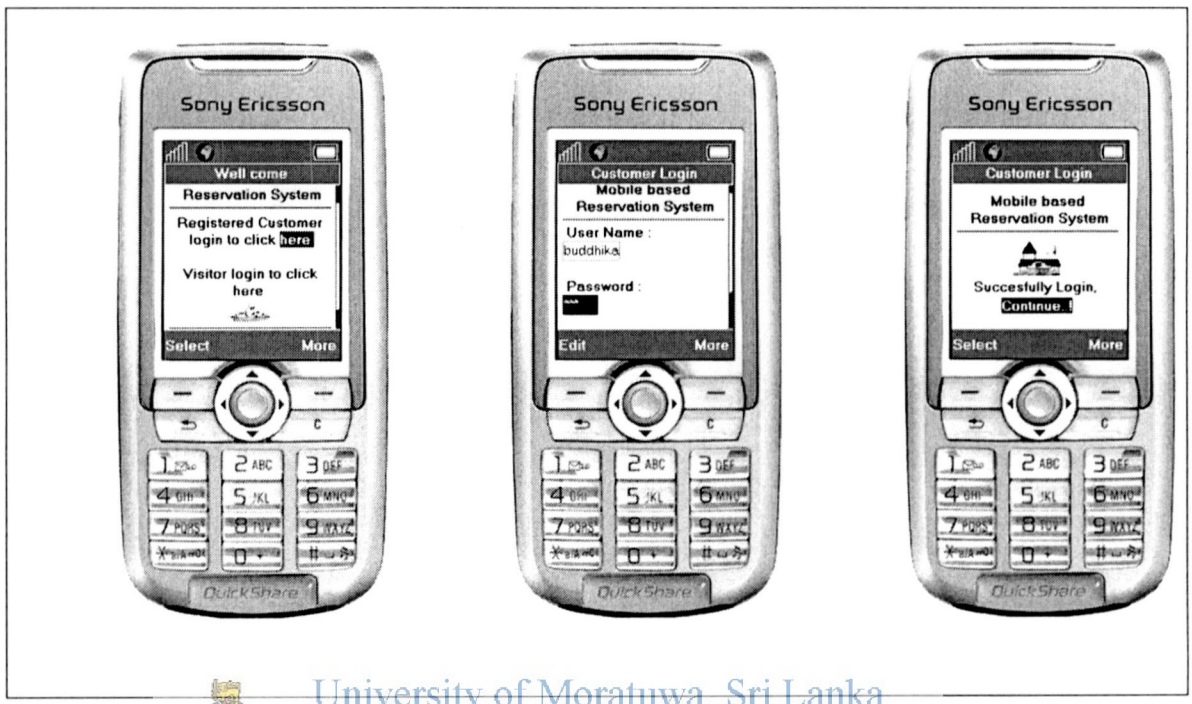


Figure 5.5- Working application

5.7 Summary

Chapter- five discussed implementation of the system. Coding structure and database implementation were concerned in this chapter. Mobile based restaurant reservation system is a three-tire application and coding complied. Php files will reside in web server and database is implemented on mysql server. Next chapter discusses about evaluation of the system.

Chapter 6

Evaluation

6.1 Introduction

This section discussed the evaluation of the project, whether the initial goals of the project were achieved. At this final stage it is essential that the prototype is critically evaluated in order to decide whether the project is a success or a failure.

First section is the critical evaluation of the entire project based on achieved project objectives. The second section consists of an evaluation of the prototype by users. The third section includes a critical assessment of the project.

The current chapter explains the evaluation processes chosen by the author to critically evaluate the prototype.

6.2 Method of evaluation

The evaluation of the prototype was carried out by checking whether prototype has achieved objectives mentioned on the project proposal and in its practical usage. For the evaluation the author selected two types of users:

- Expert user
- Ordinary Users

The selected method of evaluation was to present the prototype to above mentioned users through a demonstration. Then the feedback was analyzed through the responses received to the questionnaire issued to the users (*See Appendix B*).

6.3 Evaluation criteria

Evaluation was carried out to obtain opinions, remarks and suggestions about the product. Several techniques were used for evaluation. These included interviewing, questionnaires and demonstrations.

6.4 Review of objectives

The main Objective of this project is to provide restaurant order processing functionality based on mobile and web technology. When a user make request from WAP enabled web application or web application, the system will carry out following functionalities.

1) To Customer

- Order food and table reservation

  By implementing the prototype, customers were able to view the all set menu with description and price and able to place a new order based on preferred menu. In addition to that table can be reserved thought the order processing function to the registered customer.

- Request new registration

  Guest can request to register in to system if he desired to continue as a regular customer and to get system additional benefit for the regular customers.

- Check order state

  Order status can be checked for the place orders

2) To service provider

- maintenance of user log

  The system provide user maintain facilities to the administrator. Registration request can be approved by setting state of the user. In addition to that user deletion and editing can be done.

- Maintenance of web site

  Maintaining menu, table, etc. facilities has been provided to the administrator in order to carry out efficient website service.

- Order handling

  Placed orders current status can be set by the chef when they parsing deferent processing cycles. This will help to provide fast order delivery for the customer.

6.5 Evaluation results

The majority of the users who evaluated this project were of the opinion that mobile and web based ordering system has a great business importance to restaurant carry out its operation to efficient manner. By using this system, it can improve the restaurant's service and competitiveness with others. The following evaluation results were based on user's comments obtained during the evaluation process.

Level of mobile literacy

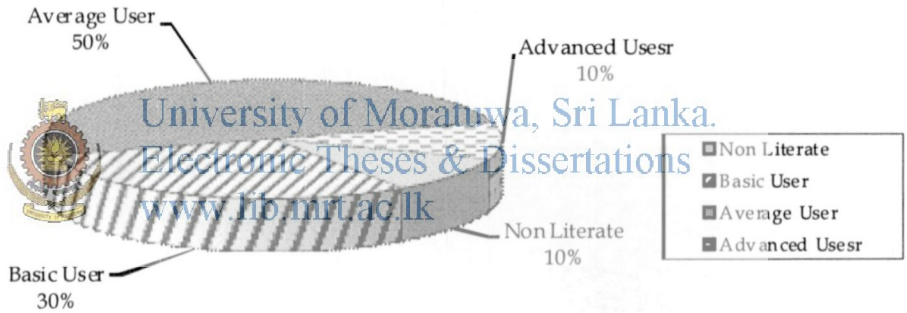


Figure 6.1: Mobile Literacy level

The Mobile literacy level distribution of evaluators is illustrated in figure 6.1 (Q 4 of questionnaire)

Previous mobile based restaurant reservation system usage

100% of ordinary users commented that they haven't used a mobile based restaurant reservation program before. Professional user had previous experience using such a system. In this county some of the universities and organizations were involved developing in WAP enabled mobile based systems. (Q 7 of questionnaire)

Preferred restaurant reservation to do in manual method

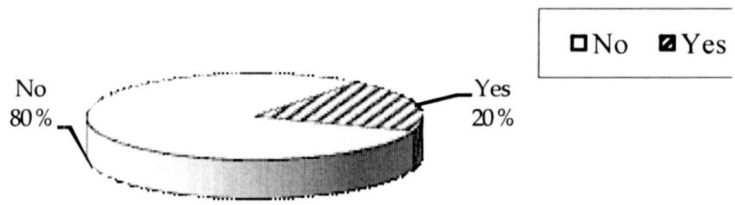
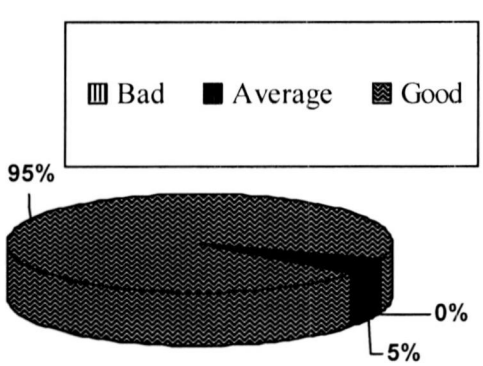


Figure 6.2: Preferred restaurant reservation to do in manual method

Answering to the questions directed at the evaluators whether they would prefer the primitive method of reservation or the proposed mobile based reservation system, 80% agreed to use the mobile based reservation system. Author's demonstration about project background before presenting the questionnaire was beneficial to the evaluators when providing answer as majority of them were unaware of the existence of reservation systems. Figure 6.2 illustrated above. (Q 8 of questionnaire)

User-Friendliness of menus and interfaces



The evaluators' comments for the user friendliness of the system interfaces are shown in figure 6.3.

(Q -9 of questionnaire)

Figure 6.3: User friendliness of menus and interfaces

Level of user satisfaction

The satisfaction levels of the evaluators are illustrated in figure 6.4.

(Q 10 of questionnaire)

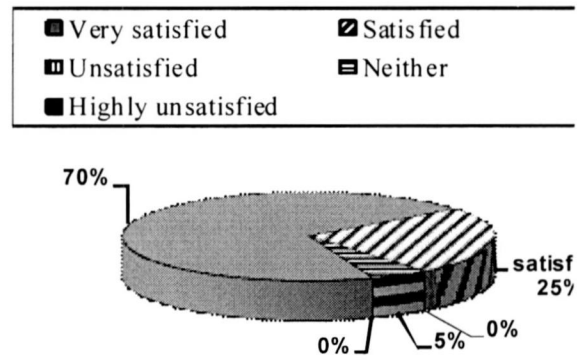


Figure 6.4: User satisfaction level

Suitability of mobile based reservation system for other organizations

The suitability of mobile based reservation system for other organizations such as home delivery services and tourist hotels is illustrated according to evaluators' feedback in figure 6.5. (Q -11 of questionnaire)

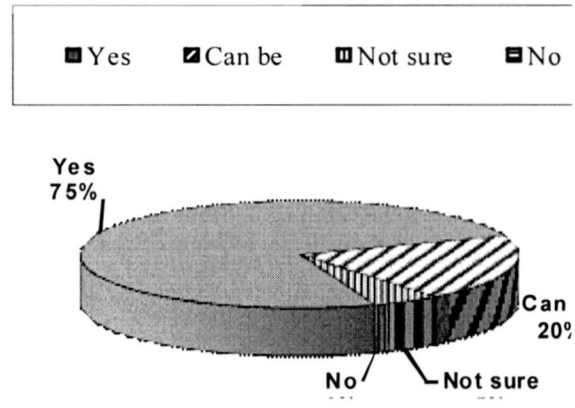


Figure 6.5: Suitability of mobile based reservation system for other Organizations

6.6 Usability of the proposed solution

Mobile based restaurant reservation system is letting its customers place orders via their mobile phone, before they even get to one of the fast food chain's locations. We should also note that there are plenty of web-based applications that offer mobile ordering, but the user experience of these is generally not nearly as good as it is on native apps.

The proposed solution is not confined to a specific restaurant with predefined food items and table reservation. The prototype was designed with maximum flexibility to handle any kind of restaurant foods servicers. Therefore the solution offered was a practical one, capable of being adapted to specific conditions encountered by real situations demanded by a necessitated project.

6.7 Testing

Testing of the system is carried out as a parallel activity together with system development and implementation. Each web page forms a module in the code model of this application. Therefore, each page written in Php code should be tested in isolation. When the pages are strung together integration. Testing was also carried out to ensure that the outputs of one web page are compatible and consistent with the inputs required by another related web page written in Php code. Therefore, module testing and integration are carried out during the system testing. A test plan is designed by defining the input and the output required and comparing it with the actual output. This approach is also known as the Black box testing technique.

Test plan

The test strategy consists of a series of different tests that will fully exercise the system. The Primary purpose of these tests is to uncover the systems limitations and measure its full capabilities. A list of the various planned tests and a brief explanation of them follows bellow.

System test

The system tests were focused on the behavior of the system. User scenarios were executed against the system as well as screen mapping and error message testing. Overall, the system tests test the integrated system and verify that it meets the requirements defines in the requirements document.

Performance test

Performance test was conducted to ensure that the system's response times meet the user expectation and does not exceed the specific performance criteria.

Security test

Security tests determine how secure the system. The tests verified that an unauthorized user access to confidential data is prevented. Allowing different users to log in and verify the available user options with the user rights.

Following format is used to measure the system output in Black box testing

Test case No	01			
Form	Login form			
Functional specification	User authentication			
Test objective	To check whether the entered user name and password are valid or invalid			
Test data	User name: Password			
Step no	Steps	Data	Expected results	Actual results
1				
2				
3				

4				
5				

Table 6.1 –Test document format

Actual test results

Test case no	01			
Form	Login form			
Functional specification	User Authentication			
Test objective	To check whether the entered User name and Password are valid or invalid			
Test data	User name Password:			
Step no	Steps	Data	Expected Results	Actual results
1	Enter user name And press login button	User name=admin	Should display message "invalid username or password"	Display message "invalid username or password"
2	Enter password and press login button	Password=123	Should display message "invalid username or password"	Display message "invalid username or password"
3	Enter user name and password and	User name=admin and Password=test	Should display message "invalid	Display message "invalid

	press login button		username or password"	username or password"
4	Enter user name and password and press login button	User name =XYZ and Password=CEOS	Should display message "invalid username or password"	Display message "invalid username or password"
5	Enter user name and password and press login button	User name =XYZ and password=123	Should display message "invalid username or password"	Display message "invalid username or password"
6	Enter user name and password and press login button	User name =" " and password=" "	Should display message "invalid username or password"	Display message "invalid username or password"
7	Enter user name and password and press login button	User name =admin and password=123	Should navigate to home page.	Navigate to home page.

Test case no	02			
Form	Order detail form			
Functional specification	User enter order detail			
Test objective	To check whether the entered quantity, required date & time valid or invalid			

Test data	Quantity Required date (yyyy/mm/dd) Time (hh:mm)			
Step no	Steps	Data	Expected Results	Actual results
1	Enter quantity and submit button	Quantity=10	Should display message "Enter valid data"	Display message "Enter valid data"
2	Enter required date and time and submit button	Date =2011/10/15 Time=15:30 (after current date and time)	Should display message "Enter valid data"	Display message "Enter valid data"
3	Enter quantity required date and time and submit button	Quantity=2 Date =2010/10/15 Time=15:30 (before current date and time)	Should display message "Enter valid data"	Display message "Enter valid data"
4	Enter quantity required date and time and submit button	Quantity=2 Date ="" Time=15:30	Should display message "Enter valid data"	Display message "Enter valid data"
5	Enter quantity required date and time and submit button	Quantity=2 Date =2011/10/15 Time=""	Should display message "Enter valid data"	Display message "Enter valid data"
6	Enter quantity required date and time and submit	Quantity="" Date ="" Time=""	Should display message	Display message "Enter valid

	button		"Enter valid data"	data"
7	Enter quantity required date and time and submit button	Quantity="" Date =2011/10/15 Time=15:30 (after current date and time)	Should display message "Enter valid data"	Display message "Enter valid data"
8	Enter quantity required date and time and submit button	Quantity=5 Date =2011/10/15 Time=15:30 (after current date and time)	Should navigate to table reservation page.	Navigate to table reservation page.

6.8 Summary

This Chapter discussed how the author carried out the critical evaluation of the prototype and the results were presented here with a multi faceted view. The project was reviewed in great detail while the evaluation was carried out. The next Chapter will discuss future enhancements proposed and other possible modifications to the system to improve its performance and functionality.

Chapter 7

Conclusion and Future Work

7.1 Introduction

In the last Chapter the author explained the evaluation process of the prototype, carried out through the usage of a questionnaire directed at selected recipients. The feedback of the participants was logically analyzed and presented in the same chapter. This chapter contains a limitation of project, achievements, difficulties encountered by the author in carrying out the project, solutions to identified problems and author's comments on the project.

7.2 Limitation of projects

The system has few shortcomings to overcome. First, one is the device configuration part of the web pages. Latest models of Nokia, Samsung, Sony Erickson or Motorola phones can access the system without any format changes of the controls of the software and it is well tested and configured. However, it needs to be tested with other brands currently available in the market to use without any major changes to the appearance of the system. Although format changes may occur, there may not be expected nay deficiencies in the functionalities. Other issue is the limited number of user options to query the database to getting information. Therefore, users can have limited number of information to analyze.

7.3 Difficulties encountered

- Project start with wml coding. But prototype implements using XHTML MP. The major advantage of XHTML MP over WML, XHTML MP Tags are almost same as familiar XHTML tags so that development process improved significantly.
- The author faced problems in time management. Even then author succeeded in finishing both the prototype and the report before the deadline.

7.4 Benefits in carrying out this project

- Since the author was a novice to Order Reservation Systems, it was a challenging task and a tough exercise to venture out into unknown territory of WAP enabled mobile based techniques and identifies the new techniques, which involved a lot of literature survey.
- The problem solving skills of the author were put into test and had been enhanced during this period.
- After undertaking the project, the self confidence building process had been strengthened and improved to a higher level preparing the author to face many complex design / implementation challenges with success.
- This interaction further strengthened the practical knowledge in several areas namely the Internet usage as a powerful and cost effective source of knowledge and related development technologies.
- Improved documentation and presentation skills.
- Gained skills in successful time management and performance of multiple tasks (in parallel) within the given time framework to meet deadlines.

7.5 Future enhancements & modifications

- Currently system demonstrate the payment scenario, as a future work it should be implemented the on line payment system in collaboration with the clients bank.
- Current system does not support each and every mobile device, so that in future it should be developed to support unsupported mobile devices as well.
- The system should be enriched with customizable food menu facility which could definitely lead more customer satisfaction. Currently it consists pre defined fix menus.

7.6 Authors view of the project

This project is an attempt to build mobile based reservation system for restaurant. To accomplish this task the author created a prototype which is capable of performing given basic operations.

The prototype fulfilled its given tasks of food ordering and other relevant functions.

7.7 Summary

The report concludes with this chapter, which flows through seventh chapters. In the final Chapter author carried out an evaluation of the whole study. The goal and objectives stated in the project proposal were successfully achieved. Difficulties encountered and the benefits gained by the author were also included in this Chapter.

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Appendix - A

Mobile based restaurant reservation system

User guide

Table of contents

1. Introduction

This user manual is designed to give user guidelines on how to use the system. This Restaurant reservation system includes two main modules.

- Mobile based WAP enabled web application to provide customer's functions. There are two customer types
    1) Registered customer
    2) Guest

- Web application for Administrator and chef's function.

2. WAP enabled web application for mobile uses

How to access the mobile site

User requirements

A mobile Device with following properties

- WAP enabled
- GPRS activated

Mobile site URL: http://mobicare.0fees.net/mobi.

Enter the mobile site address to visit the site

You will be directed to **welcome page**

a) Customer login

1. Click **Registered customer** link in welcome page
2. Enter **username** and **password**
3. Click on **submit** button

b) Request new registration

1. Click **guest** link in welcome page
2. Select **new registration** link in Guest detail page.

   Enter following information in to **new registration** page.

   - Name
   - Password
   - Confirm password
   - NIC
   - Phone
   - Email

3. Click on **submit** button.
4. System will provide a reference number.

c) Request order

1. **Login** to system.
2. Click **new order** link in main menu.
3. Follow the instructions.

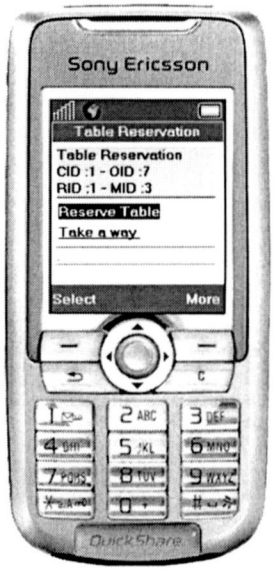
d) Select restaurant location

1. Click on **new order** link in Main menu.
2. Click on restaurant location in select restaurant page.

e) Select menu

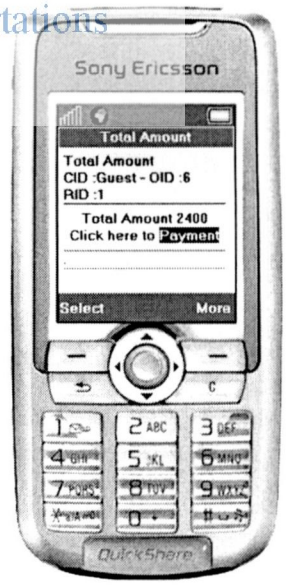
1. View available set menu
2. Select a food menu item from the Food Menu
3. Enter quantity , required date and required time in order detail page
4. Click on submit button

f) Table reservation for registered customers



1. Click **reserve table** link in Table Reservation page
2. Click desired available table in select table page

g) Payment



1. Click payment link in **total amount** page
2. Select card type in payment page
3. Enter card number, card code and name
4. Click on submit button

h) Check order state

1. Click **existing order** link in main menu

   For guests

   Enter order id press submit button

   For registered customers

   System will display the order ID(s)

   Select order id press submit button

i) View contact information

1. Click **contact us** link in main menu
2. System will display address, email and contact number in contact detail page.

j) Contact on line through mobile phone

1. Click **contact us** link in main menu
2. Click on telephone number link to connect customer care service

k) Check existing customer registration state

1. Click guest link in welcome page
2. Enter existing reference number in guest detail page
3. Click on submit button

3. Web application for restaurant management

Administrator and chef are two back end users in the system to carry out its operation.

The administrator has responsible for overall web application management which includes user management, customer management, food menu management, etc. Customer order management is the main operation of the chef until order is delivered to customer

How to access the web site

User requirements

A computer with internet facilities

Web browser

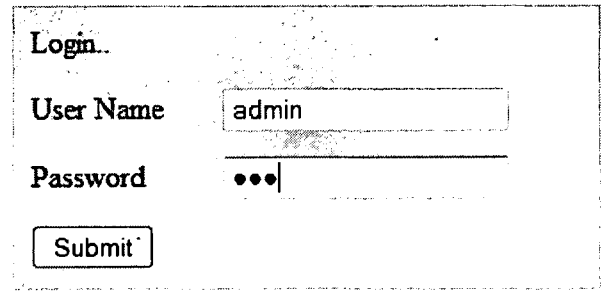
Web site URL: http://mobicare.0fees.net/admin

Enter the web address to address bar on web browser to access the site

You will be directed to **login Page**

User login

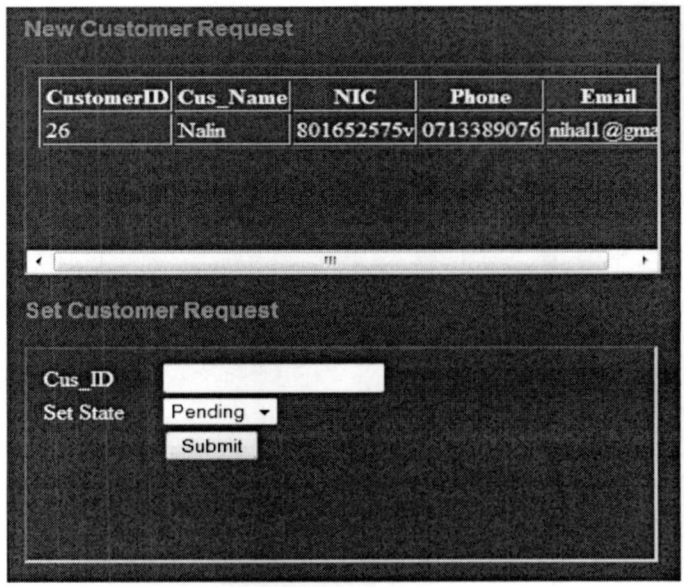
1. Enter user name and password in login page
2. Click on submit button



Administrator's main functions

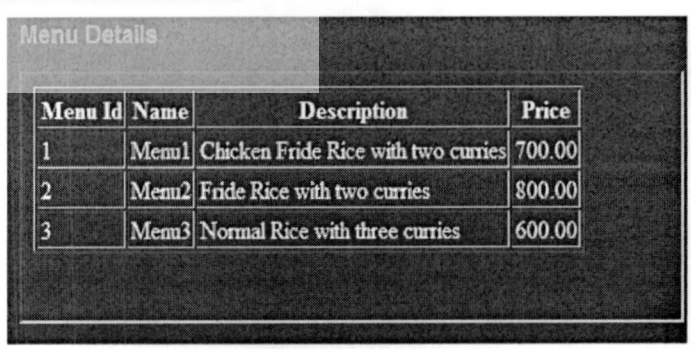
a) Set state of customers request

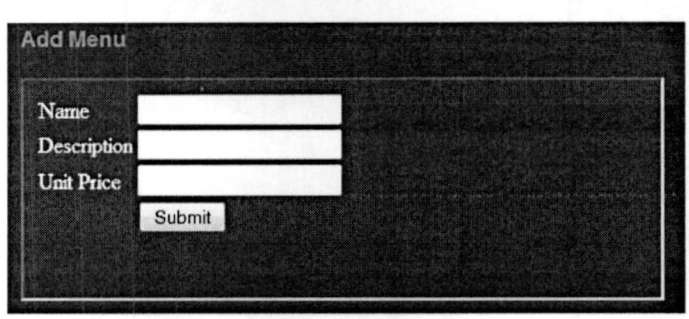
1. Click on "customer registration " button
2. Enter customer ID
3. Select state set state drop down menu
4. Click on submit button



b) Add new menu

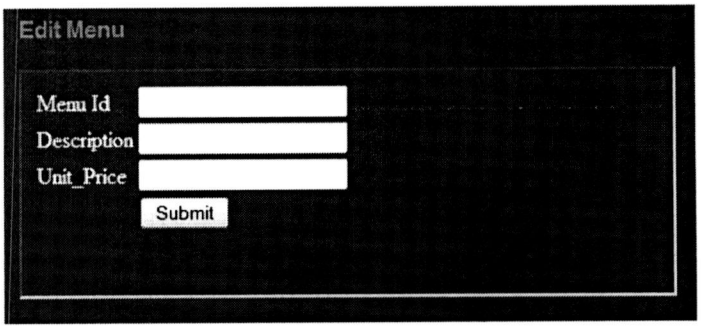
1. Click on "add menu" button
2. Enter following menu detail
   - Name
   - Description
   - Unit price
3. Click on submit button





c) Edit existing menu

1. Click on "edit menu " button
2. Enter menu id to edit
3. Edit description and unit price
4. Click on submit button



d) **View detail**

1. Click on "view detail" button
2. View all customers and orders detail

Chef's main functions

Web site URL: http://mobicare.0fees.net/chef

Enter the web address to address bar on web browser to access the site

You will be directed to **login Page**

Login to system

a) Set order state

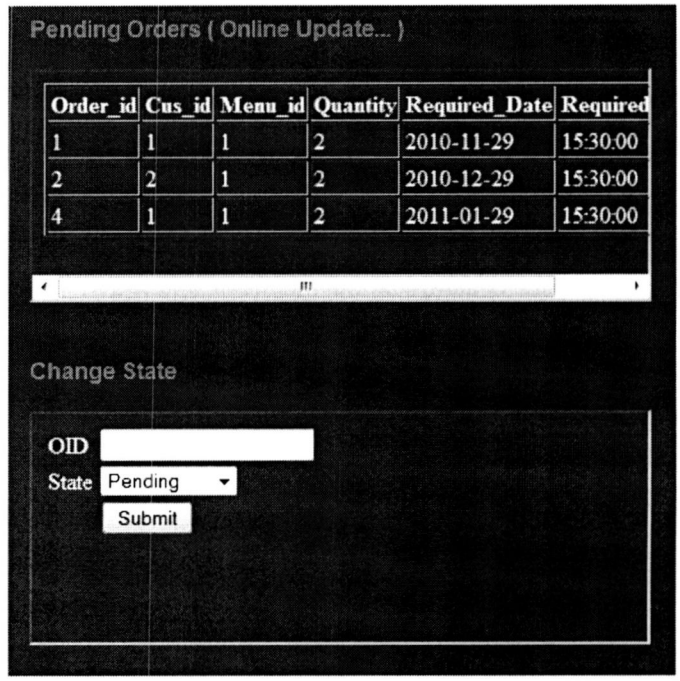
1. Pending orders are listed online on the "pending orders" frame

2. Enter order in to "change state" frame.

3. Change state to following as needed

    - Pending
    - Accept
    - Processing
    - Reject
    - Ready
    - Close

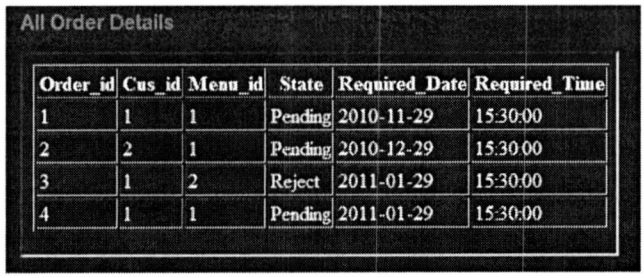
4. Click on submit button



b) View order report

View all order detail

Order id, customer id, menu id, current order state and required date and time.



4. Troubleshooting

Try the following solutions if mobile based reservation system does not function properly:

- Be sure that you have a WAP enabled and GPRS activated mobile device
- Be sure that you have entered correct URL.

Appendix - B

EVALUATION QUESTIONNAIRE

Mobile based restaurant reservation system
EVALUATION QUESTIONNAIRE

The aim of this questionnaire is to build a cost effective mobile based restaurant reservation system.

The applicability and usefulness of the proposed system will be assessed through the information that will be gathered through this questionnaire. Therefore I welcome your feedback.

Thank You!

B.W. Wickramasinghe
MSc in IT
(University of Moratuwa)

E-mail: buddhikastat@yahoo.com

1. Name

   ☐ Mr. ☐ Mrs. / Miss.....

2. Age group

   ☐ 16 - 20 ☐ 21 – 30 ☐ 31 – 50 ☐ Above 50

3. Occupation/ Profession

   .....

4. How would you rate your knowledge of mobile literacy?

   ☐ An advanced user

   ☐ An average user

   ☐ Basic user

   ☐ Non-literate

5. Have you used any online reservation system before?

   ☐ Yes ☐ No

6. If Yes, please specify the purpose?

   .....

   .....

7. Have you used any mobile based reservation software before?

   ☐ Yes ☐ No

8. Prefer mobile based restaurant reservation compared to manual method?

   ☐ Yes ☐ No

9. Was the graphical user interface easy to use?

   ☐ Yes ☐ No

10. Level of satisfaction?

- ☐ Very satisfied
- ☐ Satisfied
- ☐ Unsatisfied
- ☐ Very unsatisfied
- ☐ Neither

Any comments

.....

.....

11. Suitability of mobile based reservation system for other organizations?

- ☐ Yes
- ☐ Can be
- ☐ Not Sure
- ☐ No

Any comments

.....

.....

12. Further improvements / enhancements that you feel necessary to make this software more useful?

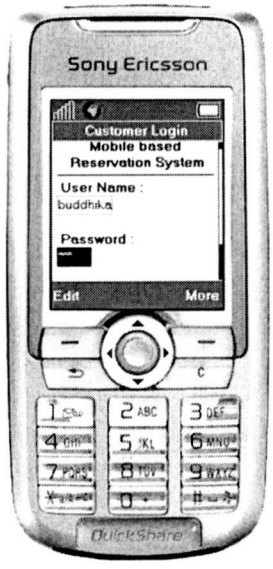
.....

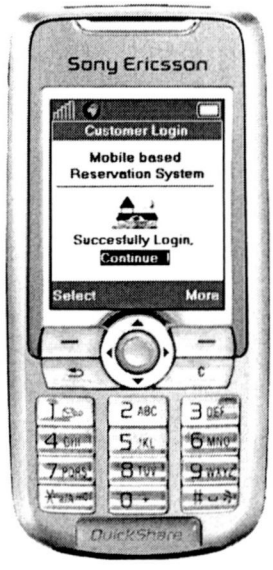
.....

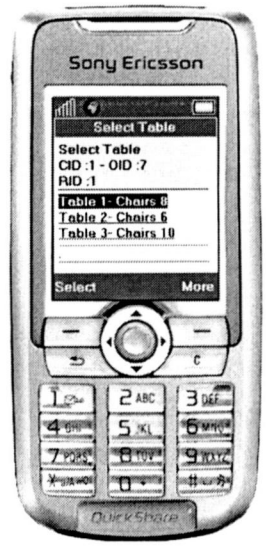
Appendix - C

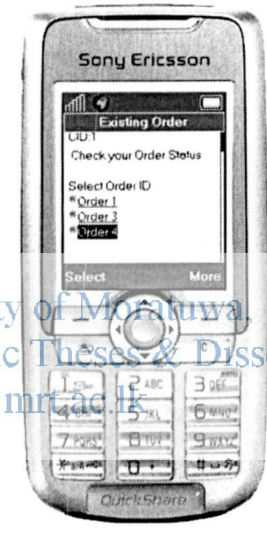
Sample screen shots

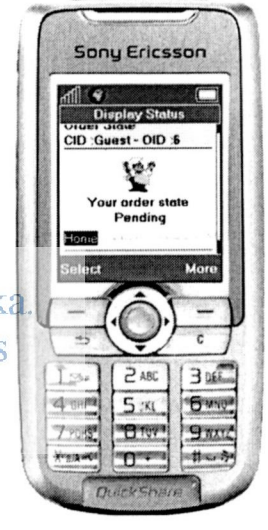
Mobile based WAP enabled web application

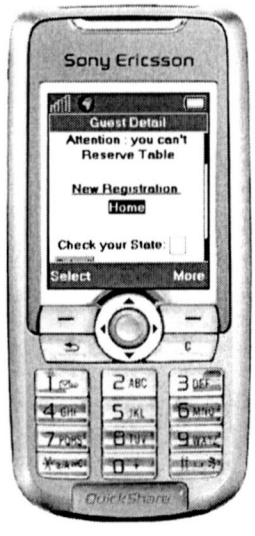


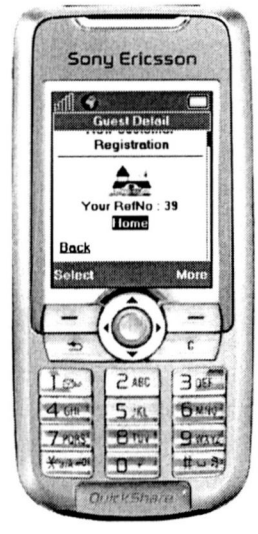


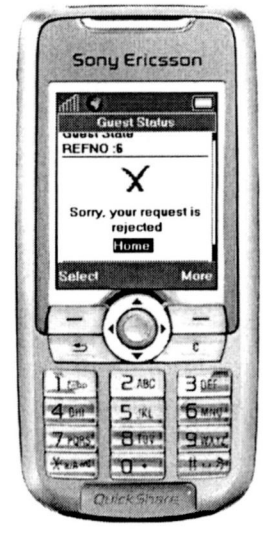




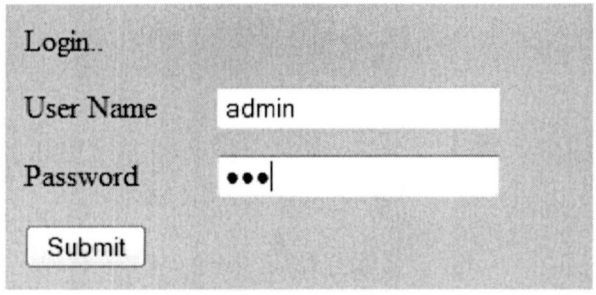




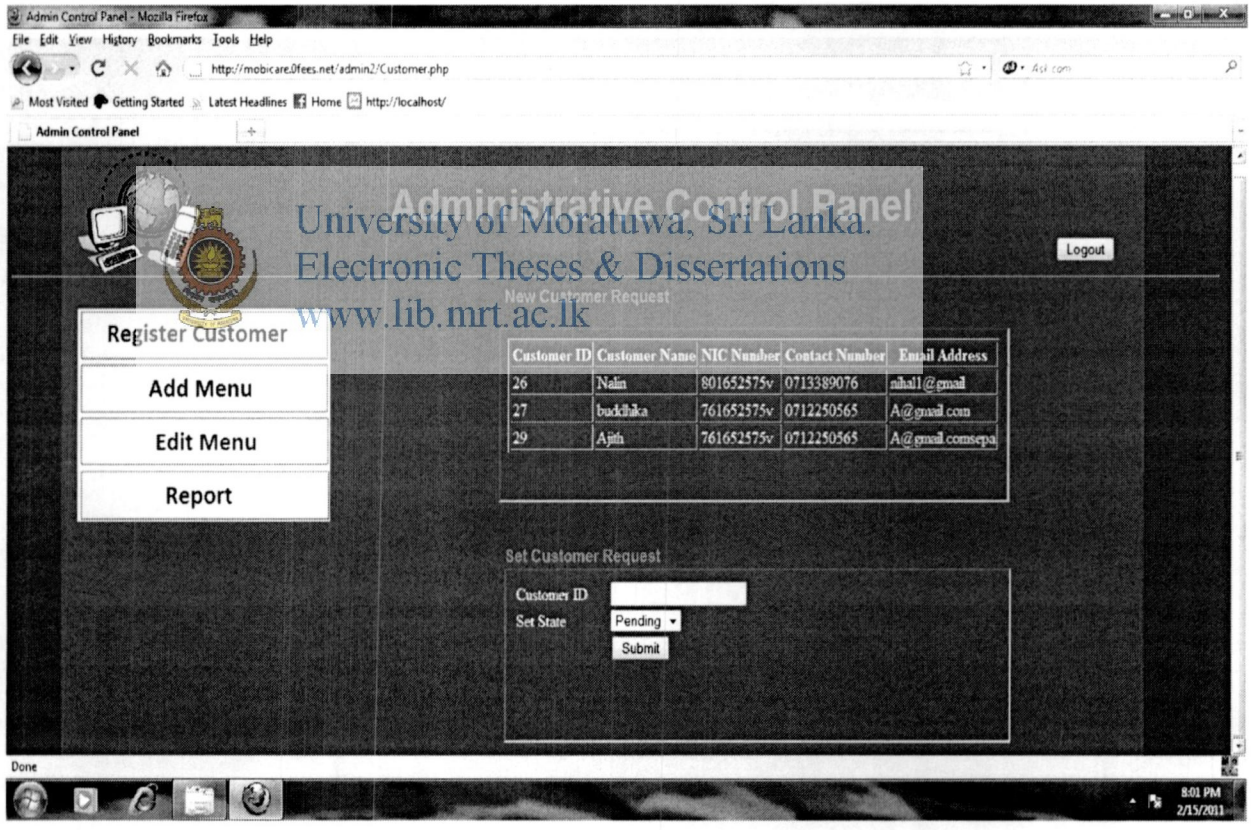




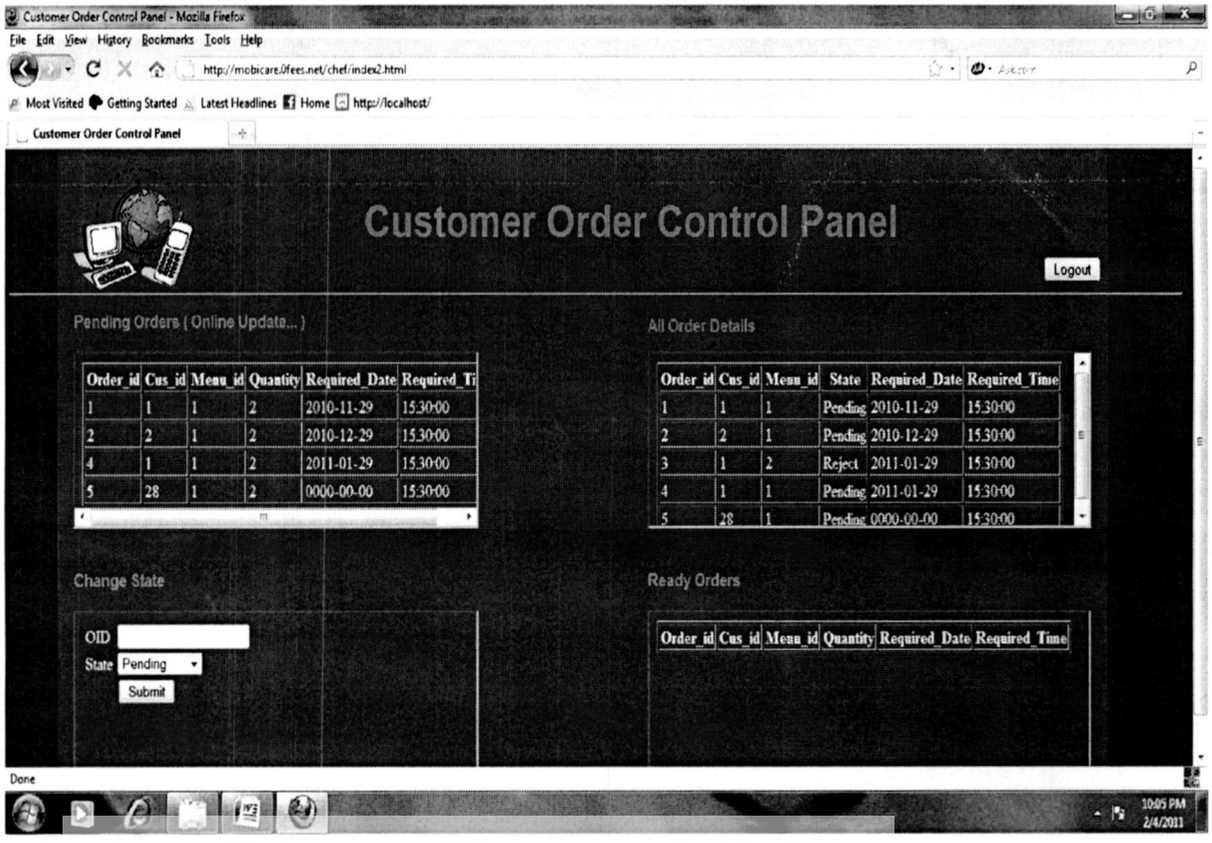
Web application



Login page



Administrative control panel page



Chef order control panel page