CREATING A GRAPHICAL GAZETTEER

Master in information Technology (Business)

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Declaration

I, Mohamed Eshaftri, confirm that this work submitted for assessment is my own and is expressed in my own words. Any uses made within it of the words of other authors in any form e.g., ideas, equations, figures, text, tables, programs, etc are properly acknowledged. A list of references employed is included.

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Abstract

This dissertation, entitled "Creating a Graphical Gazetteer", is the result of the author's work on facilitating the sharing of user’s information using web-based applications. The study is essentially two-fold: the first part is theoretical in nature and includes a detailed review of the literature on the subject of web-based applications. It then summarizes the techniques and methods that are often used to create web map applications, and proposes some new insights into the subject. The second part describes in detail the process of developing an exemplary web-based application that can be demonstrated in practice.

The structure of this document is as follows: the first chapter presents an outline of the main objectives and expected outcomes of this work. Then, the subjects of web-based applications and the targets for creating a Graphical Gazetteer are discussed in order to give the reader the appropriate context. The second chapter presents a Literature Review concerning web-based applications. Chapters Three and Four explore various techniques and methodologies commonly used for designing software systems and efficiently organizing the development process, outlining in detail the final design of the system that this work centres upon. Chapter Five details the methodologies used for testing whether the behaviour of the system meets the desired outcomes, and contributes a user-driven evaluation of the software by means of a survey conducted among students of the university.

Finally, Chapter Six describes the author's own evaluation of the whole process of developing this web-based application. It shows that the main goals were essentially met, and is characterized by extensibility for possible future feature additions. This chapter is rounded off with the sharing of several thoughts on the possibilities of extending the system, and on
implementing new features that the author finds lacking in most web-based applications on the market.
Dedication and acknowledgements

I would like to dedicate this Master dissertation to my father, Mr. Ahmed Eshafti. There is no doubt in my mind that without his continued support and counsel I could not have completed this process and my mother for her prayer.

I would like to acknowledge my supervisor, Professor Brian Palmer, Department of Computing School of Mathematical and Computer Sciences Heriot-Watt University, whose encouragement, supervision and support from the preliminary to the concluding level enabled me to develop an understanding of the project.

Lastly, I offer my regards and blessings to all of those who supported me in any respect during the completion of the project.

Mohamed Eshafti
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Chapter 1 – Introduction

1.1 Objectives and desired outcomes of this project

The project is the creation of a graphical gazetteer that will allow users to interact with its maps and provide their own information, feedback, and ratings for destinations and businesses around the world. The goal of the project is to provide users with a graphical, interactive application that will allow them to interact with other travellers so that they can easily share information as a way of learning about interesting places to visit. This concept is an important one because travel-based websites have become highly prominent on the internet over the past few years. Websites such as Expedia and Travelocity furnish travellers with reams of useful information and allow them to provide feedback on their experiences. However, what is missing on the internet is an easy to use graphical gazetteer which does not limit its users to travel destinations believed to be important by just one single company.

Instead, the proposed graphical gazetteer will incorporate the entire world. Users who travel to the least populated parts of the globe as well as those who travel to major metropolitan areas will enjoy equal capacity to provide information for others to use to plan their trips and seek out interesting things to see and do during their travels. What also makes this project so important and worthwhile is that the website will be very easy to use. Rather than having a cumbersome layout, the interactive web-based application will be as straightforward as hovering a mouse arrow over a graphical globe and selecting a location. Furthermore, providing feedback about a location will be made as simple as finding it on a globe and adding feedback to one of several categories, such as restaurants, hotels, tourist destinations, and nightclubs.

Unlike all those similar-looking websites out there, such as Google Maps and Google Earth, the graphical gazetteer’s interactive use will exist solely for the purpose of providing
information and feedback for travellers. The site will be created for the needs of people who travel on a frequent basis. This will apply to not only the content of the site, but also to the speed and efficiency of the site. The interactive web-mapping application created will operate quickly so that travellers can find information regardless of whether they are at home planning a trip or sitting in an airport between flights.

1.2 The importance of web-based applications

Web-mapping provides users with views of the road and streets using mapping applications like Google Maps, which grants the user complete control of the map in terms of zooming in and zooming out using the mouse and keyboard. Most importantly, the user’s freedom to add data to the map is accommodated.

These are some useful websites using mapping applications:

1.2.1 www.onNYturf.com
This site is a wonderful concept - the user can view any by making a selection by using the map.

1.2.2 www.trulla.com
These sites include a huge amount of information presented in an orderly, logical and connected fashion, allowing users to gain an idea about how to live. The integration of maps is amazing and provides not only an aerial view of almost any house, much like Google Maps, but also a perspective view of it from any angle. One of the most striking features is the concept of Zillow.com. Zestimates: This permits you to estimate the value of a house. One can enter one's own neighbourhood, find out the approximate market price of not only your home but all your neighbours’! In fact, an
aerial view of all the homes is listed with corresponding price estimates determined by a multitude of variables.

1.2.3 www.ikimapia.org
This website involves a world map and allows access to any region in the world. You can see everything in a city, from its neighbourhoods to its facilities. In some places, more work is needed to help users to find the smallest details. The site is very user-friendly and consists of a map of the world and the four buttons: ‘Approximation’, ‘Retracts’, ‘Move Right’ and ‘Move Left’. There are options for the site feature the work note to a specific location Wikimapia. The ‘Add New Place’ option gives users the opportunity to define a new city or region and write what he/she wants about it. The browser one uses affects how quickly users are able to view the site.

The purpose of this report is to provide an overview of the project being planned, as well as background information on the tools and technologies to be used. Furthermore, this document will provide a timeline of the project in terms of how it will be carried out. The professional, legal, and ethical issues related to the project will also be examined. Upon completion, a full plan will exist for implementing the project in question and carrying it through to final completion. This report will conclude with a discussion of the issues that have been raised, a review of the information and recommendations for ensuring that the project is truly completed in the schedule given in a way that will make it a successful endeavour with regards to attracting users over the internet.
Chapter 2 – Literature Review
The purpose of this literature review is to examine the information that is available on the various sub-topics that are important to this project. Information about interactive internet-based applications, tools and technologies of internet applications, and data management and database technology are examined. The importance of this literature review is that it will provide valuable insight into concerns or problems that may need to be addressed in the project plan and the consideration of ethical and legal concerns that will underlie the work that is to be performed. In addition, the literature review provides a means of examining the important concepts and technologies related to this project.

2.1.1 Web-Based Applications
It is important to recognize that as the internet and internet technologies have changed, web applications have increasing become the standard for how information and business is transacted online. The internet is no longer simply a set of static web pages that provide information to users, which as the case at one time. Instead, web applications allow for interactivity between developers and users, and between users who have the ability to create content and provide feedback on the content created by others (Bailey 106). In essence, web-based applications not only have the ability to allow for interaction, but they also have the ability to allow for the creation of networks of people who share similar hobbies or interests. This is certainly important for the creation of the graphical gazetteer because the desire is to create a network of world travelers who want to be able to influence other travelers with their knowledge of destinations.

As users have come to demand more interactivity on the internet and to be part of the creation of content, it has been that site developers and programmers also have to do more work than was once required. The creation of web-based applications involves more than
just the coding of a web page. Instead, it involves the interaction between a web site, an application, and various servers and databases where information is stored (Huang and Mak 51).

In fact, web-based applications may actually be one layer of several tiers of interactions between web servers, databases and end users as information is sent and received between various groups of people. The upper most tier of a web-based application might consist of the actual web browser and application. Then, there may be a second tier that consists of a server that is able to handle the information sent and received between the users of the web-based application and the databases that store the data. The databases might make up the third tier of the entire process because they store the information and send it to the server when access to the information is requested (Huang & Mak 51). Figure 1 shows the concept of tiers of web-based architecture.

Figure 1 Tiers of Web-Based Architecture (Huang & Mak 51)
This issue of different levels of architecture between servers and applications is important because it demonstrates that in order for web-based applications to truly perform as desired, there must be different layers of technology and equipment behind what might appear to be a relatively simple web application. This is particularly true if a large-scale project is being created, such as the graphical gazetteer that is being planned. Without a strong foundation of equipment and technology, a web application with a large number of users around the world could quickly find itself unable to process the information requests and new information that are being added by users. Even worse, it is quite possible that the web application might not function as quickly or efficiently as has been planned and advertised to users (Suh 78).

In fact, the issue of usability is something that should be of concern with any web-based project because it is an idea that often means different things to different people. It has been noted that there is really no agreed-upon definition of usability, particularly when in relation to what users of internet-based applications expect from different types of web sites and services (Johnson 183). There are certain factors, however, that can influence how users interpret the usability of a web-based application. Factors such as the motivation to interact with the application and input information, as well as the level of arousal that users feel to continue to use a web-based application for the purposes for which it has been designed are important (Johnson 184).

For developers of web-based applications, and for the development of the graphical gazetteer at the heart of this project, the ability to motivate users to take part in the interactive experience and the ability to arouse them to become involved is often related to the appearance of the application and the type of content that is provided. The benefit of web-based applications is that they can provide content related to areas of the world or groups of
people that might otherwise be overlooked (OECD 258). What this means is that the web based application underlying the graphical gazetteer needs to both look good and be easy to use, as well as truly put people from around the world in charge of adding and using content. The focus should not only be on large cities or certain countries. Instead, it must be an application that brings all types of people together regardless of whether they live in a small town or a large city.

The literature that has been reviewed with regards to internet-based applications has demonstrated that the task of creating and operating an internet-based application is about more than just the programming of the application. Instead, it is about motivating people to use the application and to take part in its features. Even more, there is a great deal of technology that must function properly in order to make an internet-based application usable for people and make them feel as though they are able to interact in an efficient manner. Otherwise, it is quite possible that even the best idea for a web-based application that provides the greatest promise for bringing people and information together will not attract an audience.

2.1.2 Tools and Technologies

There are several technologies that are expected to be the foundation for the creation of the graphical gazetteer. Beyond the relatively standard web-based HTML language for the web sites, one of the important technologies will be JavaScript API. It is important to understand that JavaScript API is much more than what some people may understand as Java that can be used within web pages to create applications. Instead, JavaScript API is really much closer to the C programming language as it shares a similar syntax with the C programming language. The benefit of Javascript API is that it allows information on static web pages to be updated. Information and data can be updated automatically from a variety
of sources and databases and put into web pages to create interactive applications for users (Smith, Liguori and Finegan 362).

However, beyond the JavaScript API, other technology is needed in order to make web applications truly interactive. One of the problems that exists with JavaScript is that it requires information to be sent to a server or database and then a response to be returned to a web page. In this process, a page must be reloaded for the new information to be seen by the user. This creates a lack of continuity for users and also takes away from the overall appearance and usability of a site. This is where another technology is needed. For the graphical Gazetteer and many other web-based applications, the technology that is used is known as AJAX (Elleithy 495).

AJAX is a programming language that allows for information to be sent and received in web-based applications without the need for page reloads and other delays. Through the interaction of objects on a web page and with a web server, information can be changed and updated without any page reload occurring. Even more, AJAX allows for web-based applications to be created that provide more functionality and faster functionality for users. AJAX allows for interactive charts to be updated immediately based on the data that are added by users or other sources (Elleithy 495).

AJAX is used by most of the interactive applications that are available on the internet. For example, most of the popular Google online applications use AJAX in some form. Google Maps relies heavily on AJAX to quickly retrieve maps that are requested by users, and even to update maps when users add their own photos and other information to the Google databases (Eliassen and Montresor 138). For users of Google Maps, AJAX has allowed for a truly interactive experience in which they feel that they have access to an endless supply of satellite data and maps. This is an important example because the project
in question might be best compared to Google Maps with the exception of relying much more heavily on user input of data, feedback, and information about various places around the world.

Of course, it has already been stated that a web-based application must have a user interface that is actually easy to use and motivates users to interact with others. JavaScript and API are only the programming languages that allow for information to be sent and received as quickly and efficiently as possible. On top of these programming languages must be a graphical user interface that can interact with the programming and make functionality easy for users. This is where another technology known as Dreamweaver is needed.

Dreamweaver is a development environment that allows for applications to be created for web sites. The development environment contained within Dreamweaver allows for a variety of interactions between users and web databases and servers to occur. For example, forms can be created to allow information to be inputted by users and then validated and sent to a web server or database. The development environment also has tools for helping to create web applications that have the greatest level of functionality possible by taking into account the layout and schema of the databases (Liberty, Hurwitz and MacDonald xiii).

The issue of the layout of the databases that are used as part of a web-based application is important because it can determine the speed with which data is stored and retrieved, as well as the overall experience for users. A web-based application such as the one being designed for the graphical gazetteer can involve many layers of individual databases, graphical information, and quantity of information being sent and received on a constant basis. If the schema that is developed for the flow of information is not as efficient as possible, the experience of the user is likely to be one of frustration. Even more, it is
possible that information could become lost within the process of transmission or simply not stored in a way that will allow it to be retrieved (Liu and XU 2001).

Even with the use of JavaScript API, and Visual Studio, there is another technology that will be vital to ensuring the proper retrieval and storage of information for the graphical Gazetteer. The technology in question is known as MySQL, which is a database management system (Sloot 635). MySQL has become quite popular because it is an open-source technology. This means that individuals and businesses around the world can freely download and use MySQL without having to buy the software or paying yearly fees for its use. Even more, because of the use of MySQL by large companies, such as Google, NASA, and even the Associated Press, it is constantly being updated with new features and improved for usage (Pruski and Knops 495).

The true benefit of MySQL is that it allows multiple users to connect to multiple databases at the same time. Even more, database management can be handled using a variety of graphic interfaces. This makes the management of the databases easier for the administrators of a web site. The management tools are also designed to work with a variety of other programming languages to bring the programming of content, actions, and actual usability all together in an efficient way (Pruski and Knops 495-496).

Figure 1 demonstrates an example of what is being discussed. In this example, the end user is inputting information and requesting information via a web site. The requests are sent to the server. As the requests are processed, information contained in the MySQL databases are then processed and retrieved as necessary. All of this can occur because the MySQL can be integrated as part of the larger architecture of the web-based application. For the end user, the result is the ability to share and retrieve information in a seamless environment (Sloot 637).
Overall, the discussion and information that is available on the tools and techniques for handling the data related to a project such as the graphical gazetteer might seem less like a review of literature and more like a review of programming languages and development environments. However, this information is important because it shows the full range of tools and technologies that are necessary to make a project such as this possible. It is not simply a matter of being able to use a single programming language, or even having a single development environment. Instead, a variety of tools are necessary not simply to make the project functional, but to make it something that users will want to be part of and to which they will want to contribute information. Without using all of the tools that have been
presented, this project would likely not have the full range of functionality and ease of use that would be possible.

2.1.3 Data Management

The issue of data management was mentioned briefly in the discussion of Visual Studio. However, it deserves much more attention because the way in which databases are constructed and share information is an important part of creating a web-based application that function efficiently for users. Data management involves more than just creating a series of databases and hoping that they can communicate with each other. Instead, it involves planning the layout for how information will be sent to the databases and retrieved from them as quickly as possible and without the loss of data. This requires creating a database schema which is a layout for the type of data that each database will hold, as well as how information will be transmitted between the databases. By creating a database schema, it is possible to separate the levels of information that will be handled. Even more, it is possible to plan for the interface that will be needed to send and retrieve information from each of the databases (Merialdo, Atzeni and Mecca 49). Figure 3 shows the actual physical layout that might be used for a web system and the associated network of databases.

![Figure 3 Physical Structure of Server and Databases (Liu and XU 253)](image-url)
In many respects, implementing the actual technology and programming as part of database management is relatively easy. It is the actual planning that requires a great deal of work and must not be overlooked in the creation of intensive web-based applications. The planning stage of database management by seem somewhat boring, particularly for programmers who would rather get into the creation of the application and the actions that will occur. However, the planning stage can prevent needless work from being performed as a project progresses. By creating a model of the database layout and structure that will be used, it is possible to play how the flow of data will occur, as well as how that flow of information will impact the end user of the web-based application in question (Fraternali 234). Figure 4 shows an example schema of a database layout.
Once again, the real issue in managing the databases for a web-based application is really about the planning of how they should be implemented and how the databases will compliment the other areas of the project. For the graphical gazetteer, there are likely to be a large number of databases that will be used to manage the large amounts of data that will be part of the web site. Planning must occur to take into account the information that will be part of the initial application, as well as the information that will be added by users as the application becomes more popular.

Figure 4  Example Schema of Databases and Information Exchange (Merialdo, Atzeni and Mecca 59)
At the same time, the databases must handle the unique types of data that will be part of this project. For example, the graphical gazetteer will allow people to view maps, input information about places that are important to them, and provide feedback on the information provided by other users. All of this will require databases that can store a large amount of information and quickly allow it to be retrieved. It is not simply a matter of having a large number of databases. Instead, it is a matter of having the number of databases that are necessary for the project at hand and organized in the most efficient way possible.

2.1.4 Web Development

One of the things that should not be overlooked, but would be easy to do so, is the process of web development in terms of the creation of the web pages that will be the foundation for the graphical gazetteer. The development of web pages with hyper-text markup language can be performed with a variety of tools. Simple HTML can actually be written using nothing more than a text editor. However, for more in-depth work, there are software packages that can automate some of the more mundane tasks associated with web page development and creation. Some of the more advanced software packages can allow for easy linking of web pages and management of different areas of a web site based on pages that are related to each other (Fraternali 256).

While this might seem like information that would be common sense to a person that is accustomed to working on web projects, it is worth mentioning because it once again shows the large range of applications and tools that are available for this type of project. For the graphical gazetteer to progression from its initial design to final implementation, the correct tools must be selected for the job at hand. It is not simply a matter of choosing the applications that are easily available to the programmers and having them begin the work. Instead, it is really a matter of effective project management skills to ensure that all members
of the design and programming teams are working together so that their individual parts of the project will come together as a single application.

2.1.5 Project Management

Project management is an issue that might actually seem irrelevant to a discussion of the issues and information related to the tools and technology that will be used for this project. However, the final part of this literature review deserves some attention, even briefly, to the issue of project management. The creation of any web-based application, particularly one that has many parts and will require several months of work, is about bringing people together and overseeing them in a way that will motivate them to work together and act as a single, cohesive unit (Huang & Mak 46). The process of selecting the technologies that will be the foundation for the graphical gazetteer, the design and layout of the database structure, and the management of programming is something that cannot be ignored for what might be considered the fun part of actually creating the application and writing the code.

The project development lifecycle, which is shown in figure 5, is something that members of a web-based application project should understand. The first part of the life cycle involves understanding the requirements of the project and what is expected upon completion. Then, the project moves to the design stage, which is where the actual design of the project occurs in relation to the requirements that have been established. Next, the construct stage is where the actual programming and coding takes place. Finally, the operate stage is where the application is put into actual usage and ongoing activities are performed to ensure that the application continues to be useful (Verzuh 24-25).
It is important to note that within each of the four main stages of the project life cycle that there can be smaller stages in the life cycle process. As figure 6 shows, each stage can be sub-divided into the four stages of define, plan, execute, and close-out. The define stage is where the needs and goals of that particular stage in the life cycle are defined, followed by the plan step that involves actually planning how the goals of that particular stage will be met. Then the execute step is the actual process of completing the work involved with the goals that have been established for that stage of the product lifecycle. Finally, the close out step is actually a transitional point from one stage of the product lifecycle to the next. This is where a review of the work that has been performed occurs and preparation for the beginning of the next stage begins.
2.1.6 Conclusion of Literature Review

In total, the information that has been reviewed has encompassed a large area with regards to tools, technologies, database management, and even project management. However, all of this information is important because it raises issues and concerns that must be addressed in terms of professional, legal, and ethical issues about how the creation of the graphical gazetteer will be carried out. These issues must also be addressed with the creation of the project plan. As the literature has demonstrated, all of these issues and areas of concern work together to determine the overall level of usability and success of the creation of a web-based application, or the lack of success that could otherwise occur. If these issues are ignored, then there is a greater likelihood for problems to arise and for the project to not be completed as desired. There is also a greater likelihood for users to not want to use the graphical gazetteer to share information and interact with other travelers.
2.2.1 Professional, Legal, and Ethical Issues

In planning for the creation of the graphical gazetteer, there are a number of professional, legal, and ethical issues that must be considered. The first issue that must be considered is whether the development of the graphical gazetteer will infringe on the copyrights or patents of other companies that have similar technologies and applications. Before any work begins, a thorough examination of this project in relation to the applications that already exist will have to be conducted. If there are any concerns at all that the copyrights or patents of another company might be infringed, then changes will need to be made in the way in which this project is carried out with regards to the design and implementation of the web-based mapping system.

In addition, every effort must be taken to ensure that none of the actual programming code from other similar web projects are used in any way in this project. This would immediately incur a charge of copyright or patent infringement, and would certainly result in the project causing more problems than the benefits that would be obtained from using the programming of another company’s web-based application. Even more, every effort must be taken to ensure that the programmers who work on this project are not involved in any conflicts of interest with other companies in terms of knowledge that they might have about another company’s web-based mapping system. These concerns are valid given the fact that companies protect the coding associated with their applications very seriously and any appearance of the theft of code or the misuse of information would result in the project being canceled.

The legal issue of the use of the applications and development environments to create the graphical gazetteer are also important. Some of the technologies that are being used such as MySQL are open-source. However, other environments, such as Visual Studio are
proprietary. The tools that are being used need to be check with regards to any legal restrictions that might exist in terms of their usage with the creation of a commercial application. It is not expected that this will be a problem, but a simple examination will ensure that the project begins without any legal issues that must later be resolved.

From a professional standpoint, the people who work on the project simply need to understand their role within the project, as well as their ownership of the project. It is important that the people who work on the project understand that they will be employees and will not have any ownership in the final application. They will certainly receive credit for their work, but this will not entitle them to any type of royalties beyond the compensation that they are provided for working on the project. In addition, as employees on the project, the final application can be used in any way that is desired by the owner without their permission.

From an ethical standpoint, there are several issues that need to be addressed before the project begins. The first issue that must be addressed is the concern about the information that is provided by users. The site is designed for users to provide their feedback about destinations and businesses. However, there is a very fine line between user opinions and defamation. Efforts will have to be undertaken to allow for content to be checked to ensure that local businesses or individuals are not being unnecessary harmed through the reviews that are provided.

Even more, the application and databases will likely need to be created with the ability to filter out certain words that would be considered offensive, racist, bigoted, or simply vulgar. Attempting to make these decisions on an individual basis would take too much time once the application is in use. Instead, the application will need to be written to not allow certain works to be used on the site. However, this does raise the ethical issue of
preventing users from being completely open and honest in the information and feedback that they provide. What this means is that control of language will have to be tempered with the desire for users to be honest.

It is likely that this will require a great deal of testing to determine how certain interventions to prevent specific words from being used would prevent actual use of the application. The testing will need to be conducted to ensure that users who use the graphical gazetteer as it is intended will not feel that they are prevented from being honest in their information and evaluations. At the same time, testing of the application will have to check for any ability that users might have to circumvent the protections that are put into place. If these efforts are not taken seriously, it is possible that not only will users become upset, but it could also create a legal issue of inappropriate comments are regularly posted on the site that are deemed vulgar in nature.

Another important ethical issue concerns truly making the web site available to as many people as possible must be addressed. Many of the travel sites that exist seem to cater to predominately English speaking people. If the graphical gazetteer is truly designed for people who travel around the world, then it would seem appropriate to allow the site to be available to people who speak a variety of languages. The question that this raises is which languages to select as the predominate languages on the web site. If the application is to be created for the largest number of people possible, then languages will need to be chosen that encompass large areas of the world. The gazetteer will not expand to the largest number of people possible if only English and French or Spanish are chosen as the “official” languages of the site.

Overall, by addressing these professional, legal, and ethical issues before any actual work is performed, it will be possible to administer the project and to prevent delays that
might occur if these problems have to be addressed during the actual creation of the application. It will also be possible to better plan for the goals and requirements of the project before any coding or implementation actually occurs.

2.2.2 Conclusion and Discussion

The purpose of this document has been to create a project plan for the creation and implementation of a graphical gazetteer that is targeted at travelers to allow them to provide information and opinions about destinations and businesses around the world in a web-based graphical format. The information that has been presented in this report has demonstrated that there are many issues related to technology, ethics, and even the law that must be considered. From a technological standpoint, the creation of the graphical gazetteer is not something that can be quickly created using a single programming environment. Instead, a variety of programming languages, such as JavaScript and API, along with HTML for the creation of the basic web pages are required.

In addition, databases must be created and managed through the use of MySQL so that data can be quickly stored and retrieved based on the needs of the users. On top of all of this, a graphical interface must be created so that users can access a web-based application that is easy to use and actually motivates them to want to use the graphical gazetteer in an ongoing manner. Otherwise, if the actual user interface is not easy to use and efficient, it is likely that users will not be motivated and have the arousal that they need to actually want to take part and add their own information and insight for other travelers around the world.

Overall, the information that has been reviewed and the plan that has been put into place for completing the project seem realistic. The literature that was reviewed suggested several areas of concern with regards to actually creating schemas for database layout and design, and for planning the layout of the web site on which the web-based application will
sit. These issues have been handled in the project plan. Time has been allocated according to the project life cycle to ensure that project team members actually design how they will tackle the programming of the web-mapping system in a way that meets the goals and requirements that have been established.

However, there are certain issues that have been raised in this report that deserve reiteration and special consideration as the project is carried out. First, there are ethical issues related to the ability of people to provide honest assessments of locations and destinations as opposed to the need to try and limit the use of vulgar or bigoted language on the web site. This does present ethical concerns because if the efforts to control vulgar or bigoted language go too far, then people might simply stop using the web-based application. On the other hand, if too little effort is made to try and stop vulgar or bigoted language, then people might view the web site as not carrying about these issues. It could also result in potential legal issues based on the argument that the language that is being used on the site is defaming local businesses without any effort to stop those actions.

While this issue may not be directly related to the information technology of the project, it does become an IT issue when considerations must be made for the functionality of the application that will attempt to automate oversight of user information to avoid the need for people to manually check each review or suggestion that is posted. The programmers of the project must implement a monitoring system that will prevent certain types of words from being used, as well as a system that can provide easy access to read comments and feedback that users post to the graphical gazetteer. In addition, all of this has to be performed in a way that does not limit or slow the functionality of the application. In the end, the ethical issue of language moves from simply an ethical consideration to an information technology consideration as part of the larger functionality of the project.
Once all of these issues are addressed and the final web-based mapping application is implemented, the project does not have to be considered completely over. Instead, it is worth considering how the initial application that is constructed could actually be used for future projects. One of the recommendations that could be made with regards to this project is actually making the web-based mapping application available to other companies and web sites to use in relation to the needs of their users. For example, a news web site could use the web-based mapping application as a way to allow users provide information about stories that they believe are important, or even breaking news events that they witness. The application could be used to allow users to upload photos and videos of news events.

In addition, the web-based mapping application could allow news web sites to post their news stories not as simple text links, but as icons on a map of the locations in which they are occurring. This would make it possible for people to graphically read the news based on location preferences and proximity to other events. It could also be possible for the web-based mapping application to be used to allow users to pinpoint problems with traffic, power outages during storms, or even reports of hail and severe winds during weather events.

From the standpoint of news and information, the web-based mapping application could be a foundation for many different types of uses. There is truly no need to limit the way in which it is used. At the same time, there is no need to try and limit the use of the basic application to only news and information web sites. Another use for the application could be for companies that want their employees to check in when they are out in the field. For example, companies that have salespeople in the field could use the web-based mapping application for their salespeople to post pictures of the businesses or homes that they have visited to meet with clients.
The application could also be used by utility companies to advise customers of the location of outages that are occurring and when it is expected that the outages will be fixed. Once again, it is about providing a graphical means by which important information can be presented to a group of people for analysis and examination. The web-based application makes it possible for users to actually see the information that is presented to them without needing to read a great deal of information and try and imagine the locations that are being discussed.

It is certainly true that other applications that are similar to the one that is planned exist, but many of those applications are largely one-way in nature. They are intended to provide information to users without the ability of users to take an active role in the content that is provided. It seems appropriate that there should be a truly interactive web-based mapping application that puts users in charge of the content that is available to them. In addition, it is not only the web-based mapping application that is important, the type of functionality that is included for those that might use it, regardless of the actual use, is what is important. This mapping application will have the functionality and the ability to connect to databases to allow information to become truly interactive.

On a larger scale, this project also suggests that there are many areas of the internet in which a graphical presentation of information could be much more effective than a simple description of content or information that is available for consumption. The simple act of showing locations in relationship to the information that is being presented can be enough to make it easier to understand. This can also provide people with a greater level of motivation to actually become involved with an on-going discussion and provide their own unique opinions and insights.
In the end, as was indicated in the literature, it is truly the ability to motivate users to get involved and use an application that is important. With the information that has been examined and the level of consideration that has gone into the planning of this web-based mapping application, it is believed that people will indeed be motivated to use it and to become actively involved in an extended discussion about travel destinations and their opinions about the best businesses and locations to visit in cities around the world.
Chapter 3 – System Design

Research was conducted into geographical maps as they relate to the application of the net and how easy the sharing of data between users can be. It is necessary to establish a clear set of requirements and specifications before proceeding. The final design of the application is presented in three sections:

1- The requirements analysis and specifications.

2- The design of the database.

3- The design of the user interface.

3.1 Requirements analysis

That the system provides the user with the opportunity to add data to maps is a great advantage. The purpose of this application is to provide services to two different actors: the first is the system administrator who should be able to conveniently manage the site, and the second is the user who should be able to add data to the site with ease.

1- The administrator's site.

2- The user's site.

3.1.1 The administrator's site
The specific requirements for each sub-application will be presented here with the help of use case diagrams. The administrator should be able to perform the following actions:
- Securely log into the application.
- Ensure that the web servers, hardware and software are operating accurately.
- Design the website and generate and revise web pages,
- View the details of a user.
- Delete a user and any related records from the database.

**Figure 7  Administrator's use case diagram**

### 3.1.2 User's site
The user should be able to perform the following actions:

- Securely log into the application,
- Add a mark and information to the map.
- View marks and information put on the map by other users.
The above requirements can be depicted with the following use case diagram.

![User's use case diagram](image_url)

**Figure 8 User's use case diagram**

### 3.1.3 Web navigation diagrams and flow diagrams

It is important in software design to use diagrams showing the stages of the program’s process. This is a useful method in which one can see all the stages in the development of the program and recognize mistakes that must be corrected. The following diagrams are of a web navigation nature. The flow chart diagrams show in detail the flow of the process and the logic of logging into the application.
Figure 9  The login process flow chart
4.1 Database design

One of the most important aspects of designing a software application creating the correct database to store and retrieve data without duplication or loss of data, which can sometimes result in having to re-design the database at a later stage.

The web designer must make decisions regarding how best to model a system in the real world with a database. This consists of deciding which tables to create, what columns they will contain, as well as the relationships between the tables. While it would be nice if this process was totally intuitive and obvious, or even better automated, this is simply not the case.

Figure 10 The login process flow chart
The benefits of a database that has been designed according to the relational model are numerous. Some of them are:

- Data entry, updates, deletions, data retrieval, summarization and reporting will be efficient.
- Since the database follows a well-formulated model, it behaves predictably.
- Since much of the information is stored in the database rather than in the application, the database is somewhat self-documenting.
- Changes to the database schema are easy to make.

Stages used in designing a database in this system will be described briefly in the remainder of this section.

The requirements analysis showed that there are two categories of users in this order: the administrator and the average user who is adding data to the maps. This means we need two structures of database for retaining information about users, such as first and last name of the user, e-mail address, country and password. Information to be stored includes the lat and lng attributes the name of the city and information about this place.

First, a user must register at the site where the data is saved in the table. Users can put marks on the maps and add information to the mark to be saved in the Map table. This allows a user to add more than a mark, field ID is a primary key in the user table. In the Map table, Field ID corresponds to a foreign key for each user, the relation between to table is one too many.
CREATE TABLE `user`
(
  `id` INT NOT NULL AUTO_INCREMENT PRIMARY KEY,
  `f_name` VARCHAR(225) NOT NULL,
  `l_name` VARCHAR(225) NOT NULL,
  `country` VARCHAR(225) NOT NULL,
  `city` VARCHAR(225) NOT NULL,
  `sex` VARCHAR(20) NOT NULL,
  `email` VARCHAR(225) NOT NULL,
  `password` VARCHAR(225) NOT NULL,
  `emailactivated` ENUM(0,1) NOT NULL
) ENGINE = MYISAM;

**Figure 11  User’s database table**

CREATE TABLE `map`
(
  `id` INT NOT NULL AUTO_INCREMENT PRIMARY KEY,
  `id_m` INT NOT NULL,
  `country` VARCHAR(225) NOT NULL,
  `city` VARCHAR(225) NOT NULL,
  `text` TEXT NOT NULL,
  `lat` FLOAT NOT NULL,
  `lng` FLOAT NOT NULL,
  `type` VARCHAR(225) NOT NULL
) ENGINE = MYISAM;

**Figure 12  Map database table**
CREATE TABLE `map` (  `id` INT NOT NULL AUTO_INCREMENT PRIMARY KEY ,  `country` VARCHAR(60) NOT NULL ,  `cit` VARCHAR(80) NOT NULL ,  `text` TEXT(80) NOT NULL ,  `lat` FLOAT(10,6) NOT NULL ,  `lng` FLOAT(10,6) NOT NULL ,  `type` VARCHAR(30) NOT NULL ) ENGINE = MYISAM ;

4.3 Web App Interface Design
Not only is a design user interface on the menus and buttons possible, but the interaction between user and application or interaction between multiple users through the device. This means that the advantages of the design for the user is not in how the format is in terms of its colour scheme or fastening buttons, but about how it works in terms of the most appropriate and user-friendly selection tools.

Before we begin to build a web application we must we must understand why a good user interface is good and aim for the qualities or characteristics of such an interface.

1. Clarity. We must avoid ambiguity at all costs and make Xi clear in terms of flow and language. The metaphors of hierarchy must work so as to guarantee fewer errors for the user.

2. Concision. We should not put everything on one screen, which makes it hard for users to search for something specific. The design and user interface must be brief and simple.

3. Familiarity. We must use familiar images and themes replicated in most existing web applications. This makes it even easier for users to understand the application for the first time.

4. Responsiveness. Two issues are important here: one, a good interface should not be sluggish in its speed and two, the interface should provide helpful feedback about whether the user’s input has been successfully processed.
5. **Consistency.** The whole application must be designed according to the same pattern, thus helping the user to navigate more effectively.

6. **Aesthetics.** Attractive colours and images are an important added touch to help users enjoy their browsing experience.

7. **Efficiency.** An efficient user interface helps users to complete the most work in the littlest time possible, and this is one of the most important advantages of technology.

8. **Forgiveness.** Some application users make mistakes such as deleting a file which should not have been deleted. The interface design should provide users with the opportunity to restore the file.

The following pictures depict the final implementation of the interface.

**4.3.1 Home page (Login)**
This page is divided into three sections

Login: allows the user to log in to his/her profile

Sign up: allows the new user to register if he/she would like to use the application

See the map: allowed the user to see the another user mark

![Figure 13 Homepage](image)
4.3.2 Administrator page

This page is allowed only for the administrator to login to this page using his username and password which he can see all the user they register to the application and he can delete any user as you in figure 15.

![Administrator page](image)

**Figure 14** Administrator page
4.3.3 Profile page
You can see in this page all the personal information and the mark of the user. There are five useful links on the Profile page: Profile, Account, Add Mark, Edit Mark, Log out.

![Profile page](image1)

**Figure 15  Profile page**

4.3.4 User’s Account
On this page, users can edit their personal information at any time they desire.

![User’s account](image2)

**Figure 16  User's account**
3.3.5 Add mark
As we can see in Figure 18, this page allows the addition of marks and information consisting of: continent, country, city, comment, and type.

3.3.6 See the map
In this page you will see all the marks that have been user-added. All this information is visible even by users who have not been registered on the application.
Chapter 4 – Implementation

This chapter focuses on information relevant to the construction phase about the creation of a graphical gazetteer application. The techniques and instruments used are discussed first. Current existing technology is an invaluable property in the first phases of any project. This will be justified, as will the possibilities for the development of this application in particular. The next section will detail a number of features of special interest for this project to discuss in depth. We will discuss the purpose of the implementation techniques, not to say the problems with them. A sample code is also offered.

4.1 Programming languages and tools used

4.1.1 General criteria for selecting technologies

Which programming languages and tools for such a responsible task must be decided on. This should be carefully pursued at the beginning of the design of each application, because using tools that are not suitable for the application will inevitably have a negative effect on the quality of the final product, the total cost and cause significant delays in the delivery of the product. More specifically, the choice of inappropriate tools affects the development of the life cycle. In this case, a chain of actions and effects occurs, for example:

- Research on the most suitable technologies and tools is required.
- Additional costs arise if the application is not open source or free.
- Editing services must be purchased or sold if not the support of new technologies (e.g. the server on which the hosting plan is purchased cannot support the new programming language).
- Training on the new tools might be needed for the developer.
- Transferring or rewriting the previous work and code might require a lot of time and effort.

- Rewriting or transferring of the previous work may have to be necessary, and the code can save time and effort.

- All of the above possibilities can cause significant delays and throw the project out of the time schedule.

- Customer dissatisfaction and disappointment may result from all of these factors.

Thus before the implementation phase of the development life cycle of this project, considerable attention and effort must be placed on the evaluation of various programming languages and the tools necessary to meet the following criteria:

To support the implementation of all technologies and functions necessary to meet the requirements and specifications suggested in the planning stages

To comply with other provisions specified by the customer. In this case, the system developed carries out its author’s bidding, and this is supposed to be an original work. Ideally, all code should be written from scratch and the use of frames, loans or code libraries are inappropriate, an exception to the open source JavaScript libraries on offer.

The author must possess the necessary skills and knowledge needed for the development of these tools. When the author is using tools he/she has never used before, the initial learning curve should be fairly quick or there will be a risk of untimely delivery.

To meet the budget for development and realization. In this case it is university-funded.
To make the application compatible with other existing technologies and services. For example, hosting provided by the University such as the Apache server and all resources required for communication with it. Any installation of software should adhere to the university’s rules and systems.

There now follows a brief description of the programming choices for this project and why they were chosen.

4.1.2 PHP
PHP language is characterized as an ideal choice for web programmers around the world. Here are some reasons why:

Easy. PHP is the easiest programming language to learn, as it dispels all the complexities of memory management and word processing in C on the one hand, and compensates for many of the vulnerabilities located in the interface and the design of the Perl programming language on the other. PHP’s language, structure and draft regulations are fixed and very clear, while C, Java and Perl do not allow you to build a programming language very easily and smoothly without losing any strength in the language. With PHP you will be at an advantage if you know anything about other programming languages such as Visual Basic, C or Java. In which case you will find that you always understand the course material quickly, and you will discover how to facilitate the most difficult things in PHP and humiliation of the obstacles faced by the programmer to devote himself completely for creativity only, all you can think you can implement it in PHP.

4.1.3 MySQL
The distinctions between language and SQL database management systems that simplify the profile for SQL are as follows:
Structured Query Language is a language used in the processing of data stored in management systems, relational databases or Relational Database Management System (RDBMS). The SQL is offered a set of commands to deal with the data to be extracted, stored, deleted or inserted.

In order for the commands to be compatible with a wider spectrum of individuals, Vtm subjugate the SQL language to deal with database management systems that fall under the criteria of the American National Institute (ANSI). This organization has established certain rules regarding dealing with different database management systems.

SQL can be used to work with database management systems as diverse as MySQL, mSQL, PostgreSQL, Oracle, Microsoft SQL Server, Access, Sybase and other such programs.

Because the language of SQL falls under the standards of ANSI, most orders and sentences of SQL are supported by those of the RDBMS, and at the same time there are some differences. With regard to new commands, I must develop the same model as my colleague and we will share certain things in common: the situation as it applies to all of these management systems and different databases. Something that was mentioned earlier and is very famous in the environment is open source MySQL. The company SUN Microsystems is currently in the process of buying MySQL AB, the company responsible for the development of the program.

As mentioned earlier with RDBMS, the database computer is nothing but a collection of tables, so the term ‘relational’ means you can store data in different tables that relate to each other in various ways.

**Why MySQL in particular:**

**Speed**

In database systems it ‘speed’ is defined as the time taken to execute a query and return the results for the querier. This is very important to the success of any database system. In this
respect, I have made MySQL perform better than most competitors, including business systems such as Microsoft SQL Server and IBM DB2. These good results are not just a coincidence, but are a result of the innovative design of the system. P-MySQL uses the structure of multi-tasking and SEO intended for complex tasks such as indexing and nodes. It is also assisted by information caches in the memory. All of this improvement came about without the need for any user-customized programming, as well as the unique feature of the conservation engines that allow you to select different variables for each table separately. Users can then mix and select different sets of features to yield the maximum possible performance from the system.

Reliability
When it comes to reliability, MySQL has an impeccable record in this area. MySQL is a database system laboratory certified for use in applications with mission-critical and high pregnancy status by the biggest corporations and institutions in the world such as NASA, HP and Yahoo. However, MySQL has its roots in the community of free sources; every issue is tested by users around the world on various operating systems and in different circumstances. Alchgl ensures they applications are problem-free before approving their use, and more than that, each new edition of MySQL must pass a set test called the ‘crash me’. The primary objective was to try to make the system collapse.

Security
Developers of MySQL have worked hard to ensure that MySQL is as safe and secure as possible. MySQL comprises a complex system of access control and system power to prevent users from accessing the database. There are five layers of hierarchical permissions that enable managers of MySQL to protect access to sensitive data and stop users from performing operations according to the rules of certain data or certain fields only. MySQL also has the capability to control the types of queries that a user can add to the database, table
Scalability and Transport
MySQL can deal with huge databases without its performance suffering because tables whose sizes are measured in gigabytes and contain hundreds of thousands of records are not rare in MySQL. The simplest example of this is the location of MySQL itself which uses data containing 50 million records that can be taken from one platform to another without any problems. MySQL is available for both systems, Unix and other Unix including Linux and Solaris, FreeBSD, OS / 2 and Mac OS X and Windows 95, 98, Me, 2000, XP, NT, and others. MySQL also works fine on a wide range of in-built processors such as Intel x86, Alpha, SPARC, PowerPC and IA64.

Ease of Use
Most commercial database systems are capable of tuning hundreds of transactions. The higher the degree of complexity, the higher the total cost to purchase the database. MySQL facilitates use and management and improves performance, while, Satrip, the primary interface is simple. There are two agents available - Rsumien on behalf of MySQL Control Centre and MySQL Administrator for users who prefer graphical interfaces, and Alman for the MySQL AB company vis a vis the use and administration of MySQL. Many applications that run in web browsers facilitate the scientific management of the MySQL database.

Compatibility with existing standards
MySQL supports the most important characteristics of the standard ANSI SQL-99, which supports such standards to all sentencing, and the expansion of ANSI to add functions, custom and types of data designed to improve portability and give users more capabilities. Alyuncod Character sets offer sound support and improve with each version.

Support for a wide range of applications
You can submit MySQL interface software to various programming languages which enables you to write database applications in the language of your choice. PHP, Java, C, C++, Perl, Python, Tcl, and others are supported. Developers can therefore enjoy a wide range of applications compatible with MySQL.

**Easy licensing policy**
MySQL is licensed under GPL, which allows users to freely download and use the application, not to say modify the source code. The free nature of MySQL has helped enhance its visibility and create a community of enthusiasts the world over - both users and developers. This community plays a vital role in putting the MySQL out ahead of its competitors, whether this is due to the level of test reliability and problem-solving or the expansion of the basic engine to keep abreast of technological and other developments.

**4.1.4 HTML / CSS**

**What is CSS?**
CSS stands for Cascading Style Sheet, a mechanism for controlling aspects of a web page such as its colours, backgrounds, fonts size, font format, line spacing and height of the elements etc etc.

**What are the advantages of CSS?**
- Separating content from design.
- Provides a lot of time for the design and editing of the pages.
- Allows better coordination of the elements.
- Reduces the size of the pages.
- Reduces the time required for the preparation of the pages.

**What is HTML?**
HTML is the language used to create web pages. (HTML is the word shortcut for Hyper Text
Markup Language). It is not a programming language in the sense of having the meaning and form of other languages such as C. For example, it does not contain control and spin clauses, and sentences must include codes from other languages such as Java, JavaScript and CGI. Furthermore, they do not require an interpreter of his own Compiler. They are not linked to a particular operating system, because their interpretation and implementation is directly instructed by the web browser, regardless of the user. So the language is very simple and easy to understand and learn. It does not require prior knowledge of programming languages and structures. All you really need is a little logical thinking and some organized ideas.

What are the advantages of HTML?

- Does not require any special programs for design, and works fine with Notepad that comes attached to Windows or WordPad.

- You can learn the language as you use it.

- Learning this language allows you to make changes to your website with ease.

- The possibility of writing in all languages easily.

- Knowing the Headstamps language allows you to conveniently add any software text from such programs as JavaScript code, JAVA, JAVA Script DHTML and Aldenmikip.

- You will learn the code that allows you to translate the texts in all languages.

- Your command of the language gives you precise control over the properties of your program and page design.

- All ready-made design programs are based on HTML and the language is the norm for such programs as Front Page.
4.1.5 JavaScript
What is JavaScript?

JavaScript is one of the most popular scripting languages on the internet and its role is to simply breathe life into web pages written in HTML. This affords designers greater control of their creations. Fmthala Nstamtha are the froms any Alnmadj or the windows that appear for the user to warn him or tell him something.

Netscape originally invented JavaScript which can work on different browsers like Navigator (company Ncetkib) and Internet Explorer (Microsoft).

Based on a JavaScript object base (use metal object window and document).

What is the role of JavaScript?

When designing web pages using HTML, traffic remains low (i.e., we can only change pages if we change the code). For example, the code would have to be changed if we wanted to demonstrate a declaration, image or colour change depending on the time, or show the name of a visitor to the web page, or check the evidence without any interference.

JavaScript allows us to make these alterations without changing the code.

What are the advantages of JavaScript?

- JavaScript does not depend on the operating system it is used on i.e. Windows, Linux.
- When you write the code, you take into account the quality of the characters because JavaScript differentiates between upper and lower case, which is different to the Var Var.
- JavaScript depends upon the object base (such as the use of the object window and document).
4.1.6 Dreamweaver
I have used the eighth edition of this software to build websites and was impressed by the way its performance transcended other programs. In addition, it has an attractive and professional editing facility that provides a suitable environment to develop web pages in a neutral way for browsers (and I mean for example, IE and NS) and various web programming languages, both those associated with the side of the browser or the supplied Client Side Server Side, Dreamweaver thus allows the professional creation of web pages. The editing facility supports HTML, XHTML, JavaScript, VBScripts, American idioms sources, and all visual applications, allowing designers to customize CSS styles and access the programming languages’ interactive websites: CF, PHP, ASP, ASP NET, JSP and others.

4.1.7 Google Maps API
Google created the Google Maps API &quot; a system to communicate with application software&quot; allowing developers to integrate Google Maps into their sites with their own data points. It is a free service and currently does not contain ads, but Google declares that it reserves the right to display ads in the future.

By using Google Maps Api, it became possible to include the entire web application Google Maps to an external site. Key developers submitted a request of the Institute, which was bound to enter the site and directory when the key was created. With Google Maps’ API key there is no longer a need for API with version 3. Creating a map with custom interface groups requires the addition of JavaScript code to the page, and then the use of JavaScript functions to add points to the map.
Chapter 5 – Evaluation
This chapter describes the testing and evaluation of the application. The aim is to determine whether the system’s vision is clear and accurate enough to help users find worthy information about places around the world using the web mapping capability.

The most important test to be conducted is that which locates errors, and the successful test is a test which reveals an error not known about before. However, tests cannot prove the absence of defects, but can prove the existence of errors.

Over the past two decades, a rich formation of modalities design test cases have evolved in software. There are two categories of design techniques for test cases: white-box testing and black-box testing.

5.1 White box testing:
This is the work test for the mechanism of the program’s engine which does not take the results or the introductions of the system into consideration. This is called the white fund on the grounds that all internal processes comprising the program can be followed up and adjusted.

5.2 Black box testing:
Is designed to make sure the results given by the program can be comparatively verified with information within the program. This test is called the black box, because we cannot see the internal workings of the program. The graphical gazetteer system was tested with black box methodologies. Some of the reasons that made black box testing after the end of the development process a necessity are as follows:

• It provided an unbiased evaluation of the system, since the processes of development and testing were separate and could be conducted by independent individuals or teams.
• It adopted the viewpoint of the user who will finally receive the end product.

Below is a description of some of the test cases used and their outcomes.

<table>
<thead>
<tr>
<th>Description</th>
<th>The administrator wants to log in to the administration web site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>Email and password passed to the login form</td>
</tr>
<tr>
<td>Success Scenario</td>
<td>Access to the administration web site</td>
</tr>
<tr>
<td>Result</td>
<td>SUCCESS</td>
</tr>
</tbody>
</table>

*Figure 7 Administrator login test case*

<table>
<thead>
<tr>
<th>Description</th>
<th>The new user wants to register with the application</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>First name, last name, email address, password</td>
</tr>
<tr>
<td>Success Scenario</td>
<td>Email will be sent to the new user to active his/her account</td>
</tr>
<tr>
<td>Result</td>
<td>SUCCESS</td>
</tr>
</tbody>
</table>

*Figure 8 User’s registration to the application test case*

<table>
<thead>
<tr>
<th>Description</th>
<th>The user wants to add a mark on the map</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input</td>
<td>Selection of the “Add Mark” menu item</td>
</tr>
<tr>
<td>Success Scenario</td>
<td>The user is redirected to a page that shows a map with the option to input information</td>
</tr>
<tr>
<td>Result</td>
<td>SUCCESS</td>
</tr>
</tbody>
</table>

*Figure 9 - User adds a mark on the map*

5.3 Evaluating the system

After the design, development and testing was complete, some students were invited to participate in evaluating the quality of the developed system. They were asked to use the system, go through its processes, locate the services on offer, and add marks and information
to the map. They were then requested to answer certain questions about their experiences with the system response. The questionnaire is included in the appendix.

- To the question, “What is your impression of the application?”, an average of 61.5% of students answered positively. This indicates that the students liked the system presented.

- To the question, “Did you find the application, easy to use?”, an average of 61.5% of students answered that the system was indeed very easy to use.

- To the question, “Do you think that external help with using the application is needed?”, an average of 53.8% of students replied that maybe external help is needed.

- To the question, “Do you think the system provides a complete set of features for the purposes of the graphical gazetteer?”, an average of 46.2% of students indicated that they thought that more features should be offered.

- To the question, “How did you find the user interface?”, an average of 61.5% of students answered that the user interface was very attractive.

- To the question, “What do you think about the flexibility of the application?”, an average of 92.3% of students stated that the application was very flexible.

- To the question, “Did you find your overall experience stimulating?”, an average of 92.3% of the students replied “Yes”.

- To the question, “Do you trust this application to keep your information confidential?”, an average of 15.4% students replied to the contrary, suggesting that the application is not a well-protected source of information.
To the question, “After your experience with this system, would you use the graphical gazetteer to share information with your friends?”, an average of 76.9% of the students said “Yes”, which again indicates that students are generally positive about the graphical gazetteer.

5.4 Conclusion
An overall analysis of the students’ responses clearly demonstrates the following:

- The students are generally positive about using the graphical gazetteer application.
- The application was given a high value for its user interface.
- The application needs some improvement for its ease of use.
- The information shown in the map is not trusted by some students.
- The students were satisfied with the application’s capacity to share information.
Chapter 6 – Conclusion and Future Work

6.1 Evaluation of the system

Building a full-featured new web application can be a demanding task to undertake. Several considerations need to be taken into account at all stages – the design, the development, the testing and the production. The interface needs to be accessible, user-friendly and good looking. The application should benefit from richness of features, stability, excellent performance and strong security. It is obvious that full and proper implementation of a web application that fulfils all these requirements would take a team of experienced developers months to achieve.

The time earmarked for the project was not long enough to develop all the possible features discussed in this dissertation. Thus, only a small number thought to be missing from the current graphical application were created. These allow users to interact with maps and to provide the information, reaction and assessment of cities, companies and entities in various parts of the world.

Nevertheless, the whole experience of developing web-based application like this was invaluable for the author. Several web-related technologies were used to implement the desired features as discussed in earlier chapters, most of them new to the author, and this was a challenge to him. PHP was used for the implementation of the server-side logic and data manipulations, MySQL was the database server of choice, and HTML, CSS and JavaScript were used to design the interface and create the browser-side user experience.
At last, independently from the author's own evaluation of this work, a small scale survey was carried out of students in the university. This showed that the students found that the system met the expectations they would have for a graphical application. They especially appreciated its ease of use and they shared their thoughts as to what they would like to see included in future versions of the product.

6.2 Future work

Taking into account the complexity of the issues arising from creating a graphical gazetteer, the advanced programming skills required for implementation and the inherent time limitations, the author considers the outcome to have been successful and to have met the desired specifications. It is the author's intention though to keep working on the subject and improve the current system, designing a more modern-looking interface that focuses on usability. Possible new features could include:

- A chat room granting users the opportunity to speak to each other live.
- New icons referring to the type of place (i.e. city, business, region).
- Image and video files.
- A search engine to help users find what they are looking for precisely and fast.
- Google Maps API v3 for the purpose of street views.

It is the author's understanding that software development is an ongoing process that requires time and effort and he is willing to commit himself to it.
Appendix

The following questionnaire was given to the students as part of the survey relating to the testing and evaluation of the system.

QUESTIONNAIRE

1. What is your impression of the application?
   - Positive
   - Satisfy
   - Negative

2. Did you find the application, easy to use?
   - Easy
   - Middle
   - Difficult

3. Do you think that external help with using the application is needed?
   - Yes
   - Maybe
   - No
4. Do you think the system provides a complete set of features for the purposes of a graphical gazetteer?

- Complete
- Not all
- Incomplete

5. How did you find the user interface?

- Attractive
- Satisfy
- Boring

6. What do you think about the flexibility of the application?

- Flexible
- Rigid

7. Did you find your overall experience stimulating?

- Yes
- No

8. Do you trust this application to keep your information confidential?

- Yes
- Maybe
- No
9. After your experience with this system, would you use the graphical gazetteer to share information with your friends?

- Yes
- Maybe
- No
References


