AUTOMATED BUS BOOKING SYSTEM (A CASE STUDY OF JIGAWA KANO KADUNA AND ABUJA)

BY

YUSUF IBRAHIM
FCP/CSC/16/1021

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A PROJECT SUBMITTED TO THE DEPARTMENT OF COMPUTER SCIENCE, FEDERAL UNIVERSITY DUTSE IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE (B.Sc. Hons.) IN COMPUTER SCIENCE.

JULY, 2021

CERTIFICATION

this project entitled **"AUTOMATED BUS BOOKING SYSTEM"** by **(YUSUF IBRAHIM)**

meets the requirement governing the award of the degree of Bachelor of Science in Computer Science and is approved to its contribution to knowledge and literary representation.

Mr. Ayuba John (Supervisor)	17-08-2021 Date
Dr. ZahraddeenSufyan (Head of Department)	24/09/2024 Date
Prof. ChojiDavouNyap (External examiner)	10-08-2021 Date

DEDICATION

This project is dedicated to my late parents and my inspiring brothers and sisters who have been lovely, prayerful, and supportive to me.

AKNOWLEDGEMENT

All praise and thanks are to almighty Allah, the Guide, and the Infallible Teacher, who has been guiding me to the righteous path.

Special thanks to my project supervisor, Mr. Ayuba John, who in spites of being extraordinarily busy with his duties, took time to hear, guide and keep me on the correct path. I am deeply grateful by his kind-heartedness.

It's my honor and privilege to place on record my best regards, deepest sense of gratitude to my lecturers especially in Faculty of Computing for their supports, advices, love, encouragements and precious guidance which were extremely valuable for my study both theoretically and practical.

I would like to express my deepest thanks to my uncle also a father to me, Alhaji Ayuba Rabi'u for taking part in useful decision both financial and giving me necessary advices and guidance. I choose this moment to acknowledge his contribution gratefully.

Also my reserved thanks goes to my family who have been prayerful for me to successfully graduate from this prestigious University.

I would not drop my pen until I express appreciation to my dear course mate in struggle, I'm very much grateful for their kindness.

Being in academic environment was a great chance for me. Therefore, am so grateful for having a chance to meet so many wonderful people and professionals who led me through the whole period of my stay in academic environment.

I am thankful to and fortunate enough to get constant support, love, encouragement and guidance from my entire family for been prayerful in successfully completing my academic carrier.

Special thanks goes to my mentor Alhaji Musbahu Badawi who have been encouraging me throughout my stay in the academic environment, I'm very much grateful for his kindness.

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ABSTRACT

Traditionally, bus booking system has been over the counter in bus terminals, however, today it has evolved with the rapid expansion of online. This project addresses the study and development of an Online Bus Booking System web portal that enable customers (passengers) to make an online bus booking, provide NIN, driver rating, generating of reports and etc. which also act as an operation tool for bus booking company to operate their organization effectively. This project critically studies the reason behind the evolution and the current bus booking systems. This project also addresses the problems faced by customers and bus drivers especially on illegal bus operations, long wait to purchase a bus ticket, unsafe environment and many more. The project studies some issues on implementation and also recommendations on how Online Bus Ticketing System web portal can take place effectively. This project uses waterfall model during the implementation of this software. ARGO UML software is used during the design of use cases, class diagram and activity diagram. The strength and weaknesses of the proposed system is also presented in this project. PHP, CSS, HTML, JavaScript, MYSQL database, and Xamp Server are the programming tools used in development of this research project.

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

A ticket is defined as "a piece of paper or card giving the holder the right to admission to a place or event or to travel on public transport" (Oxford, 2005).

Generally, a bus booking system consists of all the activities involved in producing a ticket, which includes, producing tickets, booking ticket, selling tickets, rejection of the tickets, total tickets produced for a trip, total tickets sold and income gained through the ticket selling.

A bus ticketing system can let customer to know the information about the bus schedule and ticket. Nowadays, online are very common issues to every one so that checking information using online can save allot of time to the customer, so that customer no need to go to the counter to ask of bus and schedule.

Bus ticketing system is a complex system that is difficult to be managed by human, so as a result software system can be used instead of human, which will help to avoid a big percent of mistakes.

Online Bus ticketing system make process of scheduling trips easier and prevent conflicting in time, also it helps customers to book their tickets from their homes and checks the pricing system of the routes, the price of ticket may increase or decrease depending on the season, availability, time of booking, and all these factors will be calculated automatically and instantly.

Online,ticketing system is a system that assist not only the passengers but also the bus staff position as an efficient service provider, gaining competitive advantages and also lead to superior control over the reservation process and operation, compared to conventional manual processing. The

main feature in this online e-ticketing system is to cater destinations between inter cities within Nigeria. With this system, the passenger can perform an online bus booking at his or her own free time and will consecutively reduce the human traffic in Nigeria (Audrey, 2006).

The prevalent view in various global circles is that man is presently living in an age growth of information gathering, processing and dissemination, popularly called the information age. For this reason, managers and other users of information especially in transport industries are demanding more kinds of information to support management and operations. They must therefore respond to the increasing requirement for information and data management.

Electronic tickets, or e-tickets, gives evidence that their holders have the permission to enter a place of entertainment, use a means of transportation, or have access to some Internet services. The design of this online system will be beneficial to the company because it has not existed before.

Therefore, Imo Transport Company, Owerri, a viable investment owned by the state government whose primary objectives are: to spread comfort and hospitality to passengers away from their home, to make profit, will definitely appreciate a system which can automate its manual operations in the area of bus ticket reservation in order to meet customers increasing demand during peak and off peak seasons. The ultimate expectation is to inspire a feasibility study aimed at providing proper guidance and awareness to any future potential investors, particularly those in the bus industry, to consider utilizing the Imo transport, as a gateway to the fertile soil of unlimited opportunities in the south-east Nigeria. Currently, staff at the bus ticket counter is using an internal system to sell tickets at the counter and customers who are unable to buy bus ticket online at this moment would have to go to the counter to a buy bus ticket. Sometimes, customers' needs to queue up a long queue to buy bus ticket and ask for information and this brings a lot of inconveniences to customers (Badre, 2002). However, Online Bus Ticket Reservation System enables the customer to buy bus ticket, make payment, and ask for information online easily. Furthermore,

staff can sell bus ticket using Bus Ticket Reservation System after checking the bus ticket availability for the customer and print the bus ticket to the customer. Besides the above given reason of curbing the traffic flow and reducing the human and negative environment congestion in Jigawa, Kano, Kaduna, and Abuja State Transport Authority Bus Terminal, therefore a customer has a choice to rate/rank a driver base on his performance and behavior during the cost of journey, the element of providing options to a customer to rate a driver is very important and will be implemented in the Online Bus Booking System web portal. This element is relatively important based on the number of unsatisfactory experiences by customers and accidents occurred due to the negligence of the bus driver

1.2 STATEMENT OF THE PROBLEM

The problems facing by Jigawa, Kano, Kaduna, and Abuja states transport authority are that customers have to go to the counter to buy bus ticket or ask for bus schedule, customers will also have to queue up for a long time in order to secure a bus ticket and will also need to pay cash when they buy the bus ticket.

1.3 AIM AND OBJECTIVES

The aim of this project is to design and develop a system that will enable customers to book for Buses from home, for Jigawa, Kano, Kaduna, and Abuja states.

Objectives: -

1. To design a website for bus ticketing.
2. To develop a database that can manage the record of travelers.
3. To establish an online bus ticketing management system web portal

1.4 MOTIVATION OF THE STUDY

The followings are some of the factors that motivate me to study the hardships faced by travelers during traveling and solution shall be provided.

1. **Time consuming:** The manual system is very time consuming, stressful and more prone to errors in purchasing a ticket, storing of data, and accessing of data.
2. **Insecurity of data:** This means lacks of security of data or information. In the manual method, records are kept in the office and several people may have opportunity to check all the files because all the files are kept in an appropriate way, this will lead to losses of data and even theft of the records that are valuable.
3. **Data Inconsistency and Redundancy:** In the manual method of keeping records for processing and manipulation, man has in course of time, devised certain tools which include paper, biro and pencil which he used in recording of data or information and using these manual tools makes him to have duplicate copy of stored data, with this redundancy
   of data and human errors may be encountered and also many papers are wasted and consume many space for storing the record.
4. **Delay in Accessing Data:** In the manual method of keeping records, accessing data or information become very tedious, because all the files that contained information are not well arranged the way that can be accessed in an appropriate and accurate manner, this will lead to losses of stored information.
5. **Ineffective Retrieval of Data:** Considering the manual method of keeping records, retrieving on information become very tedious, all files that contained the records are kept in sales office, therefore retrieving are done by checking the files one after the other, this will consume time, misplacement of data or information and wasting of energy. With this many errors will be encountered. And it took time for the staff in the company to know all transactions.

1.5 SCOPE AND LIMITATION

This study will focus on developing a system that will make it possible for travelers to reserve for ticket online. The Bus booking system targeted was only Jigawa, Kano, Kaduna, and Abuja state and did not cover travelers coming from other state which is not mention under the above listed states. The Bus booking system will also be hosted locally.

CHAPTER TWO

LITERATURE REVIEW

2.1 REVIEW OF RELATED WORKS

This chapter will give description, basic and top to bottom investigation of what other research did in this field from distributed articles, books and different assets, and in addition benchmark incomparable system that was created in light of the related research subject.

Public transportation has been classified as an essential mode of travelling. In older days, human travels from one location to another takes months and years, with less support of technology and communication tools. Currently, with the effective and efficient mode of transportation, one could travel thousands of miles with hours and days and communicate across the globe within split of seconds. Public in many countries, especially in the third world, prefer to use buses and train services to travel from one location to another.

"Electronic ticketing system is the ticketing system which uses self-service technology as a base of application helping the user to book a ticket by themselves" (Ferreira, etal, 2013).

Recently, with the introduction and evolution of smartphones applications, the consumers' behavioral habits have changed in the goods and services purchasing power. Consumers' on-line purchases using mobile application had increasing globally, without boundaries.

Consumers' or the public population, in current age, can purchase their transport ticket through mobile phone and pay on-line to book, validate and retrieve tickets using simple mobile applications (Ceipidor et al., 2013).

Using a mobile phone for making reservation systems is the easiest and convenient way to perform this task. The online booking, in general, gives the customer extra information regarding the company, availability of the services, ticketing structure,

prices, online and booking structure and other services rendered. Besides that, in certain company, handheld mobile communication may bring similar better closer partnerships between a company and its customers (Paper, 2012).

All public transportation modes in Iraq, except air transportation still use the traditional ticket system, which use a paper based ticket. The problem with the traditional ticket bus system (manual ticket) is when users have to stand up in a long queue to buy a bus ticket or asking information for buses schedule (Al-hijaj, Jabbar, & Khalil 2013).

The main issue with manual system is each branch work separately, communication must be made by each branch's front-officer to the head office for each customer's enquiry in order to get the latest update on schedule, seat availability and other reservation-related information; as well as to avoid duplicate bookings or over-capacity (Alaya, 2014).

Consumers depend on their applications for more commercial dealings, social corresponding and community interaction. Results derived from these surveys show that airline, bus liners and travel agents, being the goods and service provider, should expand the ticketing services through mobile shopping. In addition, when the customer delivers the service independently through the use of technology will simplify and increase efficiency of service delivery, this technology called self-service technology (SST). Self-service technology replacing the traditional service encounter which in the process, there is a communication between customer and employee become the customer deliver the service by themselves (Wang, Harris, & Patterson, 2012). Moreover, the customer unnecessary to visit a firm office to ask about banking transaction, tickets information and bill payment, through this service firms give simplicity for the customer to fulfill their needs, and customer can reduce money, time, and effort to fulfill their needs.

Second purpose of providing self-service technologies is transacted, this technology enables the customer to make a transaction buy, pay, or order stuff from the internet without direct interaction with an employee. The third purpose of self-

service technologies is to self-help. Through these SSTs, enable the customer to learn, receive information, train them, and provide their own service. Furthermore, Self-service technologies indeed have a benefit for both companies and consumer. SSTs are cost effective to escalation the benefit of accessibility, pervasive obtainability, and time and money savings and reduce anxiety.

Nowadays electronic ticketing systems (e-ticket system) are particularly famous for the traveler in the whole of the world. Electronic ticketing system is shift traditional ticketing system because a lot of advantages which customer can get

electronic ticketing system begins there is several ticketing systems which use paper based or smart card based. (Jakubauskas, 2010)

According to Melisa (2007), stated the basic components of an Online Bus Ticketing System web portal that provides enhanced service to the bus operators and customers consist of the following:

- Capture of customer information such as name, address, phone number and e-mail address
- Price list
- Bus operators ranking
- Seating chart
- Loyalty Points/Redemption
- Search engine
- Payment information
- Organization's advertisement/slogan, phone number, fax number, and address
- Comments and suggestions section / option
- Reports

Public transport operators have been trying to replace paper-based tickets with electronic media, and many countries have implemented or are about to

introduce e-ticketing systems. The main characteristic of e-ticketing is that tickets are sold and stored in electronic devices. However, the benefits of a comprehensive e-ticketing system for public transport operators are hard to quantify, as the main aim of e-ticketing is an improved service quality. In monetary terms, e-ticketing could reduce administrative costs as fewer cashiers are needed, fare processing times could be reduced and a better throughput of passengers could be allowed (Maike, 2014).

According to Invaderzim (2011), Online Bus Reservation System provides bus transportation system, a facility to reserved seats, cancellation of seats and different types of enquiry which need an instant and quick reservation. This system can be used by the users in performing online reservation via internet for their all business purposes. Users can use this program directly on their websites and no need to install it.

2.2 SUMMARY OF REVIEWED LITERATURES

As a preparation to start this project, reasonable amount of time was spent studying and understanding the related sources in details to have a better understanding what people had done in respect to this field of study.

Ferreira, et al (2013) stated that Electronic ticketing system is the ticketing system which uses self-service technology, they explained that, by using e-ticketing system one can booked or reserved ticket for themselves without stress as far as there is internet access.

Ceipidor et al (2013), explained with the advent of mobile phone, customers can purchase their transport ticket through mobile phone and pay on-line to book, validate and retrieve tickets using simple mobile web application.

Paper (2012), The online booking, in general, gives the customer extra information regarding the company, availability of the services, ticketing structure, prices, online payment and booking structure and other services rendered.

Al-hijaj, Jabbar, & Khalil (2013), stated that: The problem with the traditional ticket bus system (manual ticket) is when users have to stand up in a long queue to buy a bus ticket or asking information for buses schedule.

Alaya (2014), explained that the main issue with manual system of bus booking is that, when customer need information about ticket availability and other reservation related services, communication must be made by the branches managers. But by automating the system even customers would found it easy in getting latest update about the bus schedule.

Wang, Harris, & Patterson, (2012) stated that, Results derived from these surveys show that airline, bus liners and travel agents, being the goods and service provider. Should introduce use of technology called self-service transaction (SST). Self-service technology replaced the traditional service encounter. The customer unnecessary to visit a firm office to ask about banking transaction, tickets information and bill payment, through this service firms give simplicity for the customer to fulfill their needs, and customer can reduce money, time, and effort to fulfill their needs.

Jakubauskas, (2010) explained that, using the e-ticketing system customers will avoid queuing in ticket box

Melisa (2007), stated the basic components of an Online Bus Ticketing System web portal provide the following service: price list, payment information, report and etc.

Maike, (2014) stated that the main aim of e-ticketing is an improved service quality. In monetary terms, e-ticketing could reduce administrative costs as fewer cashiers are needed, fare processing times could be reduced and a better throughput of passengers could be allowed.

Invaderzim (2011), explained that online Bus Reservation System provides bus transportation system, a facility to reserved seats, cancellation of seats and different types of enquiry which need an instant and quick reservation.

2.3 RESEARCH GAP

After spending reasonable amount of time reviewing what has been done by other people's work related to this field of study, study found that some features need to be added on the existing system. The proposed system would provide more enhance features. Due the current critical situation of insecurity, this system would require customer to provide National Identification number(NIN), customer would also be provided with options when making payment online in which customer could make payment using valid debit card or through bank transfer. Another enhance feature would be provided for passengers, where passengers could rate the driver after delivering them to their final destination base on his driving performance. By providing this feature, the bus company would at least get knowledge on how the drivers perform their driving activities, because most of time the drivers used to drive recklessly and that caused massive loss of passenger's life.

CHAPTER THREE

METHODOLOGY AND TOOLS/DATA PRESENTATION

3.1 METHOD

For any project to be completed, it has to go through stages called system development Life Cycles. System Development Life Cycle (SDLC) is the process of understanding how an Information System (IS) can support business needs, designing the system, building it and delivering it to users. The SDLC composes of four phases: Planning, Analysis, Design and Implementation.

In order for this project to be developed, the methodology that will be used is the System Structured and Design Methodology. The SADM is classified as a Waterfall Development. With Waterfall Development, analyst and users proceed sequentially from one phase to the next and each phase can be mapped out and evaluated (Hevner et al, 2004). Below, in figure 3.1 is a diagram on the waterfall methodology.

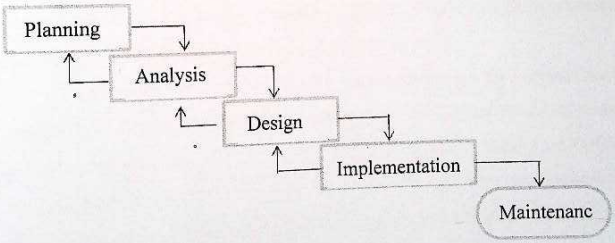


Figure 3.1 The Waterfall Model Development

The waterfall model is used as a model of Online Bus Ticketing System web portal. Waterfall model consists of stages that are cascading from one to another. One development stage should be completed before the next begins. The Waterfall model presents a very high-level view of activities taken place during development, and it suggests to developers the sequence of events they should expect to encounter (Pfleeger, 2001).

Planning is an important phase where an Online Bus Ticketing System plan is drafted out and changes are made so that a plan can be followed without any more changes during the final phase. The plan is done so that there is progression or action taken on the applications selected. The existing ticketing system within Nigeria and other countries also have been analyzed. The plan is then followed strictly so that the system can be put into operation.

The next phase after the planning phase is on **analyzing** the current and new procedures of the system. Analysis is important to gather information from the existing e-ticketing system.

Feasibility study is conducted to find out whether it is beneficial to carry out the new system. Studying the existing e-ticketing system and the procedures involved is what the feasibility study is concerned with.

After the analysis phase, the next step is to **Design** the system based on the requirements selected in the analysis phase. Design can be constructed easily by having a prototype system. Prototype system is either a workable or non-workable system that has the screen design with the important features included. So the customers and bus operators will test the prototype system to see whether they are satisfied with the requirements.

Based on the feedback obtained from the user the necessary changes are made. The next step is the **Implementation** phase where the process of changeover takes place where the existing e-ticketing system is converted into an Online Bus Ticketing System web portal.

The last phase is the **Maintenance** phase for modification and enhancement purposes. It is important that continuous assessment is carried out for better services in the future.

3.2 Method of data collection

The method used to collect data in this project consists of, observation and interview. Once information is gathered a prototype is developed as to support the findings. Development of the prototype web portal of Online Bus Ticketing System is developed to support the objectives of the research. The following will be the method used in collecting data discussed in detail.

3.2.1 Observation

Observation is the first method used to gather information regarding the development of an Online Bus Ticketing System web portal. For this project, Jigawa state transport authority (JSTA) was visited to observe the buying habits of passengers and also observe the selling of tickets by the bus operators. From the observation, it is found that the human traffic is extremely high and there are too much of chaos especially when Federal University Dutse students are going for holiday to their various state of origin.

3.2.2 Interview

An interview has been conducted with operational Manager at Jigawa State Transport Authority Dutse branch, namely **mal. Adamu Shehu**. The main objective of this interview is to understand the bus operations in the ticketing unit and to analyze the acceptance, potential and opportunities in implementing the Online Bus Ticketing System web portal. The interview questions were prepared, is based on open-ended and closed-ended questions

3.3 Development tools

1. **HTML:** which is stand for Hypertext Markup Language is the main markup language for creating web pages and other information that can be displayed in a web browser.

   HTML elements form the building blocks of all websites. HTML allows images and objects to be embedded and can be used to create interactive forms. It provides a means to create structured documents by denoting structural semantics for text such as headings, paragraphs, lists, links, quotes and other items. It can embed scripts written in languages such as JavaScript which affect the behavior of HTML web pages.

2. **Cascading Style Sheets (CSS):** is a style sheet language used for describing the look and formatting of a document written in a markup language. While most often used to style web pages and interfaces written in HTML and XHTML, the language can be applied to any kind of XML document, including plain XML, SVG and XUL. CSS is a cornerstone specification of the web and almost all web pages use CSS style sheets to describe their presentation.

   CSS is designed primarily to enable the separation of document content from document presentation, including elements such as the layout, colors, and fonts. This separation can improve content accessibility, provide more flexibility and control in the specification of presentation characteristics, enable multiple pages to share formatting, and reduce complexity and repetition in the structural content (such as by allowing for table less web design).

3. **JavaScript (JS):** Is a dynamic computer programming language. It is most commonly used as part of web browsers, whose implementations allow client-side scripts to interact with the user, control the browser, communicate asynchronously, and alter the document content that is displayed. It is also being used in server-side programming, game development and the creation of desktop and mobile applications.

4. **MySQL**: "My S-Q-L", officially, but also called "My Sequel" is the world's second most widely used open-source relational database management system (RDBMS). The SQL phrase stands for Structured Query Language.

MySQL is a popular choice of database for use in web applications, and is a central component of the widely used LAMP open source web application software stack (and other 'AMP' stacks). LAMP is an acronym for "Linux, Apache, MySQL, Perl/PHP/Python." Free-software open source projects that require a full-featured database management system often use MySQL.

5. **Sublime text:** Is a sophisticated text editor, for code, markup and prose. It has beautiful user interface, extra ordinary features and amazing performance. It has the function of: go to anything, multiple selections, command palette, distraction free mode, instant project switch, plugin API and cross platform.

6. **PHP (hypertext preprocessor):** is a widely use open source general-purpose scripting language that is especially suited for web development and can be embedded in to HTML.

7. **UML (unified modeling language):** it is a standard which mainly used for creating object-oriented, meaningful documentation models for any software system present in the real world. It offers rich models that describe the working of any software/hardware systems.

3.4 Description of the proposed system

In efforts to improve the existing bus e-ticketing systems in Jigawa, Kano, Kaduna and Abuja, observation on the problems and opportunities from the existing e-ticketing systems had been conducted. With that, it is recommended an integrated system of solutions that attempts to rectify many of the existing problems in the current bus e-ticketing and

propose an innovative way to enhance the services provided in the bus e-ticketing system.

Therefore, the goal of the proposed Online Bus Ticketing System web portal is to provide a revolutionary way to interact effectively in a one stop venue. Furthermore, with this system, customers will be able to obtain a wider choice of bus tickets since they can reach a wider range of bus operators and a decision system to rate a driver base on behavior during the journey. Customer would also require to provide national identification number (NIN) when booking ticket.

In short, with the proposed system, bus operators can now involve in making bus ticketing purchase transactions convenient, cost effective and finally can do away with the manual/conventional methods of selling bus tickets. Therefore, the proposed system will be superior and function as a catalyst in the competitive business environment regardless of the geographic barriers among the bus operators.

3.5 SYSTEM DESIGN

Systems design is the process of defining the architecture, components, modules, interfaces and data for a system to satisfy specified requirements

3.5.1 USE CASE DIAGRAM

A use case diagram at its simplest is a representation of a user's interaction with a system and depicting the specification of a use case (Gemino & Parker, 2009). Use case analysis is a major technique used to find out the functional requirements of a software system. Use case, an important concept in use case analysis, represents an objective user wants to achieve with a system. It can be in text form, or be visualized in a use case diagram. The diagram represents the use case diagram for online ticketing system for Jigawa, Kaduna, Kano and Abuja.

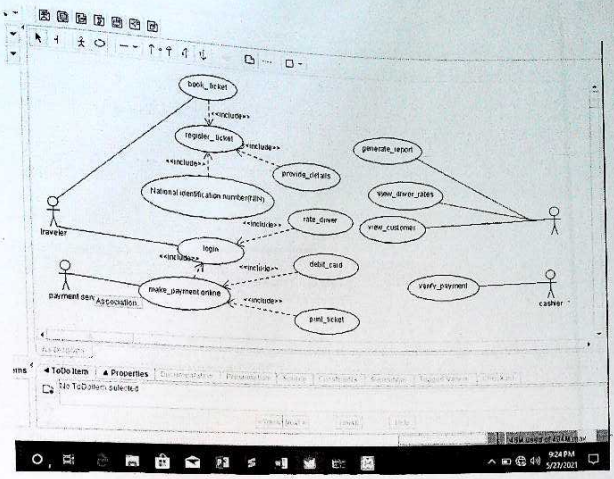


Figure 3.2: Use Case Diagram

3.5.2 Activity Diagram

Activity diagrams are graphical representations of workflows of stepwise activities and actions with support of choice, iteration and concurrency (Rumbaugh & Jacobson, 2001). In unified modelling language, activity diagrams are intended to model both computational and organizational processes (i.e. workflows). Activity diagrams show the overall flow of control.

Activity diagrams are constructed from a limited number of shapes, connected with arrows. The most important shapes type: rounded rectangles represent actions; diamonds represent decisions; bars represent the start (split) or end (join) of concurrent activities; a black circle represents the start (initial state) of the workflow; an encircled black circle represents the end (final state). Arrows run from the start towards the end and represent the order in which activities happen.

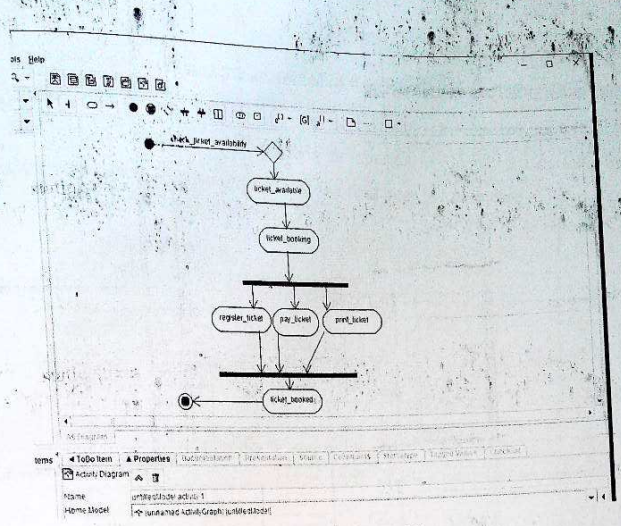


Figure: 3.3 Activity Diagram

3.5.3 Class Diagram

Class diagram in the unified modelling language (UML) is a type of static structure diagram that describes the structure of a system by showing the systems classes, their attributes, operations (or methods) and relationships among objects (Sparks & Geoffrey, 2011).

The class diagram is the main building block of object oriented modelling. It is used for general conceptual modelling translating the models into programming code. Class diagram can also be used for data modelling. The classes in a class diagram represent both the main objects, interactions in the application and the classes to be programmed. Classes are represented with a boxes which contain three parts:

1. The top part contains the name of the classes. It is printed in bold, centered and the first later capitalized.

2. The middle part contains the attributes of the class. They are left aligned and the first later is lower case.
3. The bottom parts give the methods or operations the class can take or undertake. They are also aligned and the first later is lower case

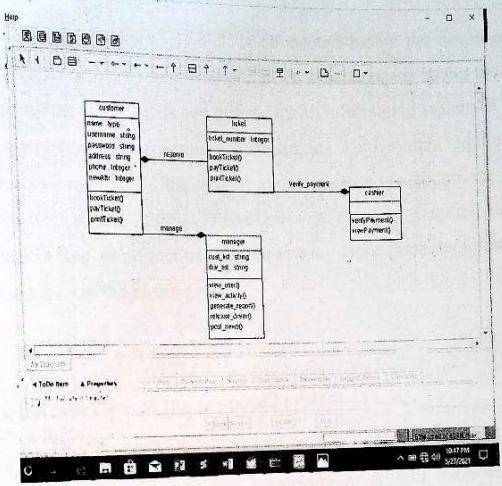


Figure: 3.4 Class Diagram

CHAPTER FOUR

ANALYSIS AND DISCUSSION OF RESULT

4.1 Introduction

System Analysis is a phase which is conducted before the development of the Online Bus Ticketing System web portal. System Analysis shows the requirement or a description of the needs and desires for an information system. A requirement may describe functions, features, and constraints. Thus, system requirement defines the services provided by the system and prescribes constraints for its operation (Whitten J.L *et al.*, 2002). There are two types of requirement, functional requirement and non-functional requirement. Both these requirements will be discussed later in the chapter.

4.2 Brief overview of the proposed system

This system function can be divided into two sections, the Administration section and the Customer section. In the Administration section, there will be two main activities taking place. The first is the handling of system administrative matters, whereby, the administrator will be responsible on updating of bus schedule information, feedback activities, forums, and staff profile. The second activity is sale of ticket by the administrator them self (which is over the counter ticket sale). Here the activity is the same as in the customer module except there will not be member registration activity and only cash transaction is allowed. The third activity is the Authority activity. Since one of the element which will be used to rate the bus operator's standard ranking is track record on traffic offences, only the Road Transport Authority will be allowed to input the data. This is done so the validity of the data will not be questionable.

In the Customer module, the customer will be able to view the home page that will allow the customer to search on the bus details for the desired destination based on the preferred search detail. After searching, a list of bus operators will be displayed

based on the search detail requested. The customer will then choose any of the results from the search option and then the system will allow the customer to continue with the booking, registration, payment activity and printing out of the booked ticket provided if the customer is a registered member and if the customer is not a member the system will indicate the customer to do so. In this module the customer will also be provided information such as latest news, promotions, and forums about the Online Bus Ticketing System web portal.

The main specialty of this Online Bus Ticketing System is to require customer to include his/her national identification number (NIN) and also customer could rate driver based on his driving performance. This is the feature that will be the difference compared to other bus ticketing systems available.

4.3 Functional requirement

Functional requirement is a function or feature that must be included in an information system to satisfy the business needs and user acceptance (Whitten et al., 2002). System Administrators and Customers (members and non-members) will use this proposed Online Bus Ticketing System web portal. A clear and detail functional system requirements for this system of both the Administrator section and Customer section are described as following.

4.3.1 Administrators

The System Administrator can access all the functions in this system, which includes the bus operator information module, and bus information module. The functional requirements for the administrators' section are as following.

4.3.2 Bus company information

(a) **Home**

This is the home page of the administrator section which displays the company profile and also the promotions that is currently available.

(b) **Latest update**

The system administrator can view, add, edit, search and delete the company latest news. These latest news includes the changes of the departure time for a particular trip, the information about the extra trip during the peak season, the changes of fare rates and so on.

(c) About Us

The system administrator can view, add, edit, search and delete the company latest news. This contained the information about the bus company.

(d) Services available

This section requires the current state available for the travelers

4.3.3 Registration

Member

This module will allow the user to register as a member and be able to do bookings from this system. The user must provide personal particulars into the registration form such as name, user NIN, password, address, e-mail address and contact number.

4.3.4 Booking

(a) Booking

This module can only be used by a member. The booking module will display the details of the bookings done and the total amount.

(b) Seat selection

Seat number will be automatically generated for customer.

4.3.5 Payment

The payment module will allow a member to select the type of payment method, i.e. Master card, verve, and visa. If a member selects online banking, then the banks details and links will appear for the user to proceeds with the payment. If a member selects credit card, then the type of card has to be selected and the card details will be requested. After providing all necessary detail about the ATM card then, the transport fee will automatically deduct from member account to company account.

4.3.6 Ticket

The ticket will then be displayed with a ticket number for future correspondence. The member can then print the ticket for their journey.

4.4 Non Functional Requirement

Non-functional requirement is a description of the features, characteristics, and attributes of the system as well as any constraints that may limit the boundaries of the proposed solution (Whitten J.L *et al.*, 2002). Such constraints usually narrow down the selection of programming language, operating system platform or implementation techniques.

The Online Bus Ticketing System web portal must ensure certain web application qualities such as ease of use, user-friendliness, as well as maintainability. The following lists the non-functional requirement of the system:

(a) Ease of use

The system should be simple and easy to use. Documentation and user manual should be provided to the users, to ensure that the users are able to use and operate the system by themselves. Help sections or user instructions should also be provided throughout the system in order to guide users when they encounter any problems.

(b) User Friendliness

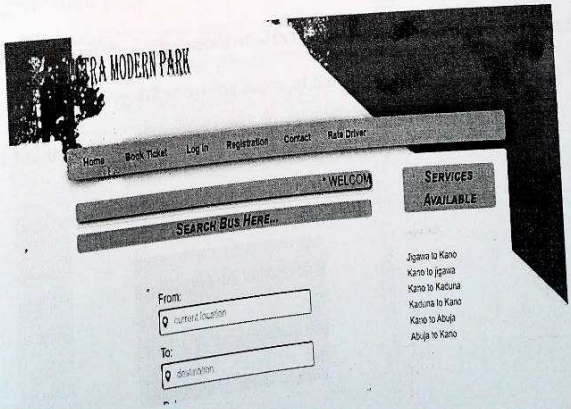
A user-friendly interface enables the users who are with or without technical background able to operate and use this system. A user-friendly system will satisfy users and allow interaction with this website and able to utilize this system to the maximum.

(c) Maintainability

Maintainability is the ease with which a program can be corrected if an error is encountered, adapted if its environment changes, or enhanced if the customer desires a change in requirement (Pressman S. Roger, 2001). In order to make the system easily maintained, the programs must be easily understandable by the maintenance programmer and easily modified and tested when updating is done to meet new requirements, rectifying a deficiency or correcting errors.

4.5 Home page

Shows the first interface that will be shown when the Bus booking system is started. It serves as the Login page for all kinds of users.



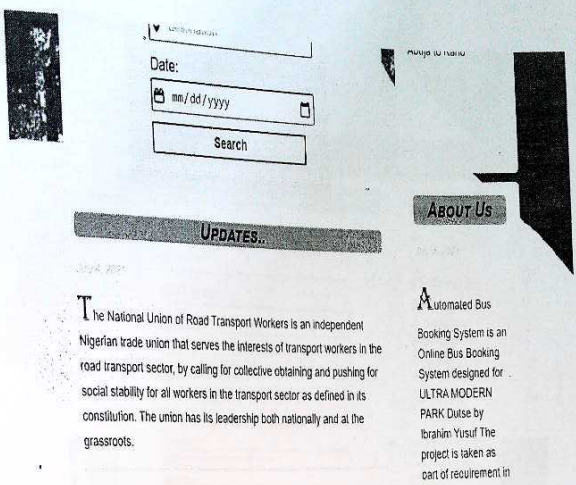


Figure: 4.1 Home Page

4.6 Registration page

The registration section is the section for the admin. It provides interfaces that allow a user to register. **Fig.4.2** show the index of the section. The head of Motor Park can see the users/customers who have registers

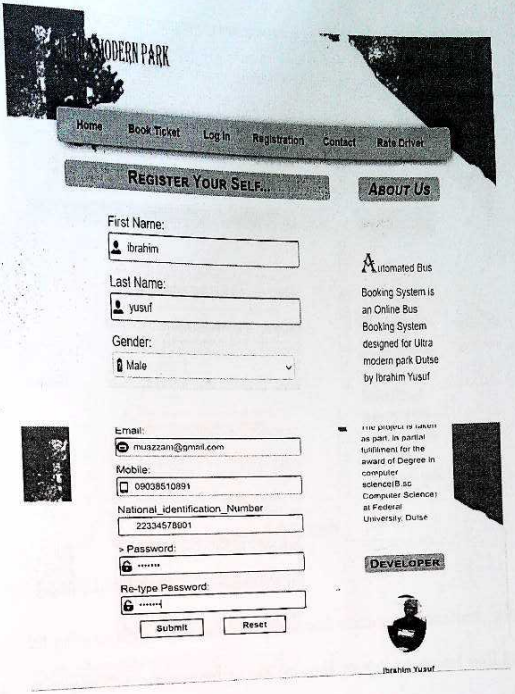


Figure 4.2 Registration Page

4.7 Login page

This login section is the section that a customer can be able login in after registration and can allow a customer to book a ticket before the day of his/her trip.

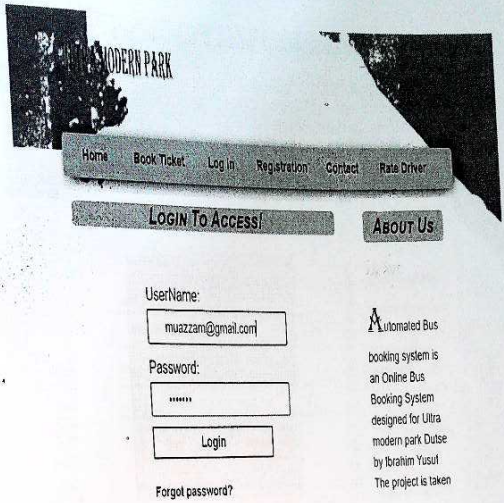
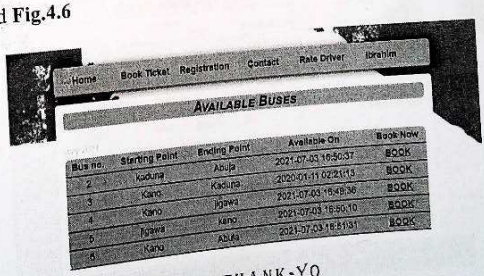


Figure 4.3 Login

4.8 list of bookable buses

This is a list of bookable buses with starting and ending destination, it is shown in **Fig 4.4** below and the subsequent pages for receipt and payment will be shown **in fig. 4.5** and **Fig.4.6**



THANK-YO

U

Figure 4.4 List of Bookable Buses

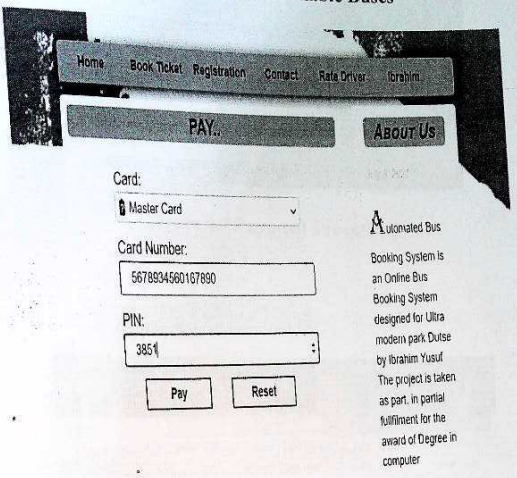


Figure 4.5 Payment Gateway

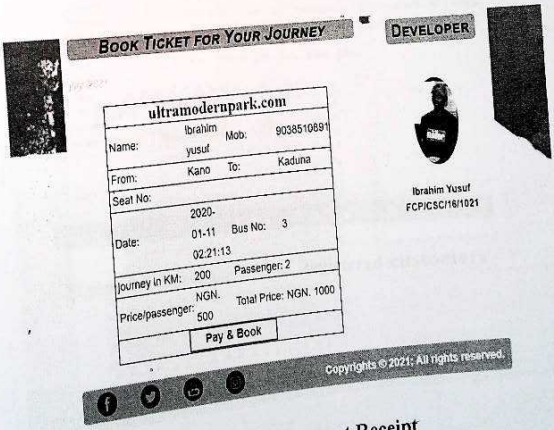


Figure 4.6 Payment Receipt

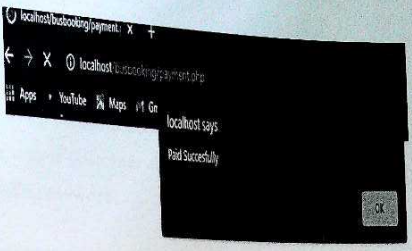


Figure 4.7 Payment Processing

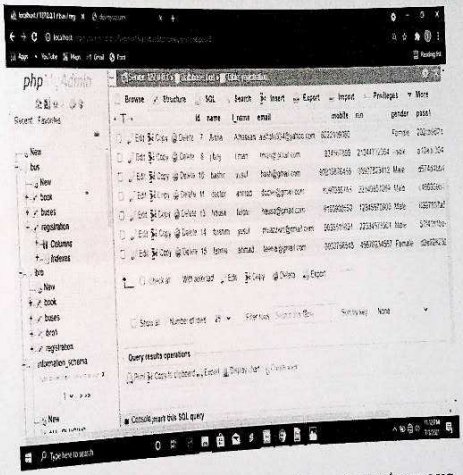


Figure 4.8 Database List of Registered customers

4.9 Strength and weakness of the proposed system

The major strength of the system is that, its ease of use in which customer having non-technical background could also use the system. The interface for registration is quite simple and if customer forgot his/her password can easily get it back by clicking forgotten password.

The major weakness of the system is that, when customer booked for ticket, no option provides for customer to cancel the ticket. Custom can only login after registration and customer cannot reserve ticket for more than five passengers at a time. Customers can not choose seat for themselves as the seat is given to each customer automatically after payment and also customer has to book for a ticket two days before travelling.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOOMENDATION

5.1 SUMMARY

Automated bus booking system is the creation of online Bus Booking system by users where a customer can access the system to book a ticket using online bus booking system, paying the tickets. The proposed of the online bus Booking system is going to handle the processed of registering of users, booking tickets, making payment using valid debit card and rating drivers base on their performance, etc. so I decided to introduced the online system that will solve the problem of manual system.it is been clearly that a customer must register with the motor parks (i.e. ultra-modern park) before he/she will allow to processed. The current system its problems and solutions to the problems were clearly reviewed in chapter one of the project. Also the proposed system and its benefits were reviewed in chapter two. methodology and tools needed to develop the proposed system were considered in chapter three of the project. In chapter four analysis, discussion of result, implementation, test data, test log and user designed interface was discussed. Finally, chapter five describes the summary of the project, concludes the project and then recommend it for use in the company.

5.2 CONCLUSION

Nowadays, Bus agencies are taking important role in transportation. And to make a ticket reliable they need a strong system that will make the ticket easier, faster and safer. This project designed to meet the requirements of a bus booking system. It has been developed in HTML, CSS, JAVASCRIPT, PHP and Database has been built using MYSQL. By using this application, the company can provide Booking services and information to their customers without the limitation of the office hours. Not only does it let customers to book a trips around the clock of location with an internet connection but it is designed for use by the company to internally manage their business processes; minimizing human errors and overcoming difficulties and problems occur in the previous system.

5.3 RECOMMENDATION

This project is recommended for use only in Jigawa, Kano, Kaduna and Abuja. It can be modified when an additional and more enhance requirements of the customers is discovered in order to accommodate the changes in the future.

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APPENDIX

SOFTWARE SOURCE CODE

```
<?php
session_start();
?>
<!DOCTYPE html>
<html>
<head>
<meta charset="UTF-8">
<meta name="author" content="Monu Lakshkar">
<meta name="viewport" content="width=device-width,
initial-scale=1.0">
<title>Admin Portal!</title>
<link rel="shortcut icon" href="image/favicon.png">
<link rel="stylesheet" type="text/css" href="css/style.css">
<link rel="stylesheet" type="text/css" href="css/cimg.css">
<link rel="stylesheet" type="text/css" href="css/reg.css">
<link rel="stylesheet" type="text/css"
href="css/contact.css">
<link rel="stylesheet" type="text/css"
href="css/animation.css">
</head>
```

```
<body class="body">

<?php
require('setup.php');
?>

<di00v class="main">
<div id="main">

</div>
</div>

<footer class="footer">
<div>
<img src="image/fb.png" alt="Facebook">
<img src="image/twt.png" alt="Twitter">
<img src="image/yt.png" alt="Youtube">
<img src="image/insta.png" alt="Instagram">
</div>
<div><div>
Copyrights &copy; 2021; All rights reserved.
```