CHRISTIAN SERVICE UNIVERSITY COLLEGE

DEPARTMENT OF COMPUTER SCIENCE

CITY WEBSITE FOR INFORMATION GUIDE

(SMARTCITY-KUMASI)

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DEDICATION

This work is dedicated, first of all, to my sovereign ruler, Allah Almighty who gave us the ability, strength and wisdom throughout my academic studies to bring out such a project.

To Him I say, blessed is your Holy Name Amen.

Our second dedication also goes to our parents for their unfading love, supervision and support throughout out four years study.

Lastly, I dedicate this project to all lecturers of computer science department of Christian service university college who contributed immensely to my academic development to making this project come into existence, I say, thank you and Allah richly bless you.

ABSTRACT

If you are desirous to give a web based platform to your city to be showcased for all it has in terms of unique business, places, jobs, bus routes, emergency information, historical places, static and dynamic maps provided city over view, political and social information, things to do, secure registration of users, Smart City is a web-based product used to store the details of particular city and helps all the users who just visits our website. This site also provides all the services like Hotel booking for tourists, Ticket booking, Transport facility providing, business related information, marketing details, city news, shopping detail. The website contains the complete information about particular city like places to be visited. Site maps route maps, Business environment, and information about organization that provide transport, Hospitality and total history of the city. This website can be used by any person who is having general knowledge about internet. All the users will be first considered as anonymous user later if he needs any service then he will be treated as registered user. This system provides a registration form for all who wants to get the services. This can be categorized based on the type of users. It provides different registration forms for different categories. In case of students if they need to download any material or to get information about college institutions, In case of businessmen to get the information about any kind of business, In case of tourists to get the hospitality facilities etc.

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CHAPTER ONE

INTRODUCTION

1.1 INTRODUCTION

City Guide is essential whenever we are visiting a particular city. It gives us the valuable information about the city and saves time. You can search a city for its prominent places, and can get social and political information of the city, city culture, security, entertainment, Business, Hotels and so on.

This site also provides direction for services like Hotel booking for tourists, Ticket booking, Transport facility providing, business related information, marketing details, city news, shopping detail. The website contains essential information about particular city like places to be visited, site maps, Business environment, information about organization that provide transport, hospitality and total history of the city. This website can be used by any person who is having general knowledge about internet.

1.2 BACKGROUND STUDY

As defined by Wikipedia, smart city is an emerging conceptual view of a city that promotes the use of information and communication technologies to engage with citizens to develop social capital and intellectual capital, to make better use of hard infrastructure, reduce usage of environmental capital and support smart grow.

In this age of technology, visitors still have to ask natives or individual information concerning activities, places, business, schools, tourist centers, political history route to places in major cities in the whole of Ghana. Tourist upon visiting cities in Ghana has to go to the palaces to listen commentary on the history of the town, heroes and heroines, as well as the reigns of chiefs.

1.3 SYSTEM ANALYSIS.

1.3.1 Purpose of the project.

The project provides services regarding to city political, historical, conventional places, bus routes, and business companies profile. Smart city is a web-based product used to store the details of particular city and helps all the users who just visits our website. This site also provides all the services like Hotel booking for tourists, Ticket booking, Transport facility providing, business related information, marketing details, city news, shopping detail. The website contains the complete information about particular city like places to be visited, site maps route maps, Business environment, Job portal, information about organization that provide transport, Hospitality and total history of the city. This website can be used by any person who is having general knowledge about internet. All the users will be first considered as anonymous user later if he needs any service then he will be treated as registered user.

It facilitate communication between users, experts and general public through mail. This will definitely help the users for the purpose of saving their valuable time which cannot be got back which is also economically viable. This system provides a registration form for all who wants to get the services. This can be categorized based on the type of users. It provides different registration forms for different categories. In case of students if they need to download any material or to get information about online library/In case of businessmen to get the information about any kind of business/In case of tourists to get the hospitality facilities and so on.

1.3.2 Problem Statement

Still in this century of technological advancement, people visiting a particular city need to gather information from the persons staying in the city or take the help of front-desk guide in the city.

In gathering of all this information you need to visit the city and these possess a lot of time and pre-planning; going for help desk, contacting individuals and so on.

The project provides additional services to the registered user. The development of this new system contains the following activities, which try to automate the entire process keeping in the view of database integration approach.

User Friendliness is provided in the application with various controls provided by system Rich User Interface, the system makes the overall project management much easier and flexible, it can be accessed over the Intranet.

1.3.3 Justification

In this era of global economic challenges, people trying to access simple information still have to spend extra both in cash and time, *Smartcity-Kumasi* will help business, students, tourist as well as the general public in finding cheap and reliable information concerning Kumasi in Ashanti region such as: Knowing the exact location of one school and the shortest route will help to manage cost of transportation for the poor student especially the first visit to Kumasi, business oriented information will also help the business populace to ascertain the kind of business currently appreciating in the city and as platform to advertise new products, showcasing the rich culture of the city, tourist will love to visit Kumasi with a clear city map to aid them and with pre-knowledge of the centers to visit also less stressful to visit.

These all combined makes the city smart: less physical effort, incorporating the use of the internet in information finding for people as well as showcasing the rich culture of the city to the whole world.

1.4 LIMITATION AND DELIMITATION

1.4.1 Limitations

We went out to find out the challenges that most people encounter in Ghana concerning finding information on: education, city history, tourist centres, hotels, location of banks, business history and so on but we had a little response from these entities due to the anticipated   limitation which included; questions not being properly answered by most individuals services, its either they didn't have enough time due to the nature of their work or they were reluctant to give information, Use of *Smartcity-Kumasi*   may cause certain problems such as danger of hacking personal information such as name, address and account. Despite these issues the study will ensue to treat in the firmest assurance the data and information collected as an academic exercise and also due to limited time constraint and availability of funds the study actually selected Kumasi.

1.4.2 Delimitation.

I had an interview with some students, tourist as well as the business populace who are already using the internet in finding information and also locating places, and they gave me information based on what i wanted. I observed that most of them don not get what they wanted.

My project combine all the major daily activities within a city as well as places, history, political, business and so on of the city.

The site does not have live map of the city but a static map showing the entire city.

1.5 REQUIREMENT ANALYSIS

1.5.1 Purpose

Smart City is website used to provide information regarding the particular city that includes city-map, history-social, political, business news and other services for registered users.

1.5.2 Scope

- It can be accessed by unlimited number of users.

- Each user will be assigned a different set of permissions for each module of the system.

- The user can have access to all the information in the site with limited services and provide extra services to registered users.

- Confirmation of end user identity and will verify which users are authorized to receive Support. Maintain history of each customer and their related Maintain history of each customer and their related information.

- Only registered members will be provided with communication between user, experts and general public through mails.

- Administrator is created in the system already.

- The administrator has to generate daily/weekly/Monthly reports, of the business and political news of the city.

- This site is best designed to be useful through internet to people of different places.

1.5.3 Users of the System

- Tourists, students, Businessmen
- Industrialists, Entrepreneur, Organizations academicians etc.

1.6 RESEARCH OBJECTIVES

- Gather information on areas of interest in Kumasi metropolis with ease.

- The system will serve as means which people locate secure and shortest bus route to places.

- The proposed system improves the difficulties students find in locating specific areas of schools basically in Kumasi.

- Putting the local culture on the globe with colourful indigenous pictures, visuals and sounds.

1.7 SPECIFIC REQUIREMENTS

1.7.1 Functional Requirements:

- Complete-map of the city with key markets and places to see marked-preferably usage of static map.

- Complete history of the city-social, political.

- Complete overview of the Businesses in the city.

- Complete Search/site map of the entire city for easy access.

- Local news, government notices, current updates of the city.

- Facilitate communication between user, experts and general public through mails.

- Non-Functional Requirements:

- 24/7 availability

- Better component design to get better performance at peak time

- Flexible service based architecture will be highly desirable for future extension.

1.7.2 User Interface Requirements.

- Professional look and feel

- Use of CSS at least with all registration forms

- Browser testing and support for IE, Chrome, Mozilla, and Fire fox, Opera mini.

- Methodology.

1.8 TOOLS

Php.

Hypertext Preprocessor (PHP) is a widely used general purpose scripting language that is suited for web development and we will use it to connect the web application to the Database.

Html.

Hypertext Markup language is a standardized system for tagging text files to achieve font, colours, graphic and hyperlink effects on World Wide Web pages.

JavaScript.

An object-oriented computer programming language commonly used to create interactive effects within web browsers.

Mysql.

For the database definition.

Photoshop.

CS3 for some of the button and banners.

1.9 METHODOLOGY

The development of the *Smartcity-Kumasi* platform entails operational findings. *Smartcity-Kumasi* will come up with necessary requirements such as system and relational objectives. The facts and findings acquired will help in the total development of the system. The development of the system will involve system analysis, system design, system construction and engineering, system testing and implementation thus the waterfall model.

CHAPTER TWO

A REVIEW OF LITERATURE

2.1 INTRODUCTION

The application of modern information technology in tourism, education, information and so on dominated so far by the use of Internet websites and search engines, gives competitive advantage to tourist companies, schools, general companies as well as the general business world. However, the potential competitive advantage can be transformed into real advantage if only the websites have proper design. As a result, the design of separate websites for companies, schools, cities and so on has received substantial attention by stakeholders as well as the general world of business and information finders.

Aggregating all the above information in one design platform or a directly platform to reduce stakeholders stress in information findings, Washburn, Sindhu, Balaouras, Dines, Hayes & Nelson (2009) concept to put activities such as: history, political history, tourist centers, and directions to schools of cities on one design platform emerged.

The concept is known smart city which is a conceptual view of a city aimed at promoting the use of information and communication technologies to engage with citizens to develop social capital and intellectual and to support smart growth, Zygiaris, (2013).

Also, a smart city is one that has digital technology embedded across all city functions.

My concept *Smarcity-Kumasi*, is a basic one aimed at aggregating activities in Kumasi so as to narrow wideness in finding pieces of information concerning major functions in the city by designing a website that aggregate or directs individual to: hotels, schools, banks, health centers, emergency lines as well as city map, city history, political history and the likes.

2.2 ROADMAP TO WEBSITE DEIGN

The development of electronic computers by Atanasoff (1984) spark the invention of internet for data communication, Kahn, Leiner, Cerf, Clark, Kleinrock, Lynch & Wolff (1997) invention of Transmission Control Protocol (TCP) which moves data on the modern Internet and Shadbolt & Berners-Lee (2008) also recognised due to their effort in the invention of the web and website design.

Shadbolt & Berners-Lee (2008) first web design was only text based and from there, Web design encompasses many different skills and disciplines in the production and maintenance of websites. The different areas of web design include web graphic design; interface; authoring, including standardized code and proprietary software; user experience design; and search engine optimization. Often many individuals will work in teams covering different aspects of the design process, although some designers will cover them all. The term web design is normally used to describe the design process relating to the front-end (client side) design of a website including writing mark up. Web design partially overlaps web engineering in the broader scope of web development. Web designers are expected to have an awareness of usability and if their role involves creating markup then they are also expected to be up to date with web accessibility guidelines.

Although web design has a fairly recent history, it can be linked to other areas such as graphic design. However web design can also be seen from a technological standpoint. It has become a large part of people's everyday lives

2.3 QUALITY OF WEBSITE

According to Jeong & Gregoire (2003) concept which indicate that information completeness and clarity are important determinant of website quality and Maier (2012) analyzed Swiss hotel web-sites over different criteria and concluded that static information have a limited transactional functions, therefore the quality of a website is measured by its dynamism.

Further, Taylor (2006) show that, it is not the interface or the hardware technology used for the system development that makes the web-site high quality but how it fits into the business arena. In other words the profit or benefit your site can add to the client's business. Therefore, understanding the flow of client's business during systems analysis helps developing a good website.

Elsenpeter & Velte (2001) also stated that, the quality of a website is also influenced by how information flows swiftly and not getting stuck in any network clogs. They argued that though the bandwidth may not be enough, the tools or technology should be able to ensure speed and efficiency which may actually cause customers and potential customers to repeat their visits.

Jeong & Lambert (2001) discuss the role of website quality in attracting online bookings and empirically test their proposed model with potential lodging customers. The authors indicated that information completeness and ease of use are important determinants of website quality.

2.4 RELATED RESEARCH AREAS

The study of networks has received significant interest from researchers in various domains such as psychology, philosophy, education, and lately computer science particularly in the field of artificial intelligence. This section defines what we mean by networks, the way in which networks form and evolve in our daily lives, and their relations to the success to daily activities.

Computer Science typically, institutions use a range of various educational approaches in the classroom, tutorial, lab and lecture hall. Activities can take place face to face, but may also be mediated by networking technologies include similar solved questions, topic information, and video tutorials. Course designers have been quick to spot such opportunities by way of additional course knowledge Enhancement Avenue. The efficiency and effectiveness of such approaches are necessarily the subject of evaluation, analysis and debate. The study of networks within a learning domain encompasses the processes of social learning that occurs when self-selective research.

Education has expanded past local resources and brings information from vast library of knowledge Duttweiler, (1982). According to Science Daily (June 20, 2008), the researchers at the University of Minnesota came with discovery out of social networking sites and went further in suggesting the necessity of the enrichment of emerging ideas about what it means to be a good digital citizen and leader through the use of the online networks. Despite the application of formal pedagogical practices used in the education sector and especially in universities, we cannot ignore the contributions of informal learning. Young people have now more choices over what, how, and with whom they learn in a wide range of settings: classrooms, after school programs, home-school, formal online learning programs, and web- enabled spaces that dominate popular culture Greenhow (2011).

CHAPTER THREE

METHODOLOGY

3.1 INTRODUCTION

Methodology is the systematic, theoretical analysis of the methods applied to a field of study, or the theoretical analysis of the body of methods and principles associated with a branch of knowledge. It encompasses concepts such as paradigm, theoretical model, phases and quantitative or qualitative techniques, Okeke & Sunday (2014). A software development methodology or system development methodology in software engineering is a framework that is used to structure, plan, and control the process of developing an information system, Zachman (1987).

A software life cycle is the series of identifiable stages that a software product undergoes during its lifetime. A software lifecycle model is a descriptive and diagrammatic representation of the software life cycle. A life cycle model represents all the activities required to make a software product transit through its lifecycle phase and also captures the order in which these activities are to be taken.

In the project, Waterfall model was used. The waterfall model is a sequential design process, often used in software development processes, in which progress is seen as flowing steadily downwards (like a waterfall) through the phases of Conception, Initiation, Analysis, Design, Construction, Testing, Production/Implementation, and Maintenance.

3.2 WATERFALL MODEL.

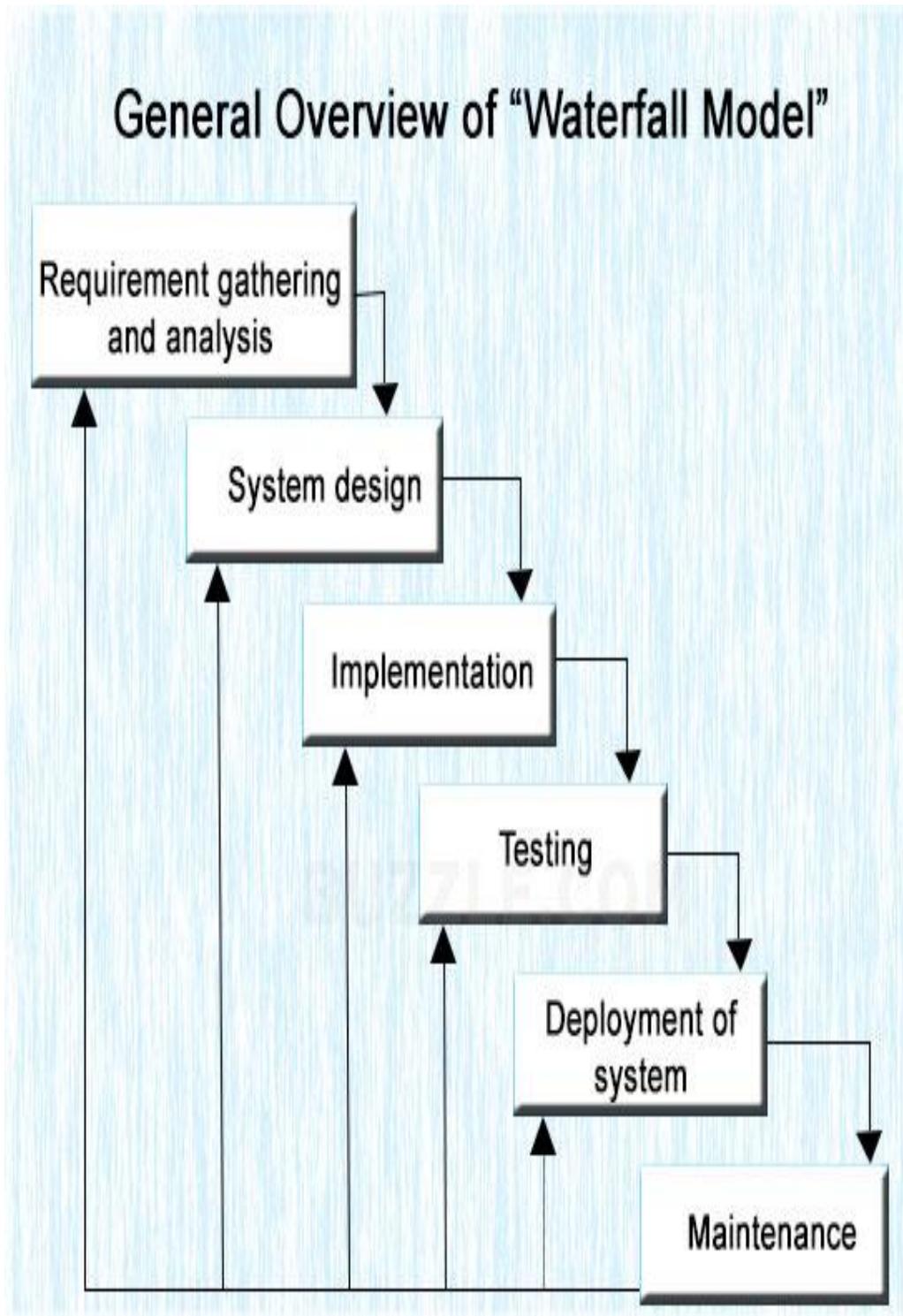
General Overview of "Waterfall Model"

Requirement gathering and analysis

System design

Implementation

Testing

Deployment of system

Maintenance

Figure 3.1Waterfall model

STAGES OF THE WATERFALL MODEL EXPLAINED IN RELATION TO THE PROJECT.

3.2.1 Requirement analysis and definition.

All possible requirements of the system to be developed are stated in this phase. Requirements are a set of functions and constraints that the end user expects from the system. The requirements are gathered from the end user, and are analyzed for their validity and the possibility of incorporating them. Finally, a requirement specification document is created which serves the purpose of a guideline for the next phase of the model.

The aim of this phase to the project is to determine whether it would be financially and technically feasible to develop the smart city. This phase is also to understand the exact requirement of the Customer and to document them properly.

3.2.2 System and software design.

Before starting the actual coding phase, it is highly important to understand the requirements of the end user and also have an idea of how the end product should look like. The requirement specifications from the first phase are studied here, and a system design is prepared. The design helps in specifying hardware and system requirements, and also helps in defining the overall system architecture. The system design specifications serve as an input for the next phase of the model.

The goal of this phase to the project is to transform the requirement specification into a structure that is suitable for implementation.

3.2.3 Implementation and unit testing.

On receiving system design documents, the work is divided into modules/units and actual coding starts. The system is first elaborated into small programs called units, which are integrated in the

next phase. Each unit is developed and tested for its functionality; this is referred to as unit testing. Unit testing mainly verifies if the modules/units meet their specifications.

During this phase the design is implemented. Initially small modules are tested in isolation from the rest of the software product.

3.2.4 Integration and system testing.

The units are now integrated to form a complete system during the integration phase and tested to check if all modules/units coordinate with each other and the system as a whole behaves as per the specifications. After successfully testing the software, it is delivered to the customer.

All units of smart city are integrated and then tested together. The units include PHP, MySQL and WAMP sever

3.2.5 Installation and deployment.

The software is now applied by the customer to his/her own system(s). What the customer needs to take care of is his own system complying with the minimum system requirements of the software. He also needs to take care of any system configurations and reconfigurations on his side of the deal. Once the software is properly installed, he will begin communication with the dealers on a need-to-know basis, and help report any bugs that occur.

3.2.6 Operations & maintenance.

This phase of the model is virtually never-ending. Generally, problems with the system (which are not found during the development cycle) come up after its practical use starts, so the issues related to the system are solved after its deployment. Not all the problems come into picture

directly, but they arise from time to time and need to be solved; hence this process is referred to as maintenance, even though it is still pretty much in the testing phase.

The phases always occur in this order and do not overlap.

3.3 HARDWARE REQUIREMENTS

The computer system hosting the proposed software should have the basic components of any computer system (keyboard, mouse, system unit and monitor). In addition, it should have the following requirements

- A minimum of 512MB of RAM recommended.

- Intel^R processor Pentium III 900MHz or equivalent or higher.

- Minimum: 1.6GHz CPU, 384MB RAM,1024x789 display,5400 RPM hard disk

- Recommended: 2.2 GHz or higher CPU, 1024 MB or more RAM, 1280x1024 display, 7200 RPM or higher disk

3.4 SOFTWARE REQUIREMENTS

The computer system hosting the proposed software should be running preferably on Windows XP Service Pack 2 or above (for 2010 release, Service Pack 3), Windows Server 2003 Service Pack 1 or above, Windows Server 2003 R2 or above. The host computer should have MySQL Server or WAMP server installed as this would be the database server to be used.

3.5 PROGRAMMING LANGUAGES USED

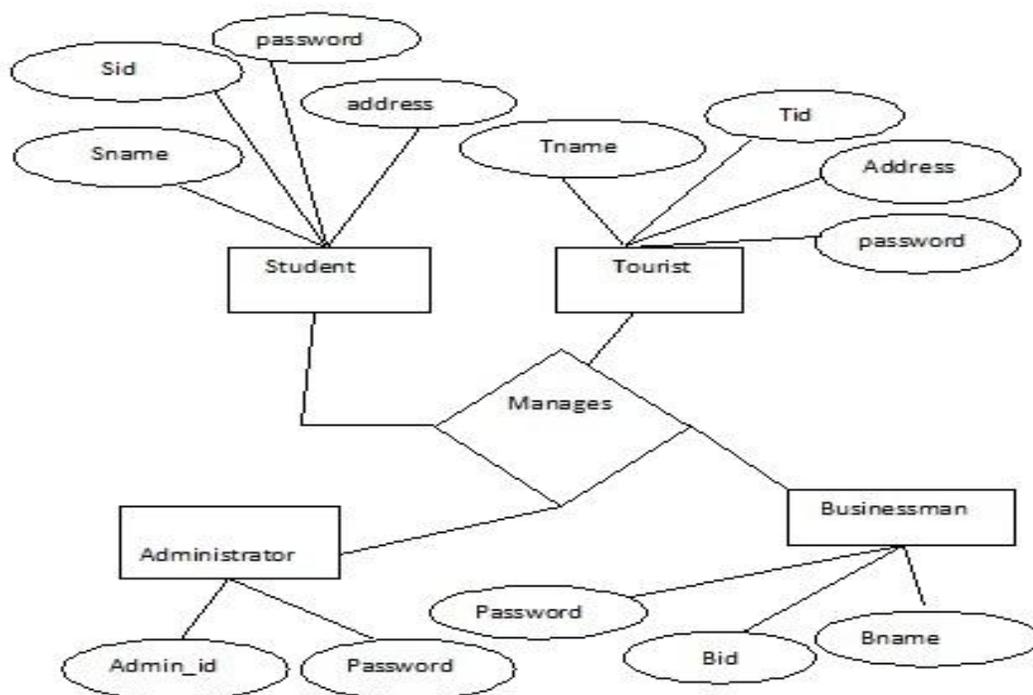The programming languages used for the *Smart City* were;

Front End

- Html, (hypertext mark-up language),

- Php,(hypertext pre-processor)

- Photoshop.

  Back End:

- Mysql.

- Wamp Server.

3.6 SYSTEM DESIGN

6: E-R Diagram

CHAPTER FOUR

SYSTEM TESTING

4.1 INTRODUCTION

According to Beizer (2003), "the thinking that must be done to create a useful test can discover and eliminate bugs before they are coded – indeed, test-design thinking can discover and eliminate bugs at every stage in the creation of software, from conception to specification, to design, coding and the rest". Testing is thus a system activity that guarantees its functional credibility and as such confirms its reliability on conversion.

4.2 TESTING METHODS

The testing methods employed are;

- Unit Testing

- System Testing

- White-Box Testing

- Black-Box Testing

4.2.1 Unit testing

This involves testing of individual software components or modules. Unit testing is typically done by the programmer and not by testers, as it requires details knowledge of the internal program design and code. May requires developing test drive modules or test harnesses.

4.2.2 System Testing

This is testing conducted on a complete, integrated system to evaluate the system's compliance with its specified requirements. System testing falls within the scope of black box testing, and as such, should require no knowledge of the inner design of the code or logic.

4.2.3 White box testing.

This testing is based on knowledge of the internal logic of an application's code. Internal software and code working should be known for this type of testing. Tests are based on coverage of code statements, branches, paths, conditions.

4.2.4 Black box testing.

Internal system design is not considered in this type of testing. Tests are based on requirements and functionality.

A test plan was also devised for the testing process.

4.3 TEST PLAN

Test plan involve the definition of a strategy and framework required in order to perform program testing on the system. In the devising of a test plan for this system, reference were made of the following features about the system;

- The program is a multiple function system driven by user choice.

- It is a graphic system with most of its functions based on queries and the use of select and click command buttons.

- The program was constructed using piecemeal coding strategy.

- Most of the completed function features of the system underwent prototyping.

An inference could be drawn from the above-stated references that the system was tested continuously during its development using the unit testing approach. Designing most features of the system through prototyping and queries and developing the system through piecemeal and ordered strategies helped to eliminate most of the *bugs* which were mainly syntax and *logical* errors. The plan that was devised for later testing therefore focused on carrying out an in depth testing on the system to highlight areas where tighter controls were required to make the software more. Two techniques were used;

- White Box Testing which checked that the details of the codes are correct.

- Black box testing which checked the correctness of the results given for specific inputs.

4.3.1 White Box Testing.

White box testing was used to check executed code. It looked at the following areas:

- The functionality of the whole system.

- The functionality of each form, query and macro.

- The functionality of each piece of code held in different expressions properties.

- Confirmation of the correct data in query results.

- Data entry for list and combo boxes.

- Error handling.

By testing each code manually, errors identified were corrected. Sometimes a re-run of the tests were necessary to ensure that modification were successful. The strategy used for this are;

- Branch coverage

- Statement coverage

- Boundary Value coverage

- All Path coverage

4.3.2 Black Box Testing

Black box testing was the final form of testing used to test the functionality of the system. The approach involved users and enabled constructive suggestions to be made of unidentified errors. The following were used:

- Boundary value

- Input of valid data

- Input of invalid data

CHAPTER FIVE

IMPLEMENTATION OF THE SYSTEM

5.1 INTRODUCTION

"System implementation is the task of realizing a fully developed system as a practical system, working to the satisfaction of its users" (Zhang Ping, System Analysis and Design, 1998). It is an important phase in any project activity. This chapter will therefore present an outline of this activity particularly with regard to this project.

5.2 IMPLEMENTING THE SYSTEM

The proposed system had been tested by the users as standalone system. Because of the regular prototype delivered to the users. It was achieved through testing and recommendation.
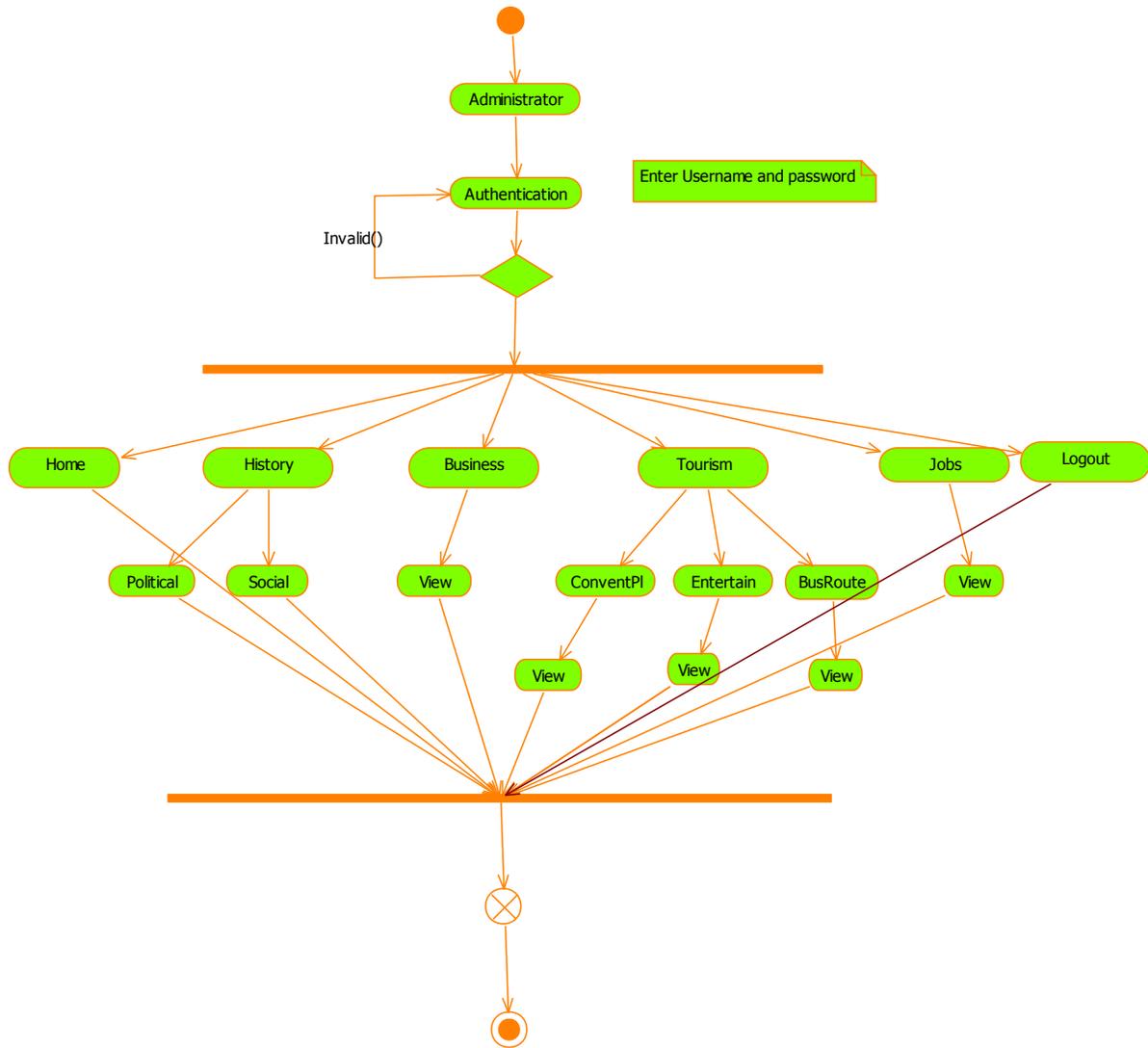
Figure 5.2: User Activity Diagram.

Column Name	Data Type	Size	Accept Null Value	Unique
LOGINID	VARCHAR2	40	YES	NO
BIRTHDATE	DATE	7	YES	NO
CITY	VARCHAR2	40	YES	NO
STATE	VARCHAR2	40	YES	NO
COUNTRY	VARCHAR2	40	YES	NO
EMAIL	VARCHAR2	40	YES	NO

Figure 5.2: Database Table.

The Figure 5.3 shows a Graphic User Interface with unprotected services and services that require user *USERID* and *PASSWORD* to access. New people will be required to *sign up* which can be located below the sign in field and corresponds to a form below the page as shown in Figure 5.4 below.
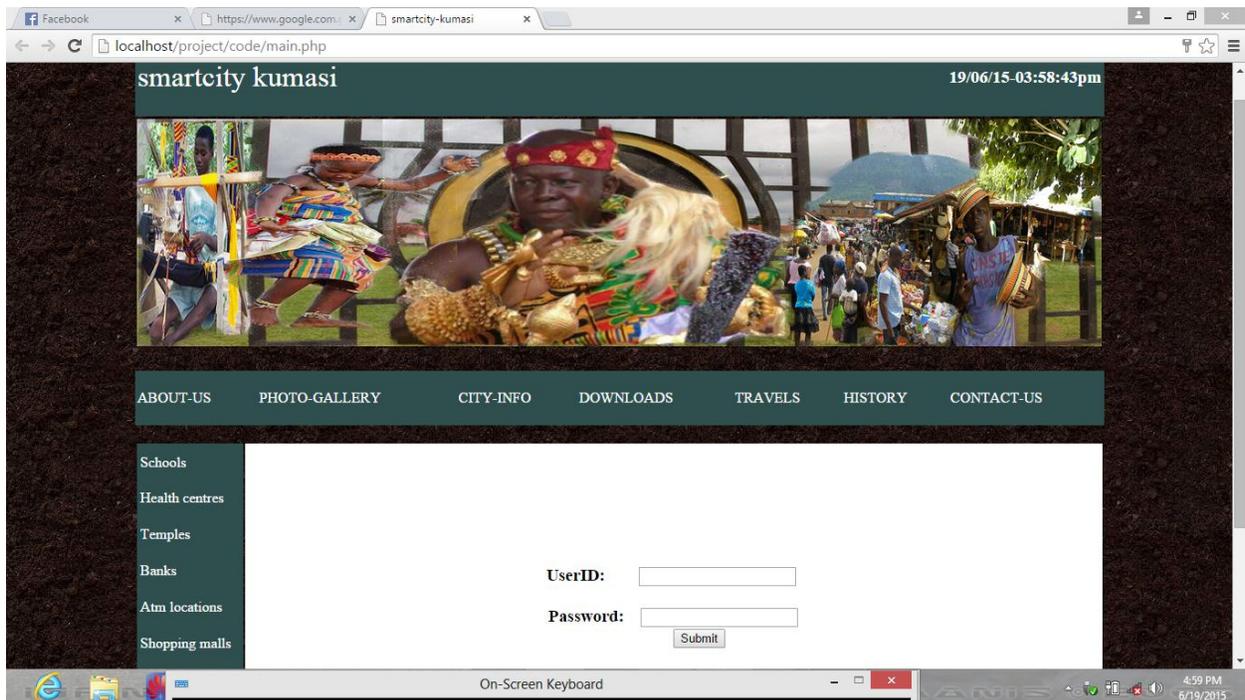

Figure 5.3: Homepage of the system.

Description: The home page provides the necessary information that is accessed by the user and provides login form and registration form for registration. The information in the home is open to all the users of the system.
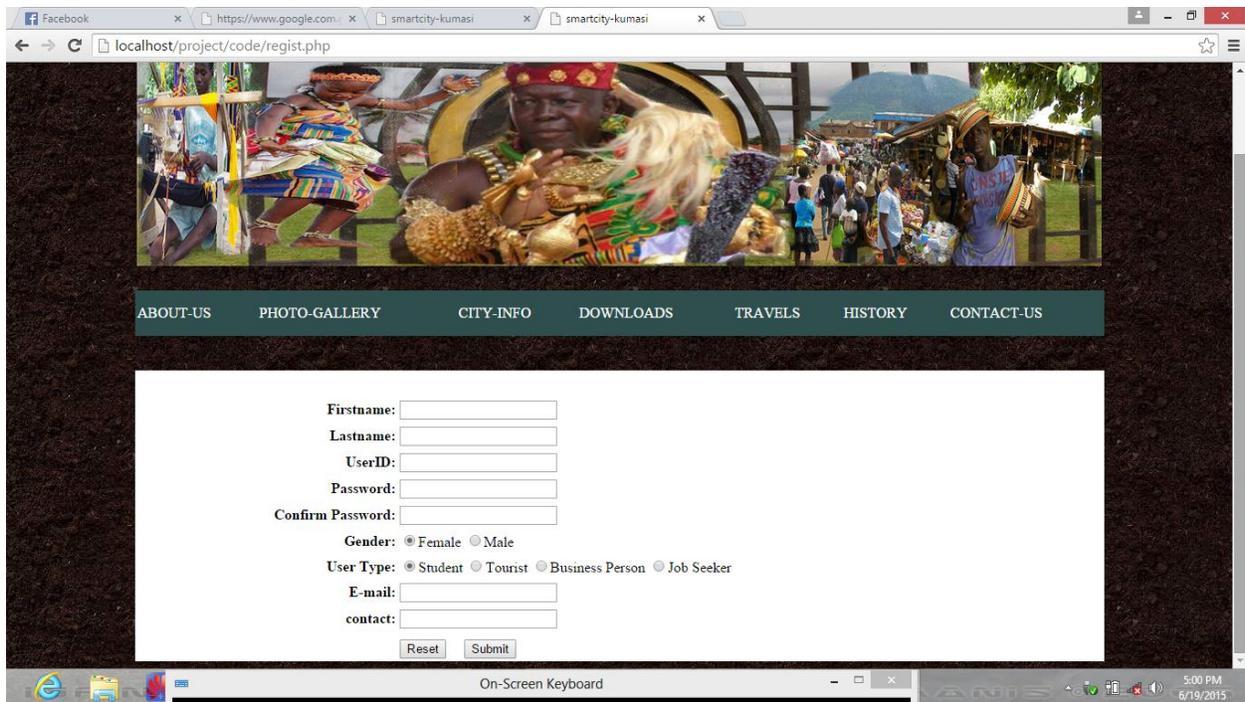
Figure 5.4: User registration page.

Description: The registration page helps the user to register in order to possess the various services offered by the site .The various users of the system are tourist, businessman, student, jobseeker and administrator.
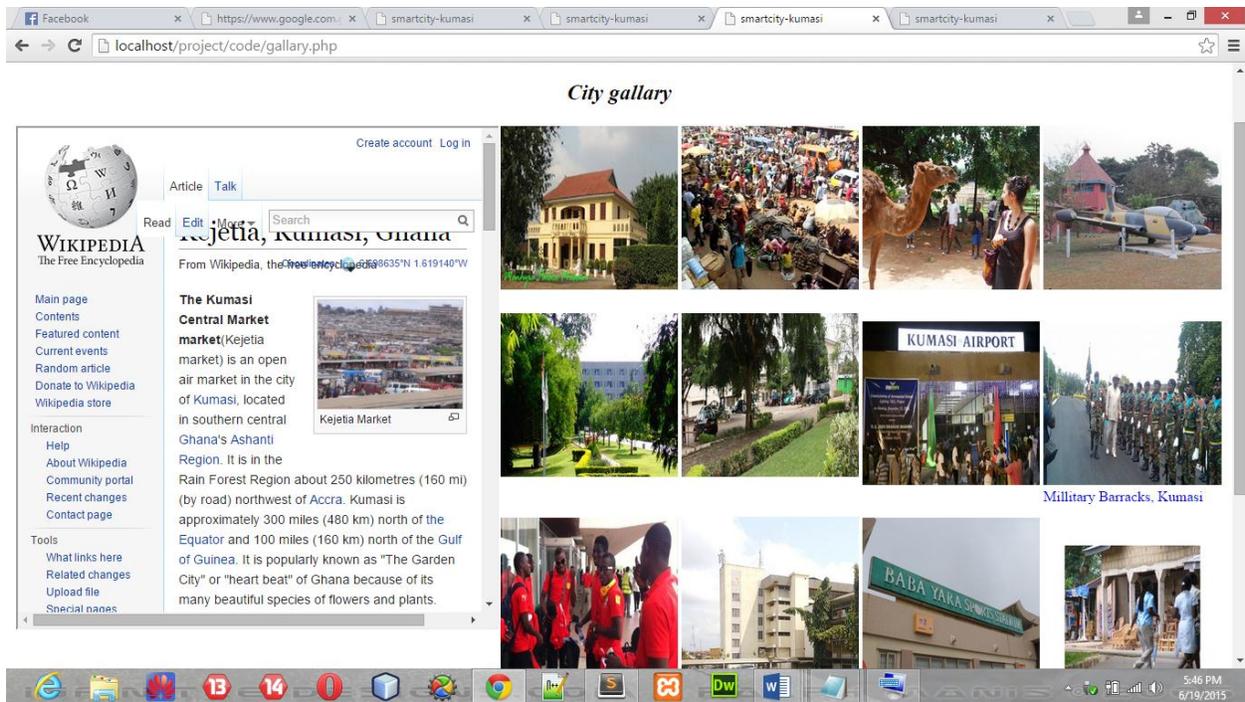
Figure 5.5: City gallery page.

Description: The gallery in the city and photogenic view of the city is provided in page. The page displays the city history by directing to Wikipedia or any site with information of key places in the city .The historical prominence of the city can be viewed. The updates are based on the directed sites.
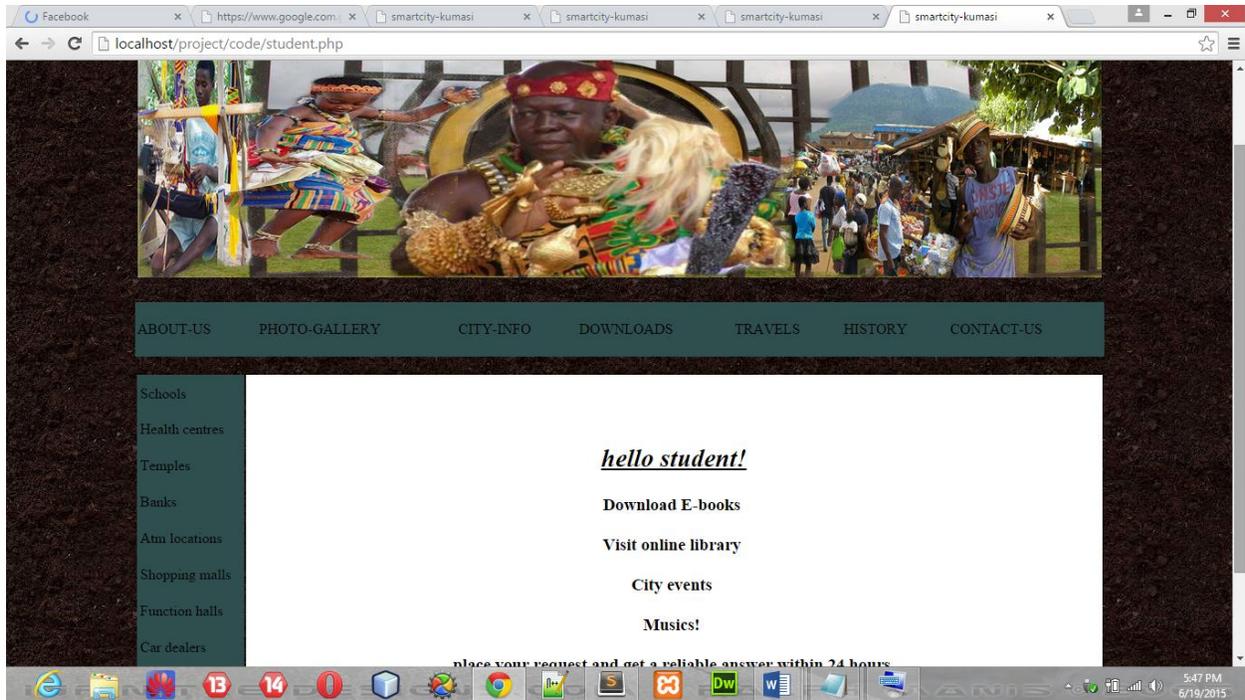
Figure 5.6: Students page for registered users.

Description: The User who is registered as a student and login with his ID and PASSWORD will be provides with various downloaded services and can access other city information. Every user will be provided with various services.

5.3 EVALUATING THE SYSTEM

After meeting all the requirement of users, the aim of the project has been achieved. The system met its main aim and objective of improving effective and efficiency of access of information about Kumasi in most key aspect of the city and to improve the relationship among stakeholders of the system. Security of the system has been taken care of, with regard to users and administration.

CHAPTER SIX

CONCLUSION AND RECOMMENDATION

6.1 INTRODUCTION

This chapter will present a summation of discussion on the project undertaken, answer the question whether or not *smartcity-Kumasi has* achieved its aim and finally make recommendations. This project has utilized the use of methodical approach to developing a site which was aimed at enhancing information finding in Kumasi metropolis. While it may not have been implemented to enable a full valuation of its impact on the city, there is one thing it has achieved for sure – its aim. In meeting this aim strict adherence to the scope and perimeters of the study were made. Keen attention was also given to particular issues that were brought to light as the project proceeded.

6.2 CONCLUSION

The main conclusions drawn from this report are;

- The analysis of the current system brought to light the shortcomings of the current system which confirmed the observations made by the administrators on the discordance of the system in maintaining increasing information finding in Kumasi.

- Prototyping allowed increased users involvement and thus ensured their influence in the customization of the system. It also inculcated a sense of ownership which raised the awareness of IS abilities.

- For security purposes users were allowed to register to be authenticated and given authorized access to selected services in the system.

- The issue of implementation which encompasses technique as well as climatic consideration remains an important phase for the use of the database.

6.3 RECOMMENDATION

The following are recommendations offered as a direct result of this project. They also forms the second basis of the second phase of the system development.

- The system management must observe the requirement of the Data Protection Act.

- Live MAP option can be implemented.

- New features can be added to meet some specific tasks.

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