Republic of the Philippines
Western Mindanao State University
College of Computing Studies
DEPARTMENT OF COMPUTER SCIENCE
Zamboanga City

"Gravekeeper": Zamboanga Muslim Cemetery Web-Based Geo-Mapping System using Quantum Geographic Information System

In partial fulfillment for the degree of
Bachelor of Science in Computer Science

Presented to the Faculty of
Department of Computer Science
College of Computing Studies

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Approval Sheet

The Thesis attached hereto, entitled **"Gravekeeper: Zamboanga Muslim Cemetery Web-Based Geo-Mapping System using Quantum Geographic Information System"**, prepared and submitted by Adzmi M. Kalnain, and Emy Joy A. Omictin, in partial fulfillment of the requirements for the degree of Bachelor of Science in Computer Science, is hereby **recommended for Oral Examination**.

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Abstract

Over the past year's cemeteries are still constantly growing. With the cemetery still using traditional method of storing the deceased record, management cannot keep up in tracking the location of the deceased, and cannot properly maintain records and archives. This research then intends to develop an information management system for proper storing of data with integration of a quantum geographic information system for grave mapping and location tracking using spatial algorithm. The fully functional system would help cemetery caretaker or management, visitors, and researcher alike in making cemetery manageable. The study employed an applied research design, specifically a research and development design approach. Pre-evaluation and Beta-testing was made before and after the development, with beta-testing as a primary basis for the success of the system development. Data were collected using a survey questionnaire on 20 convenient residents near the target cemetery. Results showed that the developed system is beneficial in improving the cemetery management. Areas that mainly benefited from the system are grave tracking, data saving and record retrieving efficiency, and services options. Results also showed the openness of the cemetery visitors and caretaker in adapting a new tool in making cemetery visit less problematic. Furthermore, results made it clear that the lack of proper system management tool is what keeps the cemetery from being manageable. Therefore, further development in management tool is recommended in making the cemetery more manageable. Specifically, using a geographic information system technology.

Keywords: Information Management System, Applied Research, Research and Development Design, Grave Tracking, Retrieving Efficiency, QGIS, Quantum Geographic Information System, Spatial Algorithm

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List of Notations

Abbreviation/Acronym	Meaning	Page
QGIS	Quantum Geographic Information System	6
GIS	Geographic Information System	7
HTML	Hypertext Markup Language	7
MySQL	My Structured Query Language	7
PHP	Hypertext Preprocessor	7
IDE	Integrated Development Environment	7
VSCode	Visual Studio Code	7
Covid-19	Corona Virus Disease 2019	7
AHP	Analytical Hierarchy Process	13
SDLC	Software Development Life Cycle	15
CIS	Cemetery Information System	18
UC	Use Case	31
GB	Entity Relationship Diagram	31
UI	User Interface	34
UX	User Experience	34
RAM	Random Access Memory	35
CPU	Central Processing Unit	35
OS	Operating System	35
iOS	iPhone Operating System	35
GB	Gigabyte	35
KBPS	Kilobits Per Second	35
MB	Megabyte	35

CHAPTER I

Introduction

Background of the Study

A cemetery is a place where the remains of our loved ones – family, relatives, and friends are buried or interred. The term cemetery is derived from the Greek word 'Koimeterion' which means a "sleeping place". Traditionally, we pay our respects to our loved ones in the cemetery and pray for their souls.

Most cemeteries today still use the traditional method of keeping records. They used to keep paper records, but these are especially vulnerable to damage and disaster. As a result, if these records are damaged or lost, it may be arduous to recover them. According to Cox and Day (2011), not all cemeteries allow equal access to anyone looking for a deceased person's record. Some helpful and friendly cemetery personnel, on the other hand, may provide the information free of charge, while others would charge fees that are higher than the cost of reviewing the deceased's records. In other cases, proof of relationship to the deceased would be required before disclosing the information. Many nonprofit cemeteries do not have the staff or resources to research burial records. Cemeteries without electronic records rely on old records most of the time, regardless of their condition, causing further degradation. If cemetery registers are digitized, there may be no established backup method in place, which could lead to the loss of recent registers if the computer fails.

Keeping records and mapping the cemetery is essential for visitors as it would allow easy access to the graves they are looking for and would provide a clear list of the parcels used and available for the cemetery. Mapping a gravesite or other sites can come with a few challenges. Their complexity may vary depending on the age of the site and the accuracy of the records. The only way to find unmarked graves is to dig or excavate the site, which is not ideal. On the other hand, disturbed soils may be spotted, and tombs are marked using radar devices. This, however, would be impractical because it would necessitate experts and would take longer to locate the graves
(Opus Blog, 2020).

Many cemeteries are divided into sections for various cultures and religions. Each of these sections may be managed in a completely different manner. In Zamboanga city, there are unidentified graves in a Muslim public cemetery because the site is neglected, and no one from the family visits the graves. Furthermore, no one oversees the cemetery, whose graves are overgrown with tall grass and plants, making them difficult to locate; there is no technology to map the burial, and no one manages the deceased's information or records.

Statement of the problem

A cemetery is a burial place where we bury our dead. A Muslim public cemetery in Barangay Mampang located in Zamboanga City is a non-profit cemetery that is not maintained by anyone. The site is neglected as the grasses and plants grow, making it difficult for visitors to locate the grave of their deceased.

The goal of this research is to fill a void in Muslim cemeteries. The problems identified by the researchers are as follows:

- The lack of a geo-mapping system to easily locate the graves of a specific dead person.
- The absence of a records management system for proper maintenance and archiving of the records of the deceased.

Objectives

General Objectives

The general objective of this research is to develop a web-based system for grave mapping and record management for a Muslim cemetery.

Specific Objectives

To achieve the general objective, it is necessary to:

- develop an information management system to store and search records of the deceased person's information;

- integrate a web map using quantum geographic information system (QGIS) to enable grave mapping;
- use a spatial algorithm that organizes geometric data for efficient search; and,
- to evaluate the design, reliability, efficiency, and user-friendliness of the system.

Scope and Limitation

The research is limited to a web-based management system with the primary features of searching for deceased information and digital plotting of graves. Provision to mark plots and set them as either occupied or available, the system used open-source geographic information system (GIS) technology. The system could only be used in Muslim cemeteries and is used for graveyards.

The target user and respondents of the research are the Admin and the cemetery visitors of the Muslim Cemetery of Zamboanga City, regardless of religion. Supposedly, the respondents of this research were Muslim cemetery visitors, but due to the covid-19 pandemic, the respondent was randomly chosen.

The software used for building the system were the following: Vs Code as IDE alongside the latest HTML, Bootstrap, PHP, and MySQL web programming technology.

Significance

The research result would be beneficial or significant to:

- Administrator/Cemetery Caretaker – This system provides practical assistance in managing the Muslim cemetery and significantly contribute to the client's easy access and reference of information. Furthermore, to increase the cemetery's sales in service offered.
- Cemetery visitors/Customers – The system would help the Visitor/customer lessen the time locating the graves and knowing the other services provided.
- Researchers – The study would aid or serve as a reference for future research into a similar topic involving cemeteries and the usefulness of information management systems as a solution.

- Future Researcher - Future researchers with the same account as the one used during this study might be able to obtain incite and materials for their prospect study.

CHAPTER II

Review of Related Literature

Related Literature

Short history, Impact, and Development of Cemeteries

Philippine cemetery architecture spans more than three and a half centuries. It started from rocks and cave cemeteries, and it was before the Spanish rule and American intervention. Some cemeteries are sometimes permanently built beside or around churches or Mosques. Even today, some cemeteries are still noticeable near churches and Mosques. Burial is always associated with the church because of burial ceremonies and prayers. Today, cemetery development is evident, dating back to the long period of Spanish rule (1565-1898). Cemeteries keep changing due to or maybe because of Philippine cultural and burial practices. Because of the country's development, capital cities innovate to establish modern cemeteries. Although development means qualitative change, which is always good, cemetery development is not always positive. The best example is unplanned development. Unplanned development, especially in cemeteries, can hinder the growth of urban places. According to Soliman, A. (2015), who did the studies on "Impact of cemeteries on the development of urban settlements in Egypt," cemetery planning is essential. It should consider the legal, moral, and religious needs of society. Creating guidelines and principles would help prepare for future urban and cemetery development structural plans in selecting cemetery sites.

Information Management System

Businesses nowadays are supported by information systems for data management, including storing, searching, and analyzing incoming and outgoing data. The primary uses of the information system are for decision-making, control, analysis, and visualization of information in an organization. An information system is essential in an organization because it makes the communication process much more efficient. Businesses gain cost advantages over competitors. Reports can give insights and ideas for a plan or strategy. It also helps in decision-making by modeling the information and results of decisions and calculating possibilities. The record helps reflect, analyze, and

forecast action for the future. The primary objective of using management information systems is to manage and meet the growing and diverse needs of staff, customers, and the community. Information systems have been around for a long time. Of course, we, humans, are the backbone of the information system, and our desire, passion, and needs are the driving force of its development and innovation. Modern technology like the management information system would benefit businesses and help them ride the rising flow of growth and innovation.

One of the institutions or businesses that need information systems is the cemetery. The cemetery represents the history of our land and the resting place for our deceased family members. Although the cemetery is considered a sacred place, it is also a source of income for somebody. The caretaker or cemetery manager sells plots with indefinite care, cutting or trimming grass, caring for the headstone or markers, and maintaining anything associated with that grave. However, cemetery management gets problematic when a cemetery is not in a manageable state. For example, searching for log records could take a long time if a person wants to see how many empty spaces there are with the manual records. The worst is calculating it by looking around or patrolling the cemetery, which is inefficient. These problems make the job of managing complex and wasteful. However, all problem has a solution because, based on an article published in the campsite (2015), why cemeteries should need management software, the author stated that software would provide management with the benefits listed below;

- Quick Record searches - as it makes work simplified, organized, and efficient.
- Quick gravesite navigation guides visitors to the grave's exact location.
- Secure record - back up all documents and control who has access to the data.

With the support of a management information system, the difficulty of the management work can be easily flipped and take the management to a new level. When the information system establishes a connection between the physical location of the cemetery and the data collected, Using the Geographic cemetery mapping system formed. Before jumping into potential solutions, a discussion should be done first on cemetery structure and characteristics for modification or adjustment.

Cemetery Types

There are many types of cemeteries with varying levels of services and options. Each type of cemetery is designed based on religion, culture, and tradition. The changes

in both burial tradition and legal issues have led to the creation of different types of cemeteries. However, regardless of cemetery type, cemeteries are considered sacred places collectively. The kinds of cemetery we have are; [a]Monumental cemeteries or monument cemetery, is a traditional cemetery that feature upright headstones and typically made of granite, marble or stone and bronze, [b]Memorial park, is a lawn-level memorial type that looks like a park or garden, [c]Garden cemetery, is a combination upright monument and with a garden or nature feel, [d]Religious cemeteries, is a specific cemetery for specific community, Muslim and Christian cemetery are examples of religious cemetery, [e]Municipal cemeteries, is simply a cemetery owned by a local city, [f]Natural burial ground, emphasize minimal environmental impact funeral and burial practices, [g]Green burial, is a certified and monitored natural burial ground, [h]VA cemeteries, is a type of cemetery owned, operated and controls by the Veterans Affair Administration, [i]Graveyard, is a burial ground attached to or associated with the church or Mosque, and is very common burial ground in the Philippines, lastly the [j]Family burial ground, is a private land designated for burial of members of the same family. Different cemeteries also serve various services with histories and other policies, practices, and rules and regulations. In the Philippines, the most common cemeteries are public cemeteries, Religious cemeteries, District or municipal cemeteries, and cemeteries for veterans or nationals. Preparing burial sites, placing the dead body in the grave, installing grave markers or headstones, and sometimes having a crematorium and funeral parlor are all standard services and responsibilities of cemeteries.

Furthermore, cemeteries are required to save the person's burial documents and maintain the grave-site indefinitely. All cemeteries have also shared similar visitors, burial planners, familiar visitors like individuals, and families. The Common problem of cemeteries is that the dissemination of information is slow, and visitor inquiries are sometimes not met. Even though cemeteries have different types and services, they still have similar problems.

Geographic Information System (GIS)

Geographic Information System, or the GIS, is a framework for communicating, organizing, and understanding the science of our world. GIS is used to make maps that display, perform analysis, share information, and are used to solve complex problems across the globe. Simply, GIS is changing the way our world works. Geographic information system technology applies geographic science with tools for understanding

and collaboration. GIS helps an organization or even an individual understand patterns and relationships.

In 1832, a French geographer named Charles Picquet utilized different color gradients on a map of Paris to show the number of cholera deaths, providing an early contribution to epidemiology. Twenty-two years later, English physician John Snow took this concept further and demonstrated the problem-solving potential of maps by identifying the connection between an outbreak of cholera in London and a contaminated water supply. Today, GIS has various applications. Over the history of geographic information systems, researchers, analysts, and programmers have continued to innovate, develop, and enhance the GIS further. It led to a technological breakthrough that we now have (i.e., navigations, banking, geology, surveying, mapping, and many more). GIS has played an essential role in business, industry, work, and everyday life.

Related Studies

Foreign Studies

Few studies have utilized geographical information systems to help analyze the cemetery, structures, landscape, and grave location. They obtained a formula to generate data analysis from GIS using the data. J. Pritsolas and G. Acheson (2017) determined that GIS effectively documented, analyzed, and mapped the cemetery. Reading a few lines of their research would lead readers to believe that cemetery development is impossible without precise data, appropriate tools, and effective management. Lotfi S., Habibi K., and Koohsari M. (2008) used geography and urban land structure to formulate a multi-criteria model to determine an excellent site to build a cemetery. They integrated the GIS and AHP or the analytic hierarchy process to filter factors, alternatives, and others that might get involved in selecting a site. The studies can potentially be used as a pre-selection tool when planning to build a proper cemetery. Some may disagree with their ranking of the importance of the elements they used to weigh their chosen sites. However, the studies are detailed enough to prove their effectiveness.

Some cemeteries are already considered historic because of the age of their structures. For instance, Abbot J.S.'s research (2012) took place in a graveyard in the Georgian capital of Athens. The cemetery was long considered historical. Their studies defined a historic landscape's importance, even though it is a cemetery. Their studies tried to discover appropriate strategies and possible solutions to improve the current

management approach at the cemetery. They studied the historical context of the place, its existing management structure, and the current management issues. Eventually, it came up with a model that could solve the problems of the management approach of the cemetery manager.

The Cemetery Information System is the one with good features. The research data can be shareable with both internal and external universities. The system's key features include reducing visitor confusion and workload, delivering information to staff and citizens via the internet, and collecting the output of the ideal path by optimum path analysis and the main spots in the cemetery on the map (Sefa S. et al.2017). It was the closest foreign study similar to the proposed research. Furthermore, the researcher tried to provide as much as the current studies have and improve the performance and quality of work in the target cemetery.

Features standard in some previous studies is almost the same as manual records and information management. Many studies focus on cemetery changes over the past decades rather than control. They left only a few studies and research material discussing cemetery information management. However, the researcher noticed that GIS is evident in each study and research material on cemetery information management.

Local Studies

The proponent studied the memorial park business in a study by Fortunato et al. (2009) entitled Geographic Information System for St. Francis of Assisi Memorial Park. After a few reviews, they came up with the right features that may help manage the memorial park business. The said features are; customer status identification, faster transactions using the system, providing accurate data, viewing the park's geographic location, and generating accurate reports.

The study by Baldano et al. (2014) proposed an Online Geographical Information System for J. Bacolod Realty. The study mainly focuses on helping users find low prices but beautiful houses and lots using only smartphones and internet connections. Geographic Information System were also similar to the Heaven Peace Memorial Garden Online Information System research.

Heaven Peace Memorial Garden Online Information System disseminates information to promote the memorial garden using online communication rather than the previous method of promoting the place, using flyers and billboards. The study focused on the cemetery management of a private memorial garden. Inspired by the advancement

of modern technology and the problems regarding locating graves. Researcher came up with the idea of having an Online Cemetery Management. The researcher gathered the necessary data to provide accurate information for the success of the research. The study's main objective is; to give the customer and the management an easier way of locating graves. This objective would help to have an easier way of disseminating information using an Online System to help them increase their sales through an Online System (Arevalo et al.,2009).

Every study requires location analysis, structure, and management. It was evident that technological tools such as GIS, Web Development Tool, and other Software Development technologies are just blessings. Customers' desire for more and new services is increasing as a business grows. There may be hacking, technical errors, and a lack of expertise and experience using technology. However, studies have proven that venturing or adopting technology in business benefits both the customer and the business owner. During these studies, researchers planned, strategized, and reviewed each possible solution and tool that the researchers could utilize to support our target users and institution.

Waterfall Model

The first Process Model to consider was the Waterfall Model. It was also considered a linear-sequential life cycle model and is straightforward to understand and use. In a waterfall paradigm, each phase must work and complete before moving on to the next. There are no stages that overlap. The waterfall approach was the first SDLC Model used widely in Software Engineering to ensure the project's success. In "The Waterfall" approach, the software development process separates phases into different steps. Typically, the outcome of one step acts as the input for the following stage in this Waterfall approach. The following diagram denotes the various phases of the Waterfall Model.

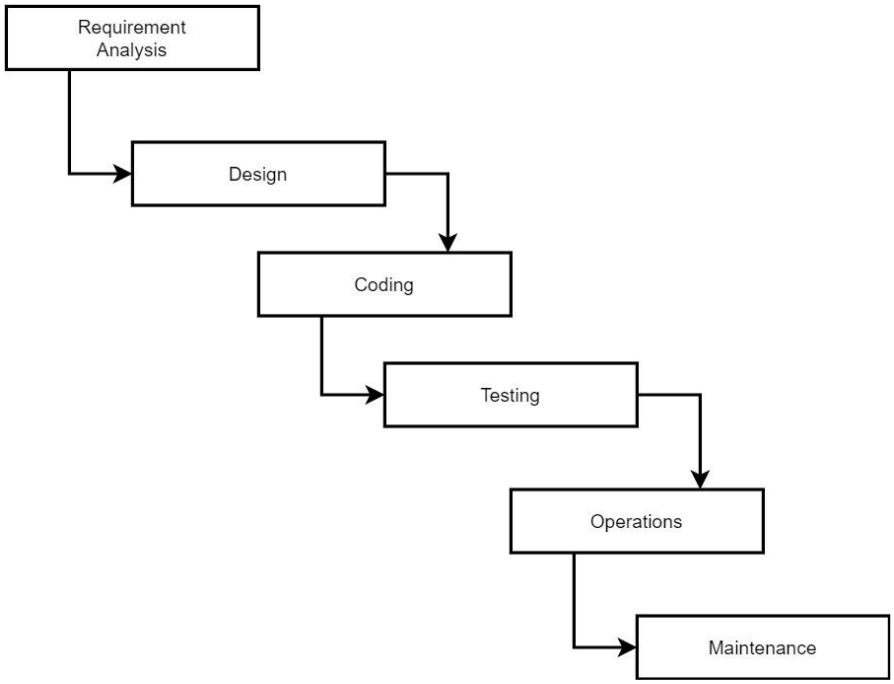

FIGURE 1: WATERFALL MODEL

The researcher considered using the waterfall model because of its simplicity. The phases are easy to follow but require a bit of modification. Hence, the researcher came up with the idea of using the iterative waterfall model. This idea would allow the researcher to step back and polish the system in development or any part of the phase. The waterfall model maximized the usage of data collection (pre-evaluation and beta-testing). The iterative feature allows heading back and fixing or modifying anything needed in that phase.

Spatial Algorithm

The researcher used a Spatial algorithm in this research because it deals with geometric data. Geometric data is a spatial data type mapped on a two-dimensional flat surface. Spatial indices are a family of algorithms that arrange geometric data for efficient search. For example, doing queries like "return all buildings in this area," "find 1000 closest gas stations to this point", and returning results within milliseconds even when searching millions of objects. Spatial data can have any number of attributes about a location. For example, this may be a map, photographs, historical information, or anything else that may be deemed necessary. Users can save spatial data in various formats, as it can also

contain more than location-specific data. Analyzing this data provides a better understanding of how each variable impacts individuals, communities, and populations. There are several spatial data types, but the two primary kinds of spatial data are geometric and geographic data.

- **Geometric data** is a spatial data type mapped on a two-dimensional flat surface. One example is the geometric data in floor plans. Another example of spatial data in action is Google Maps, which uses geometric data to provide accurate direction.
- **Geographic data** is information mapped around a sphere. Most often, the globe is planet earth. Geographic data highlights the latitude and longitude relationships to a specific object or location. A familiar example of geographic information is a global positioning system.

Related System

Cemetery Mapping Information System

The purpose of the "Cemetery Mapping Information System" was to create a platform that would make it easier for users to find the graves of their loved ones and for personnel to efficiently access, update, and maintain the data. The system allows users and personnel to type in the name of the deceased person and displays information about them, including their location. The current system for locating and recording this information is time-consuming and requires a lot of effort, but the new system aims to make it more efficient and user-friendly.

Cemetery Information System: A Case Study in Sivas City

Cemetery Information System (CIS) is a case study in Sivas City. The case study aimed to provide better quality services to the citizen to satisfy the city's religious and spiritual needs. The study aims to help people find their relatives' graves quickly. Using GIS would shorten the time to find the tomb of their loved ones. Having the output of the optimum path analysis and the main points in the cemetery on the map would decrease the confusion in finding their relatives' graves. Workload during a special event would provide online information for staff and citizens through the internet and Geographical planning for future burials in the cemeteries. The study used the designed system to transfer thousands of deceased records to the database.

The Cemetery Information System (CIS) provides a better quality of service to the people of Sivas City. With this study, cemetery works, one of the most critical, complex, and indispensable activities in municipalities, have been solved with the help of GIS and presented to the service of citizens. One of the essential features of this work is the development of a platform-independent web-based application. With the help of ArcMap, the CIS is a success.

Comparison of Features

TABLE 1: COMPARISON OF FEATURE

Features	Gravekeeper	CMIS	CIS
Search & Locate *(Search and locate the exact location of the grave in the map)*	✓	✓	✓
Map / Spatial Visualization *(The system has a clear map or satellite map of the entire cemetery and the data is graphically presented)*	✓	✓	✓
Payment & Order *(System accommodate cemetery related services)*	✓	x	x
Record Deceased Information *(The system is able to store the information of the deceased in database)*	✓	✓	✓

The table displays the comparison of features from recent studies. These will serve as a basis for what features can be added and what features can be further developed for future studies. Based on the comparison, almost all recent studies relating to cemetery management have incorporated GIS technology. This study will use QGIS and web technologies to develop an improved solution for cemetery management.

Conceptual Framework

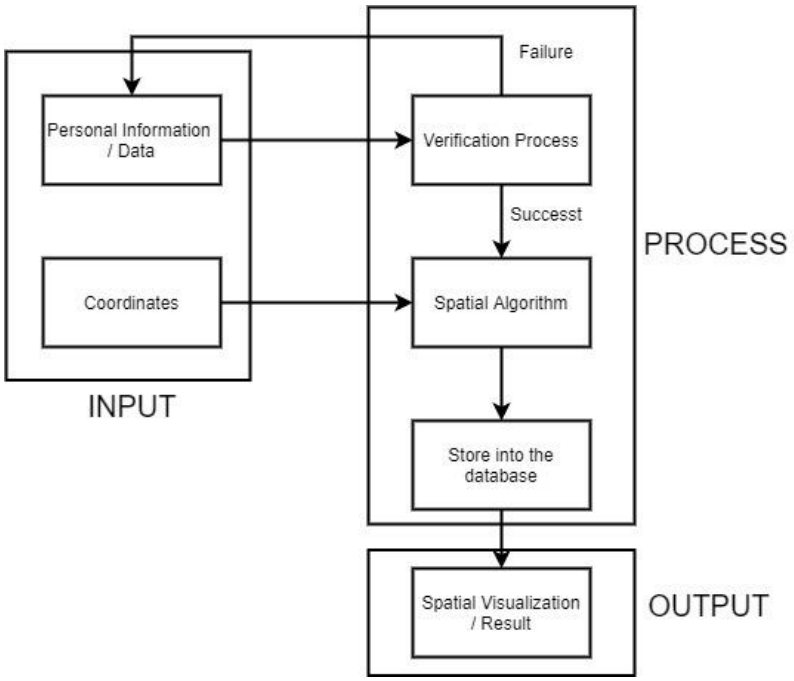

FIGURE 2: CONCEPTUAL FRAMEWORK OF THE SYSTEM

The study's primary purpose is to visualize the cemetery record spatially and make it fast to track and locate where the deceased is residing. No existing tools, descriptions, or documents could help organize cemetery dead records and their graves in the target scope of the study. The deceased personal information must be inputted and saved in the system to verify and avoid falsification and duplication, confusing the record pool. The spatial algorithm then passes on to assign or merge the data into its designated spatial location before permanently storing it in the database. The spatial algorithm arranges and references geometric data to a specific area or location. As a result, the record can be viewed and accessed in a spatial form, which is much more efficient and appropriate for a cemetery.

CHAPTER III
Methodology

Introduction

This chapter discussed the research design, research locale, population and sampling, research instrument, instrument's validity, data gathering procedure, and statistical tool, which are relevant to the study. This chapter explains the research and software methodology in detail.

Research Design

This study employed Applied Research Design, specifically, a Research and Development Design. As a result, the development held on to the research or relevant facts from the study of the target population or the system/project implementation location. The primary reason why this study would be using research and development design is because of the following:

- to maximize the connection and usability between the research design and software methodology (refer to Figure 7).
- to guarantee the usability of the system/project.

Research Method

The study employed both qualitative and quantitative research methods. The researcher used the qualitative research method to understand the topic further and identify relevant data by interviewing local Muslims about their experiences with the current or existing cemetery management. At the same time, a quantitative research method to measure and understand the general ideas, experiences, and responses during the pre-evaluation and beta testing of the proposed solution using a survey questionnaire.

Research Locale

This research aimed to improve the storage and retrieval of records and the overall management of Muslim cemeteries in Zamboanga City, particularly the Mampang Muslim Public Cemetery. As a result, the data would come from within Zamboanga City.

Population and Sampling

Due to the government's strict protocol implemented because of the pandemic, the researcher slightly shifted the specification for pre-evaluation. Non-Muslims are now considered a participant in the current public cemetery management re-evaluation. Regardless of religion, as long as they have deceased relatives or family members buried in a grave-type cemetery. The criteria for selecting participants are the following:

- willing to participate
- had deceased relative, family member, or friends buried in a grave type cemetery
- be of any or either sex and religion
- at least 18 years old or older

TABLE 2: SURVEY DISTRIBUTIION OF RESPONDENTS FOR PRE-EVALUATION

Gender	Population	Sample	% Distribution
Male	**9**	**9**	**39.1**
Female	**13**	**13**	**56.5**
Gay	**1**	**1**	**4.3**
Prefer not to say	**0**	**0**	**0**

TABLE 3: DISTRIBUTION OF RESPONDENTS FOR BETA TESTING

Gender	Population	% Distribution
Male	6	30
Female	14	70

The sampling technique that was used in this study is a convenience sampling technique. It is a sampling technique that considers the researcher's demography and capability. The total number of respondents convenient and willing to participate was 23, with nine males who account for 39.1% population, 13 females or 56.5% of the total population, and one gay participant or 4.3% of the total population (see table 2). These samples were willing to participate in the research during a week-long data gathering.

Table 3 shows six (6) male and fourteen (14) female respondents participated in the beta testing. Males account for 30%, and females account for 70% of the total population.

Research Instrument

Pre-evaluation utilized a questionnaire as the research instrument, combining printed and online Google forms, to draw out essential data from the respondents. The questionnaire contained several questions that rate the satisfaction level of cemetery visitors and questions that would draw out critical data to figure out problems of the current cemetery management. The questionnaire has two parts: the respondent demographic and survey questions (see Appendix B).

Post-evaluation or beta testing also utilized a questionnaire as an instrument. The question is open-ended to understand how they perceive our project. The researcher assists the respondent in recording and transcribing their responses.

TABLE 4: INTERPRETATION OF FIVE-POINT LIKERT SCALE

Rating	Verbal Interpretation
5	Strongly Agree
4	Agree
3	Slightly Agree
2	Slightly Disagree
1	Strongly Disagree

Rate interpretation had used a Five-point liker scale to understand respondents' feedback to the System Beta Testing. Five (5) was the highest point with an adjectival understanding of "Strongly Agree." Followed by four (4) as "Agree," three (3) as "Slightly Agree," two (2) as "Slightly Disagree, and one (1) as being the lowest with an adjectival interpretation of "Strongly Disagree."

Validity of the Instrument

The instrument utilized in this study was content-validated and reviewed by the research adviser and research review committee for mass data collection without causing any unnecessary problems.

Data Gathering Procedure

The researcher conducted the data gathering during the early planning phase. It started with the pre-evaluation to acquire relevant data to determine the problem further and kickstart the study. Survey questionnaire was used to obtain the necessary data. It was handed out or disseminated using online messaging apps and emails. The researcher also conducted a short interview in the local barangay of Mampang with the Muslim elders as an interviewee. The researcher asked several elders who voluntarily responded to the discussion. It is to ascertain some beliefs of Muslims that may be related to or may affect the development of the system/project. Lastly, the researcher conducted beta testing after developing the system/project. Like the pre-evaluation, Beta testing also used online messaging apps and emails. Questions such as design, usability, reliability, efficiency, and user-friendliness are software-related. Instruction was provided clearly in the beginning section for the participant to answer the survey questionnaire accurately. It was conducted for a week-long period while being assisted by the researchers.

Statistical Tool

Descriptive statistics – the study used descriptive statistics quantitatively summarize the information or data from the beta testing.
Central tendency – used to get the probability value distribution.
Mean – used to get the arithmetic average of the data collected during the beta testing.

Analytical Tools

Flowchart - The algorithm used in mapping and how the search feature acts, which is critical in the system/project, were plotted using a flowchart. A flowchart is a diagram that represents a process.

Software Development Methodology – This is a structured process engaged when working on a project. This study's software development methodology combines the Iterative Waterfall method and the one-group pre-evaluation and beta-test method.

Use Case – was used during the design phase to present the flow of the system processes. The use case is a set of a possible sequences of interaction between the users and the system.

Logical Entity Relationship Diagram -The logical ERD was used during the study's design phase to understand the data used in the system project. It depicts the relationship among each data.

System Architecture

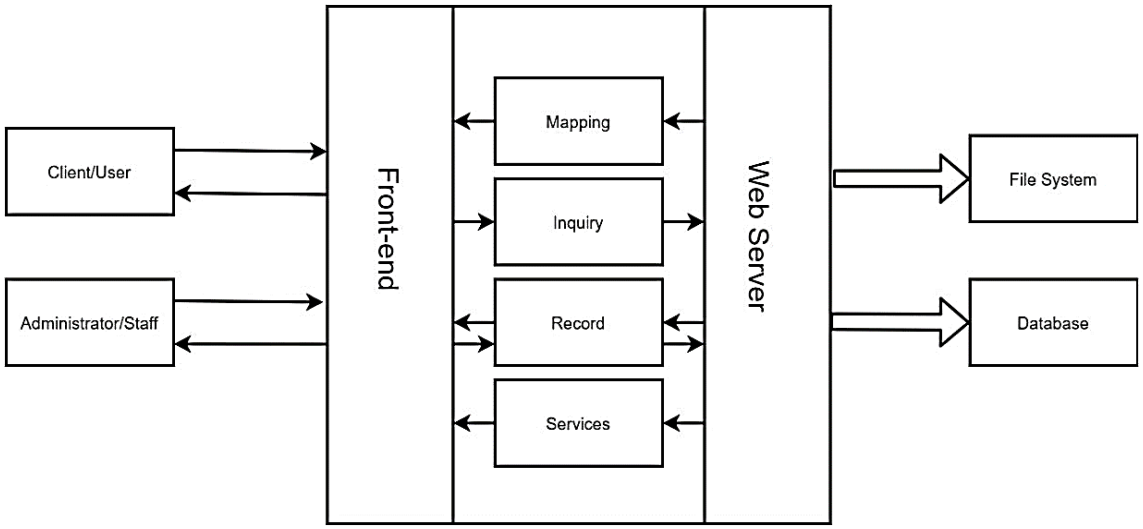

FIGURE 3: SYSTEM ARCHITECTURE OF THE PROJECT

A layered architecture describes the interface, processing, and data layer of the system project; the interface layer is the request of the customer or admin to see the record or map from the database. Front-end web technology such as HTML, CSS, JavaScript, and QGIS web components are the tools used to create the interface. The processing layer processes the request of the users and asks for information from the data layer. On the other hand, the data layer stores the people's records and map information and stores persistent information or files such as images and documents.

CHAPTER IV

Results and Discussions

Management Information System Development

The following section discusses how the system was built, from the data gathering to testing. As one of the research objectives, the system was carefully built based on the pre-evaluation and guidance from the researcher's professors. For the system UI/UX, please refer to (appendix a).

System Processes and Flow

The algorithm was used in translating the behavior of search feature of the system, which is critical in the system/project were plotted using a flowchart.

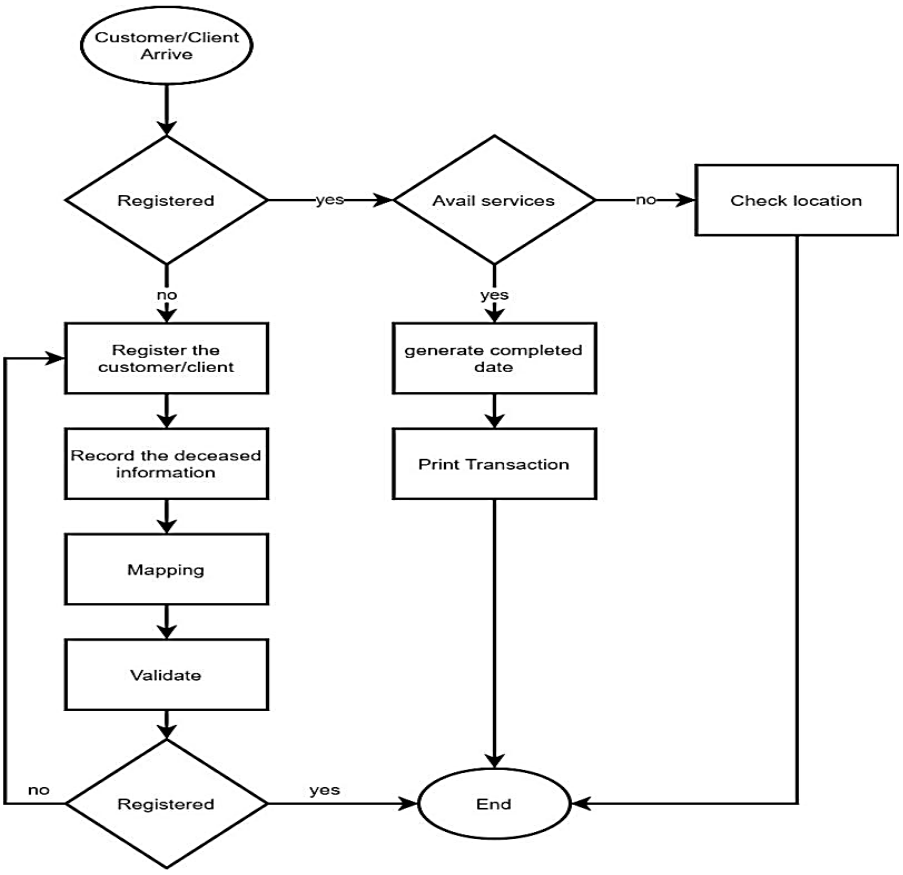

FIGURE 4: FLOWCHART FOR MAPPING PROCESSES

When a customer wishes to have an account, the Customer should sign up first. The system would check whether the account is new or existing. The new account should provide the necessary information, such as deceased personal information before they can avail graveyards and services the cemetery offers. After giving the essential information and choosing a grave location, the Customer should wait for validation, and this is to validate if the chosen grave is available. A registered account could directly access the different services offered by the management and also search publicly and their corresponding location on the map.

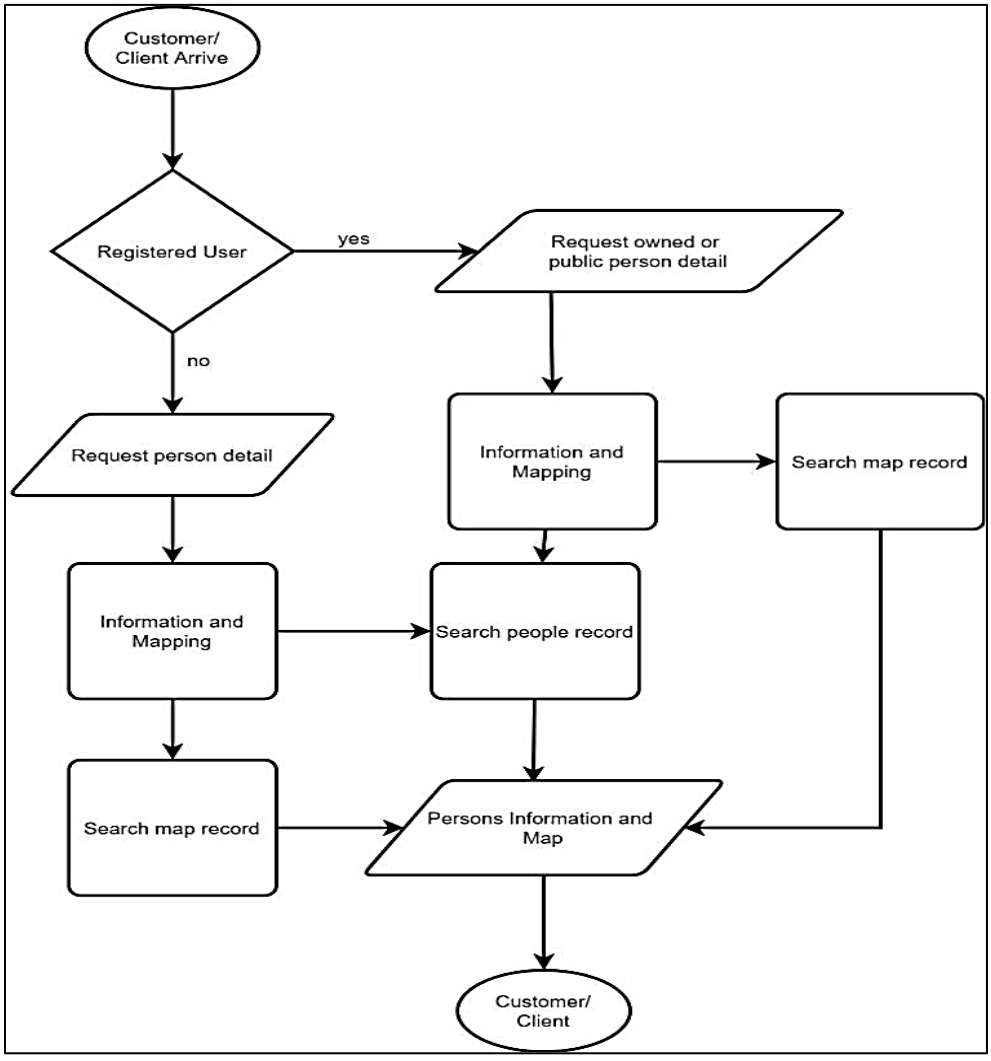

FIGURE 5: FLOWCHART FOR SEARCH RECORD PROCESSES

This flowchart shows the process of searching by the Users/Customers. When a customer randomly searches for deceased information or a grave location, the system

would automatically determine if the user is a logged-in user or not. Users that are not registered or do not have an account can only view limited information or records that are for the public. Meanwhile, suppose the other user searches for a particular individual registered in the system, and the system does not show the deceased individual's record. In that case, the specific user sets their status to Private. No one can view private information but the owner only.

Project Plan/SDLC Model

In operating the system, the researchers used the software development cycle (SDLC), the overall process that consists of six cycles. The first is to determine the requirement. The researcher should decide what software and hardware technology the team would procure to develop and implement the proposed system during this cycle. The second is to gather data: this is where the researcher interviews the management office to collect data that could help the system's operation. The third step is to analyze the data. In this cycle, the researcher explored all the gathered data to identify the necessary information to develop the proposed system and give solutions. Next would be the phase of designing. The researcher designed a system related to the research problem, the specification, and operation with detail and some conceptual models of the user requirements. The last cycle would be the coding. The researcher encoded all the codes with the hand of the technical expert to check if they had an error or if the program would debug successfully. The project undergoes some testing to determine if the data is reliable. Maintaining the system is also part of it and also giving solutions.

Software Development Methodology

The study's software development methodology combines the Iterative Waterfall method and the one-group pre-evaluation and beta-test method. The researcher chose this method to make modifications after the post or beta testing or each phase for better development and improvement of the system. It is also relevant because the research design and research method use research and development methodology design.

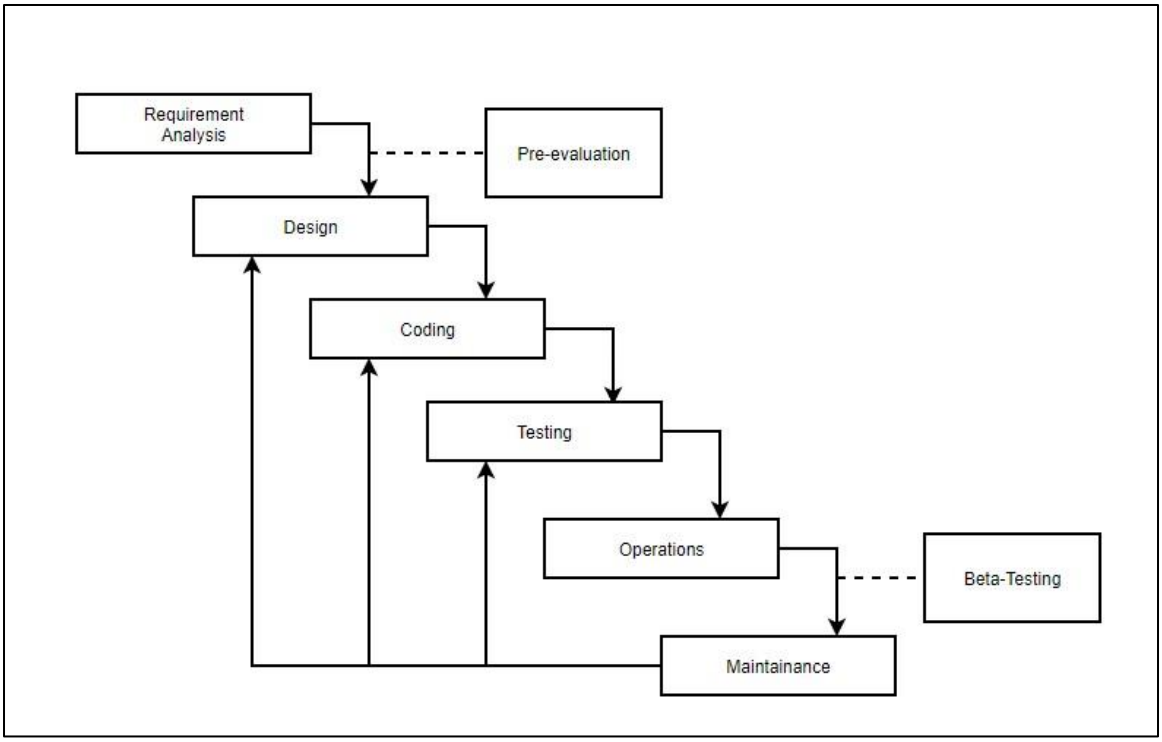

FIGURE 6: COMBINED ITERATIVE WATERFALL MODEL, PRE-EVALUATION AND BETA TESTING DESIGN

Phase 1: Requirement Analysis

This phase covered the task conducted, such as defining the problem and objective, extensive literature review, and pre-evaluation for the target user. The following are the requirement from the system based on the data gathered and interpreted during the study:

- The system should be able to record the information of the deceased in the cemetery
- The system should be able to map or set the deceased's record in the proper grave.
- The system must allow the customer to view the information and tomb of the dead.
- The system should be able to cater to cemetery services that are helpful to the customer.
- The system must notify the customer regarding completing the services they have requested.

Phase 2 Design

The researcher uses the requirement specification from the first phase to prepare the system design, use case, flowchart, and an entity-relationship diagram of the proposed system.

Use Case (UC) - was used during the design phase to present the flow of the system processes.

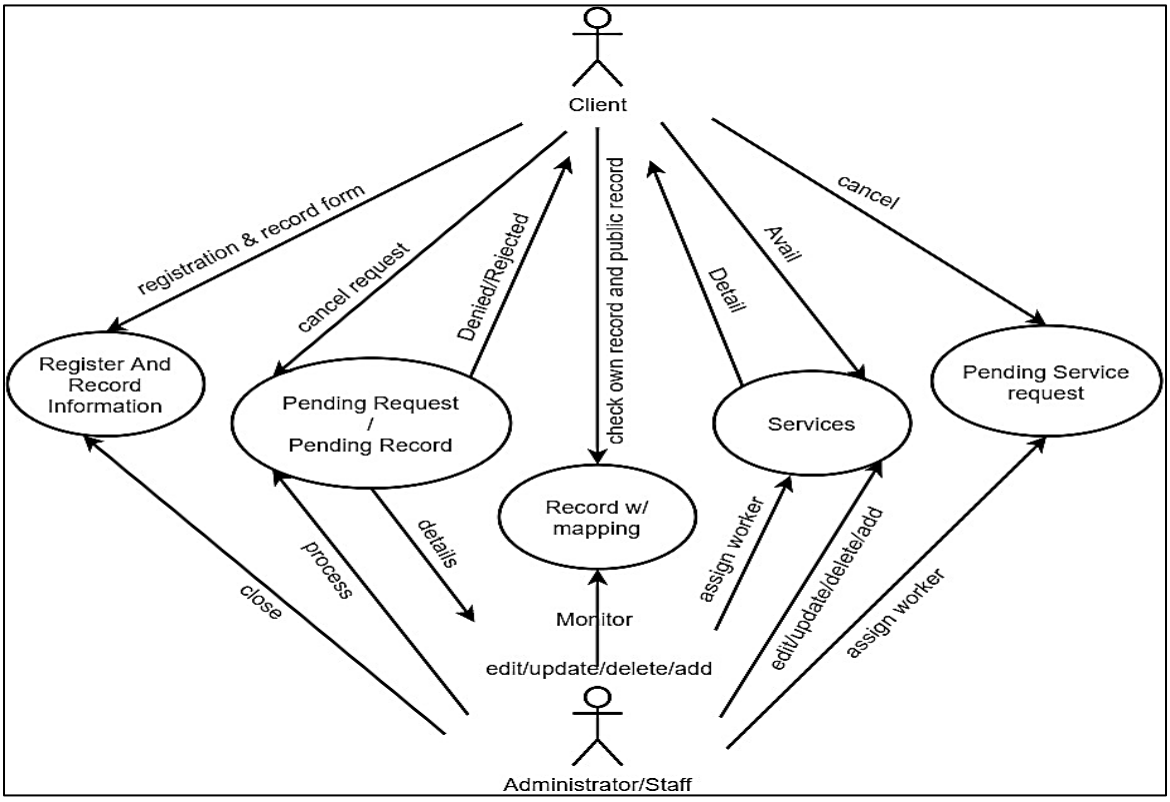

FIGURE 7: PRODUCT USE CASE OF THE SYSTEM

TABLE 5: PRODUCT USE CASE TABLE FORM

UC no	UC name	Actors	Input/Output
1	Record Information	Client/User	Registration and Record form(in)
2	Pending request/Pending record	Administrator/Staff Process(in)	Request detail(out)

UC no	UC name	Actors	Input/Output
		User	Cancel request (in) Denied Request (out)
3	Record Mapping	Administrator/Staff	Edit(in) Update(in) Delete(in) Add(in) Monitor(out)
		User	Check(out)
4	Services	Administrator/Staff	Edit(in) Update(in) Delete(in) Add(in) Assign worker(in)
		User	Avail(in) Check/Detail(out)
5	Pending Services Request	Administrator	Assign worker(in) Check(out)
		User	Cancel Request(in)

- Data – The logical ERD was used during the design phase in the study to better understand the data to be used in the system project.

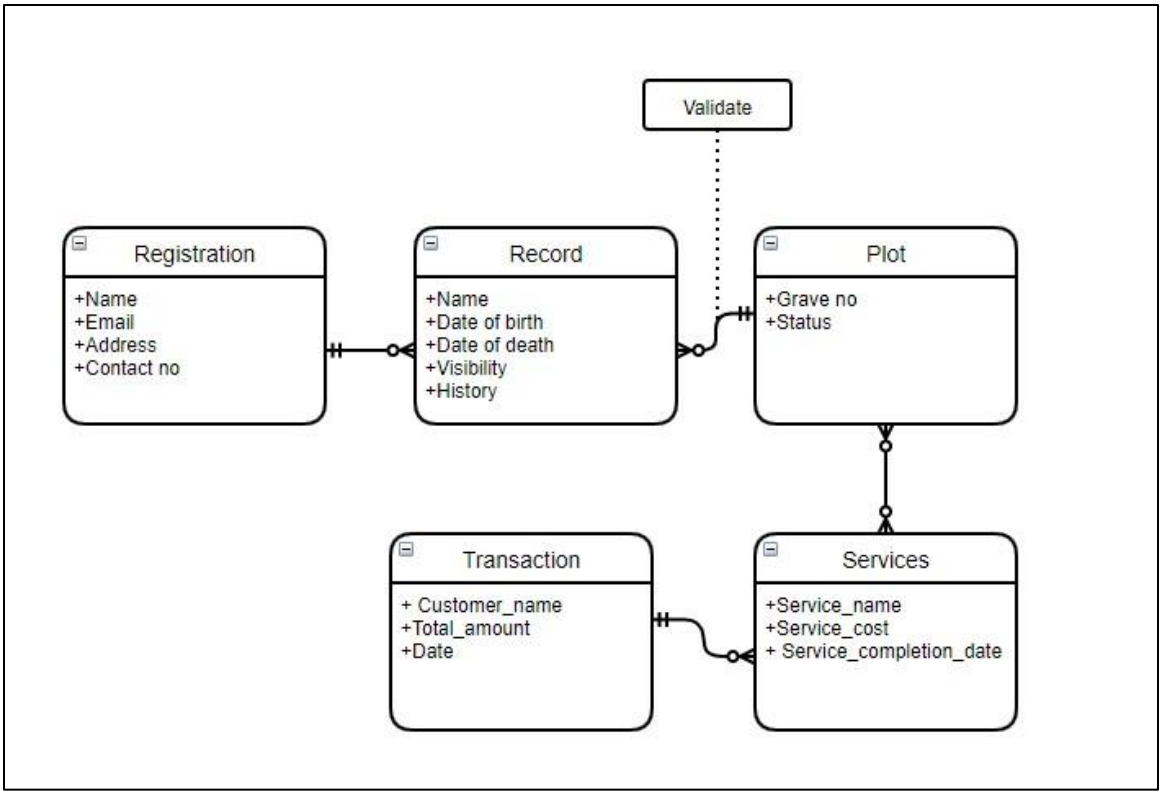

FIGURE 8: LOGICAL ERD OF THE SYSTEM PROJECT

The registration entity would store the customer account information. A single account can record or register a maximum of three users, and the record entity would hold the data of the deceased. Single or many records can share a single plot, with a maximum of three records per grave. The plot entity or table would store the plot area, plot number, and plot availability. In contrast, the services entity would house the management or supplied services. A single account can use one or more services for many records or graves.

Phase 3 Coding

This phase covered the development, the required tools, and the components necessary to accomplish the system development.

Development Tools

There are two groups of tools that the developer has used. The first set of tools was for mapping or graphing maps, and the second set of tools was for web development. The tools used are as follows:

- QGIS – a free and open-source Quantum Geographic Information System.
- Photoshop – is a raster graphics editor developed and published by Adobe Inc.
- Visual Studio Code – a code editor redefined and optimized for building and debugging modern web and cloud applications.
- Google Earth Pro – Used to import and export GIS data.

GIS Components

This study requires GIS technology to visualize and interpret data in the form of maps. GIS is an organized collection of computer hardware, software, geographic data, method, and personnel. The components are as follows:

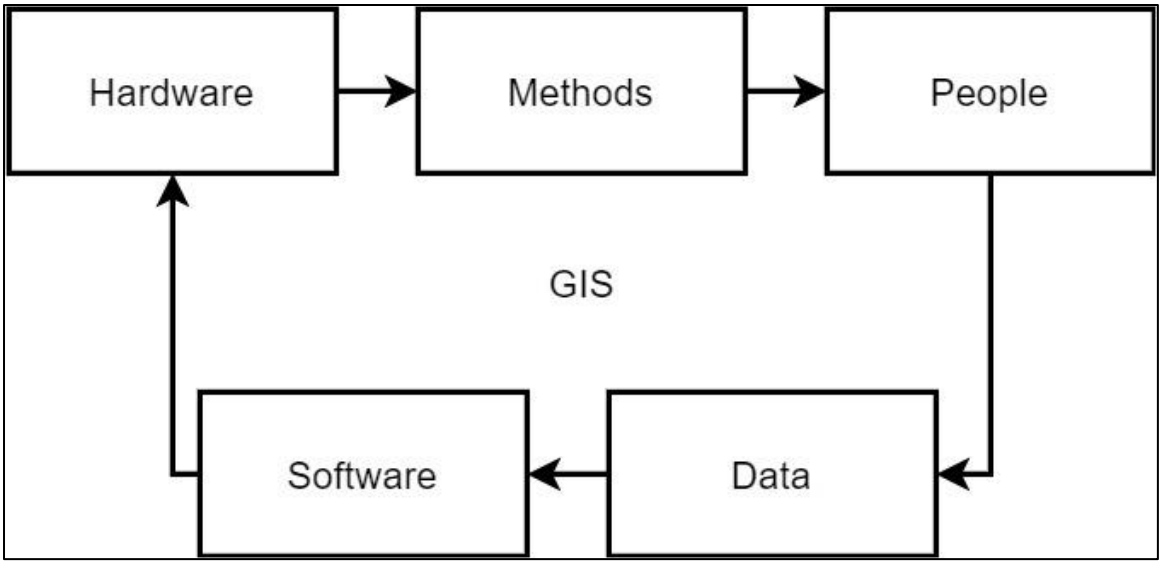

FIGURE 9: GIS COMPONENTS

- Hardware - hardware is the computer on which the GIS operates. There is a wide range of hardware types, from centralized to standalone. GIS runs on almost every hardware type.

- Software - The GIS software provides the functions and tools needed to analyze, store, and display geographic information. The components of the software are as follows:
    - Database
    - input and output tools
    - query, analysis, and visualization tools
    - GUI tools
- People - manage the system and devise plans for applying it.
- Methods - Designed plans, models, and operating practices are the basis of a successful GIS operation.
- Data - The most critical component of the GIS. The data the GIS operates on consists of any data bearing a definable relationship to space, including any data about things and events that occur in nature. GIS mainly employs DBMS to create and maintain databases to help organize and manage data.

Phase 4 Testing

This phase is limited to the testing of the system and consultation with the tester. The researcher implemented a beta-testing to ensure that the system was working correctly. A *questionnaire* was used as an instrument for beta testing. The questions are consisted of concerned with the system's user interface, user-friendliness, usefulness, reliability, and efficiency. The testing results could guide the implementation processes.

Phase 5 Operation

This phase has covered the training for the personnel who would be handling the system from behind. The researcher had monitored the outcome, perform a comparison or post-evaluation test, and analyzes the result.

Hardware Requirement

The minimum system requirement for the user and client are the following:

- CPU of Pentium 4 or newer
- RAM of 4GB

- Storage space of at least 500MB

Software Requirement

The minimum software requirements for the end-users are the following:

- Window 7 OS or newer
- Mac OS 10.12 or newer
- Android version of 5.0 or newer
- iOS version 11.4 or newer

Network Requirement

The minimum network speed or bandwidth is 500kbps or higher. But higher network speed is recommended as the system have uses several geo-mapping technologies.

Phase 6 Maintenance

This phase covered the actions done to fix the issues regarding the system's deployment in the client environment and concluded the study.

System implementation

The proposed system, the cemetery mapping, and the information system were presented for the end-user to find their deceased relatives easily and worry-free. A representative in the group of researchers provided questionnaires to answer the questions, clarification, and difficulties that could arise upon operating the proposed system.

Integrating the Web-Map using QGIS into the MIS

Researchers used the Quantum Geographic Information System (QGIS) to create a map to locate the deceased person's grave in the system visually. The Researcher utilized the Spatial Algorithm to implement the project for searching and storing of dead person's data using information such as the deceased person's name, date of birth, and date of death.

QGIS Browser Essential

FIGURE 10: QGIS BROWSER ESSENTIALS

The most essential extension that is needed in developing a grave map is the vector tiles which will be used in creating the markers, and also the XYZ Tiles or the satellites which is necessary in figuring out the exact location of the graves via satellite view. The other extensions are installed by default by QGIS.

QGIS Grave Map Layers

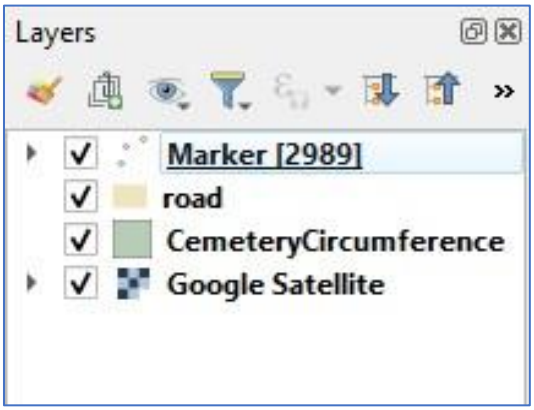

FIGURE 11: QGIS GRAVE MAP LAYER

- Marker – are the marking that identify if the grave is occupied or vacant. They are separated by colors, green indicate a vacant grave, while orange indicate an occupied grave.
- Road – road layer are the pitch-colored large lines that indicate a road. Its primary purpose is to give visitor an idea of different possible routes.
- Cemetery Circumference – is the overall size of the cemetery, and where plotting is allowed.
- Google Satellite – is used as an extension to have a clear view of the entirety of the cemetery, which makes it easy to plot grave markings.

FIGURE 12: QGIS EXPORT FEATURE

One of the greatest features of QGIS 3 is that they allow you to export the map that was created in their software. When a map is exported as a web map, it would then convert the layers, together with the necessary extensions in browser into JavaScript, Json, and CSS codes. They are originally a raster file when they are in QGIS. The detailed conversion are as follows:

- Markers Layer → Image Files, and JS File
- Circumference Layer → Image Files, JS File
- Road Layer → Image Files, JS File
- Google Satellite → API

The next thing would be linking them together with the MIS, which is done using the common tags in html such as:

- <link> Tag – which is commonly used to link a CSS file.
- <script></script> Tag – which is commonly used to link a JS file.

Result of using QGIS

QGIS, in comparison to other GIS frameworks, loads faster and performs processes in a smaller amount of time. The researcher created a web map using QGIS to respond to the study's stated problem: the lack of a geo-mapping system for locating a specific deceased person's grave.

TABLE 6: RESULT OF USING QGIS APPLICATION ON THE SYSTEM

Result of using GIS	
Design	Visible Icons
Usability	Grave search, and grave map is very helpful.
Reliability	The grave image is helpful to quickly find the grave.
Efficiency	Easy to search the record of the deceased person.
User-friendliness	Cemetery map function such as, zoom-in, zoom-out, search, and location tracker are simple to use.

The problem of locating the grave of a particular deceased individual on a map was solved using the spatial method.

Spatial Algorithm for Efficient Search

The spatial algorithm was the most efficient when dealing with extensive spatial data or objects, mainly because of spatial indices used by spatial databases to optimize spatial queries.

Spatial indices are a family of algorithms that arrange geometric data for efficient search. For example, doing queries like “return all buildings in this area,” “find 1000 closest gas stations to this point”, and returning results within milliseconds even when searching millions of objects (Agafonkin, 2018).

The researcher implemented the QGIS algorithm provider, which also supports the creation of spatial index under the vector category. The algorithm from this provider would work without any additional configuration. Nevertheless, the researcher modified the target component when searching for spatial data to fit into the research objectives; the property name is used instead of using cartesian (complex and lengthy numerical data) (fig.13).

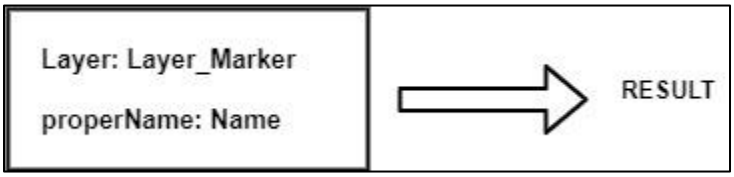

FIGURE 13: CORE COMPONENT OF SPATIAL SEARCH ALGORITM

This intuitive approach searches the raw data for spatial data and vice versa to develop a result efficiently and faster. As a result, even searching with thousands or hundred thousand records, the result would arrive more quickly. The researcher exported the search algorithm in a JS file based on the QGIS pre-built spatial algorithm.

Result of Beta Testing

Each piece of content is rated on a Likert scale of 1 to 5. The highest possible score is five (5) with a verbal interpretation of "Strongly Agree," while the lowest point is one (1) with a verbal interpretation of "Strongly Disagree." The verbal interpretation for the four (4) points is "Agree," three (3) points for "Slightly Agree," and two (2) points for "Slightly Disagree." The information gathered is shown below.

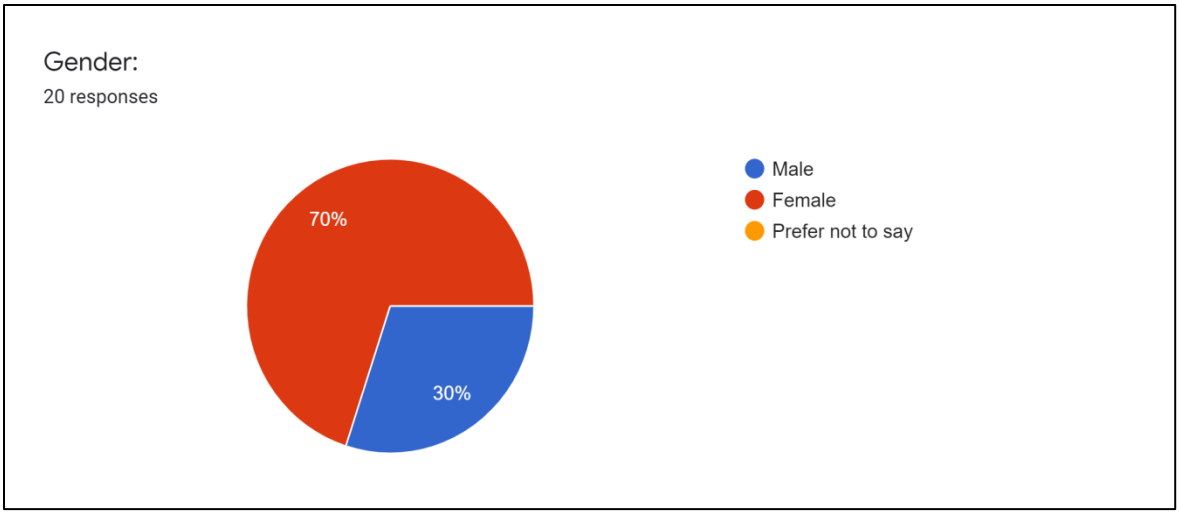

FIGURE 14: RESPONDENTS GENDER DISTRIBUTION

A total of 20 respondents answered the surveys that the researchers disseminated. It shows that the respondents are 14 females and 6 males.

Respondent Evaluation in Terms of Design

TABLE 7: RESPONDENTS ANSWERS IN TERMS OF DESIGN

DESIGN	MALE		FEMALE		GRAND MEAN	INTERPRETATION
	MEAN	INTERPRETATION	MEAN	INTERPRETATION		
1.THE BACKGROUND COLOR WAS GOOD.	4.17	AGREE	4.07	AGREE	4.10	AGREE
2.I LIKE THE COLOR OF THE ICONS	4.00	AGREE	4.21	STRONGLY AGREE	4.15	AGREE
3.SIZES OF THE ICONS IS VISIBLE ENOUGH	4.33	STRONGLY AGREE	4.21	STRONGLY AGREE	4.25	STRONGLY AGREE
ALL	4.17	AGREE	4.16	STRONGLY AGREE	4.17	AGREE
LEGEND: 4.21 – 5.00 – STRONGLY AGREE 3.41 – 4.20 – AGREE						

2.61 – 3.40 – SLIGHTLY AGREE 1.81 – 2.60 – SLIGHTLY DISAGREE 1.00 – 1.80 – DISAGREE

Table 7 showed (3) three factors to consider that the system has a good design. The result showed significant results for each factor, with the grand mean ranging from 3.41 to 4.20 and 4.21 to 5.00, which translates to agree and strongly agree consecutively. Factor 1 got a mean value of 4.10, and factor 2 got a mean value of 4.15, which independently translate to agree. Factor 3 got a mean value of 4.25, which translates to strongly agree. The result showed that the system achieved a great design.

Respondent Evaluation in Terms of Usability

TABLE 8: RESPONDENTS ANSWERS IN TERMS OF USABILITY

USABILITY	MALE		FEMALE		GRAND MEAN	INTERPRETATION
	MEAN	INTERPRETATION	MEAN	INTERPRETATION		
1.IT WAS SIMPLE TO USE.	4.17	AGREE	4.36	STRONGLY AGREE	4.30	STRONGLY AGREE
2.I BELIEVE THE GRAVE MAP WAS HELPFUL.	5.00	STRONGLY AGREE	4.57	STRONGLY AGREE	4.70	STRONGLY AGREE
3.IT WAS EASY TO FIND THE GRAVE THAT I'M SEARCHING FOR.	5.00	STRONGLY AGREE	4.57	STRONGLY AGREE	4.70	STRONGLY AGREE
4.REQUESTING SERVICE WAS USEFUL.	5.00	STRONGLY AGREE	4.43	STRONGLY AGREE	4.60	STRONGLY AGREE
5.THE INTERFACE OF THE SYSTEM WAS PLEASANT.	4.00	AGREE	4.29	STRONGLY AGREE	4.20	AGREE
ALL	4.63	STRONGLY AGREE	4.44	STRONGLY AGREE	4.52	STRONGLY AGREE
LEGEND:						

4.21 – 5.00 – STRONGLY AGREE 3.41 – 4.20 – AGREE 2.61 – 3.40 – SLIGHTLY AGREE 1.81 – 2.60 – SLIGHTLY DISAGREE 1.00 – 1.80 – DISAGREE

Table 8 showed (5) five factors to consider in system usability. The result showed excellent results for each of the items. Factor 1 got a mean value of 4.30, which translates to strongly agree. Factor 2 got 4.70, factor 3 with 4.70, and factor 4 with 4.60, which all strongly agree. Lastly, factor 5 with 4.20 translate to agree. This outcome proves that the system is deemed usable.

Respondent Evaluation in Terms of Reliability

TABLE 9: RESPONDENTS ANSWERS IN TERMS OF RELIABILITY

RELIABILITY	MALE		FEMALE		GRAND MEAN	INTERPRETATION
	MEAN	INTERPRETATION	MEAN	INTERPRETATION		
1.THE GRAVE IMAGE IN EVERY GRAVE WAS CORRECT.	4.33	STRONGLY AGREE	4.14	AGREE	4.20	AGREE
2.THE GRAVE IMAGE IS HELPFUL TO EASILY FIND THE GRAVE.	4.67	STRONGLY AGREE	4.50	STRONGLY AGREE	4.55	STRONGLY AGREE
3.THE CONTENT OF THE SYSTEM IS ARRANGED IN MANNER.	3.50	AGREE	4.07	AGREE	3.90	AGREE
ALL	4.17	AGREE	4.24	STRONGLY AGREE	4.22	STRONGLY AGREE
LEGEND: 4.21 – 5.00 – STRONGLY AGREE 3.41 – 4.20 – AGREE 2.61 – 3.40 – SLIGHTLY AGREE 1.81 – 2.60 – SLIGHTLY DISAGREE						

1.00 – 1.80 – DISAGREE

Table 9 showed (3) three factors in considering the system reliability. Factor 1 with 4.20 means which translates to agree. Factor 2 with 4.55 mean value which translates to strongly agree. These results proved that attaching images is valuable and reliable in helping visitors to have additional means of verifying the grave they own. Lastly, factor 3 got a mean value of 3.90, which translates to agree.

Respondent Evaluation in Terms of Efficiency

TABLE 10: RESPONDENTS ANSWERS IN TERMS OF EFFICIENCY

EFFICIENCY	MALE		FEMALE		GRAND MEAN	INTERPRETATION
	MEAN	INTERPRETATION	MEAN	INTERPRETATION		
1.SEARCHING OF GRAVE IS FAST ENOUGH.	4.00	AGREE	4.64	STRONGLY AGREE	4.45	STRONGLY AGREE
2.EASY TO SEARCH THE RECORD OF THE DECEASED PERSON.	5.00	STRONGLY AGREE	4.43	STRONGLY AGREE	4.60	STRONGLY AGREE
ALL	4.50	STRONGLY AGREE	4.54	STRONGLY AGREE	4.53	STRONGLY AGREE
LEGEND: 4.21 – 5.00 – STRONGLY AGREE 3.41 – 4.20 – AGREE 2.61 – 3.40 – SLIGHTLY AGREE 1.81 – 2.60 – SLIGHTLY DISAGREE 1.00 – 1.80 – DISAGREE						

Table 10 showed (2) two factors to consider the system efficiency. Factor 1 got a 4.45 mean value, and factor 2 with 4.60 mean value which both translates to strongly agree. It shows the significance of the spatial algorithm in terms of geometric search queries. The result indicates that grave search is quick and efficient in searching grave.

Respondent Evaluation in Terms of User-Friendliness

TABLE 11: RESPONDENTS ANSWERS IN TERMS OF USER-FRIENDLINESS

USER-FRIENDLINESS	MALE		FEMALE		GRAND MEAN	INTERPRETATION
	MEAN	INTERPRETATION	MEAN	INTERPRETATION		
1.THE SYSTEM RUNS SMOOTHLY AND QUICKLY.	3.50	AGREE	4.07	AGREE	3.90	AGREE
2.THE CEMETERY MAP FUNCTION SUCH AS ZOOM-IN, ZOOM-OUT, SEARCH, AND LOCATION TRACKER ARE SIMPLE TO USE.	4.83	STRONGLY AGREE	4.43	STRONGLY AGREE	4.55	STRONGLY AGREE
3 THE TEXT IS CLEAR AND READABLE.	4.00	AGREE	4.36	STRONGLY AGREE	4.25	STRONGLY AGREE
4. I NEED TO HAVE A MANUAL TO USE THE SYSTEM.	2.00	SLIGHTLY DISAGREE	2.93	SLIGHTLY AGREE	2.65	SLIGHTLY AGREE
ALL	3.58	AGREE	3.95	AGREE	3.84	AGREE

LEGEND:
4.21 – 5.00 – STRONGLY AGREE
3.41 – 4.20 – AGREE
2.61 – 3.40 – SLIGHTLY AGREE
1.81 – 2.60 – SLIGHTLY DISAGREE
1.00 – 1.80 – DISAGREE

Table 11 shows (4) four-factors to consider in the system's user-friendliness. Factor 1 has a 3.90 mean value, which translates as agree. Factor 2 with 4.55 mean value which translates to strongly agree. Factor 3 got a 4.25 mean value which also translates to strongly agree. Lastly, factor 4 with 2.65 can be translated as slightly agree. This outcome proves that the system is user-friendly and easy to use for navigation.

Discussion

Beta Test Evaluation

Based on the data presented in chapter 4, most respondents rated "Agree" on the design category with the mean value of 4.1, with an interpretation of "Agree." They were

able to like the Color of the background and icons and the visibility of the icons. At the same time, some of the respondents rated "Strongly Agree" and "Slightly Agree." Most respondents rated "Strongly Agree" in most statements in the Usability category and rated 4.49 mean value with and interpreting "Strongly Agree." They could see the system's effectiveness, particularly with the grave's map, searching for records, and requesting services. Some of the respondents rated "Agree" and "Slightly Agree." The system Reliability got a mean value of 4.21 with an interpretation of "Strongly Agree." They were able to determine the system's dependability. The image in each grave is reliable in locating the grave, and some respondents rated "Agree" and "Slightly Agree." Most respondents rated "Strongly Agree" in most statements in the Efficiency category, with a mean value of 4.47 interpreted as "Strongly Agree." The respondent could determine the system's efficiency regarding how fast searching for the grave and the searching for a deceased person was. The User-friendliness category got a mean value of 3.85 with an interpretation of "Agree." The respondent could see the system's ease of use, particularly in zooming in and out, searching, and location tracking.

Application of QGIS and Spatial Algorithm Evaluation

Based on the overall evaluation in beta testing, applying GIS and Spatial algorithms to the system was advantageous. GIS notably raised the efficiency, user-friendliness, and reliability of the system using live maps and grave tracker. At the same time, the spatial algorithm lessens the searching time to find a specific record. Based on the response of some respondents, searching was fast enough to their liking. It was good enough because the execution time was supposed to be slow. Not to mention the involvement of objects and live satellite maps, which are factors to be considered in calculating the execution time.

CHAPTER V
Conclusions and Recommendations

Conclusion

The research findings reveal that a fully functional web-based geo-mapping system is ideal. Because of how accessible and efficient it is, research results generated substantial interest and openness to the user, which proved that the perfect method of management for the cemetery is geo-mapping.

The store and search record features have significantly increased the efficiency of obtaining and inserting new deceased data. The result showed a great usability level, and that was made possible because of these features.

Research findings also reveal that geo-mapping top with the spatial algorithm for data search has the highest significance to the success of this research. It has a tremendous impact on the outcome of the system by increasing the search time of the record and increasing search outcome accuracy by displaying the data in a geo-map.

The final evaluation reveals that the research has proven that geo-mapping is the most suitable tool for cemetery management. It also showed that the research project is fully functional and usable, which is the general objective of this study. Collaborative use of QGIS, GIS, and Spatial Algorithms are undeniably the most effective and efficient tools for a geo-mapping system.

Recommendation

Since cemeteries continue to use outdated data recording methods, the researcher advised that they adopt an information system tool to maintain order. A fully functional system can aid management and even visitors in making visiting cemeteries less difficult. When fully operational, the system will enable visitors to find the grave they intended to visit with just a few taps on their mobile devices.

The management must effectively use a geo-mapping system in plotting the grave with their necessary and assigned identification to prevent grave stacking, misidentification, and grave loss. Additionally, it is advisable to include images that visitors can use as a guide to help them find their visiting graves.

For future researchers, if they also plan to develop a geo-mapping system. It is advisable to use the spatial algorithm since it is the fastest searching algorithm when working with spatial indices. When the retrieval of geometric data takes longer than is recommended for it to arrive, a geo-mapping system will become pointless. With a spatial algorithm, spatial searching would only take a couple of seconds regardless of how many spatial indices are in the database.

A cemetery-related online service should be integrated into the system, as well. The management could use this additional income to cover costs associated with operating and maintaining the cemetery. Online scheduling of services would reduce the number of visitors who bring their sharp objects into cemeteries; this feature also helps ensure other visitors' safety.

For the final recommendation, it is advisable to use advanced GIS technology as open-source GIS has limitations. Advanced GIS technology is software that is not free to download and use but requires a subscription fee. Researchers can develop an advanced and more accurate solution with advanced GIS technology.

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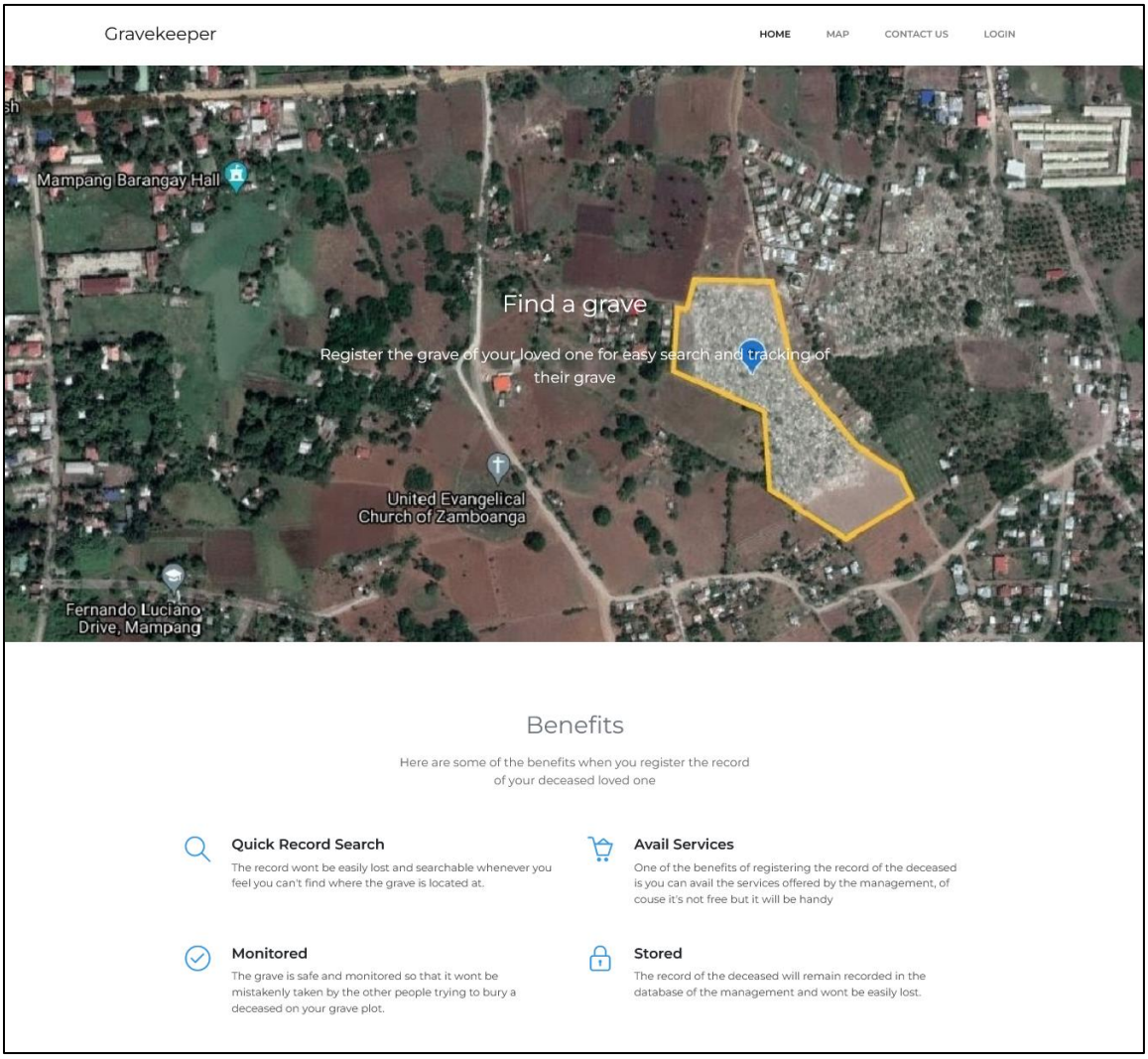
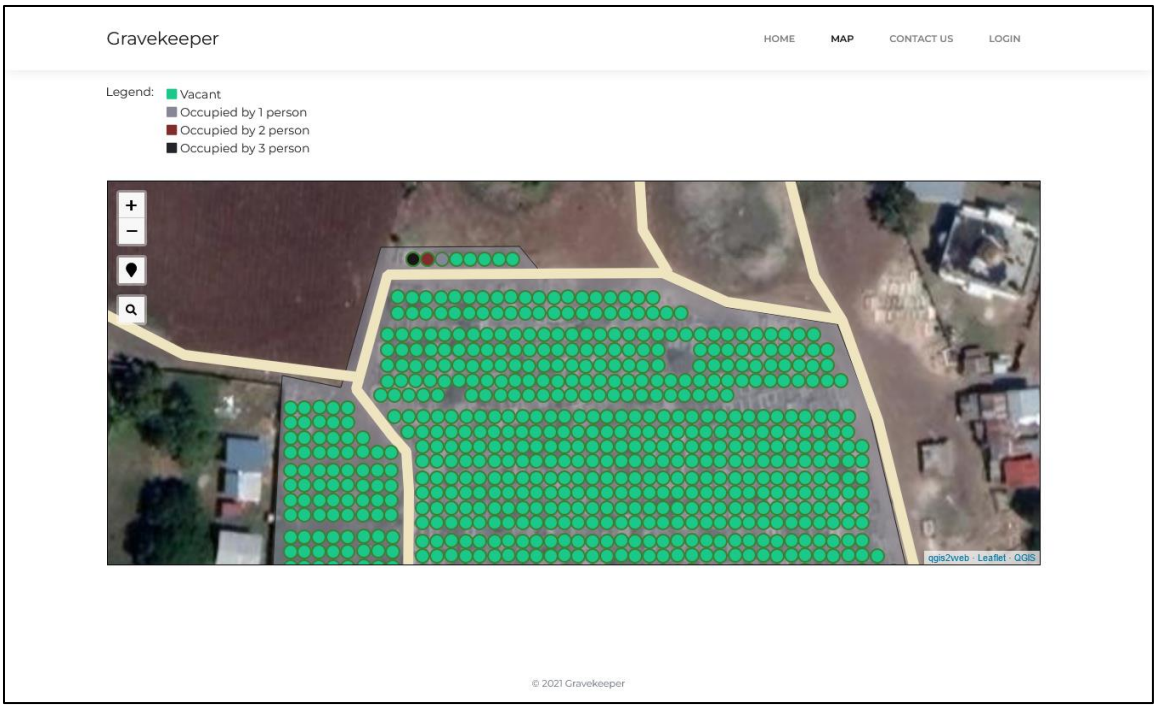
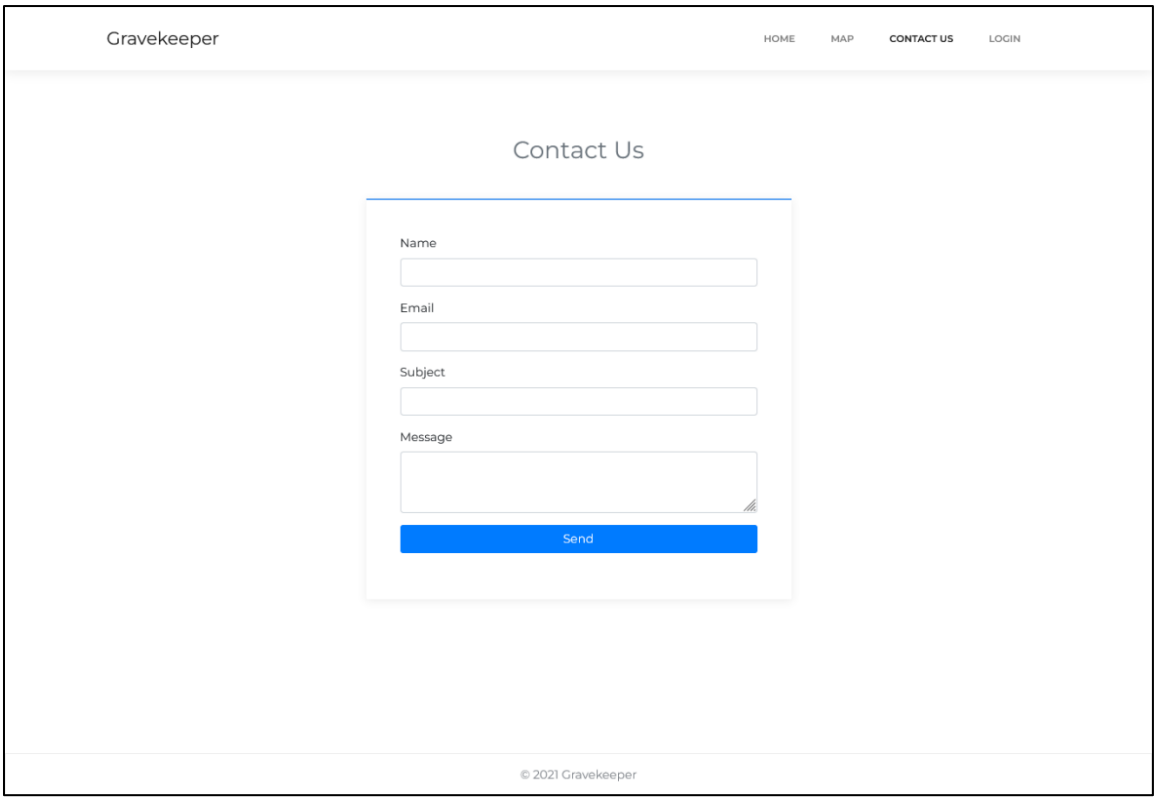
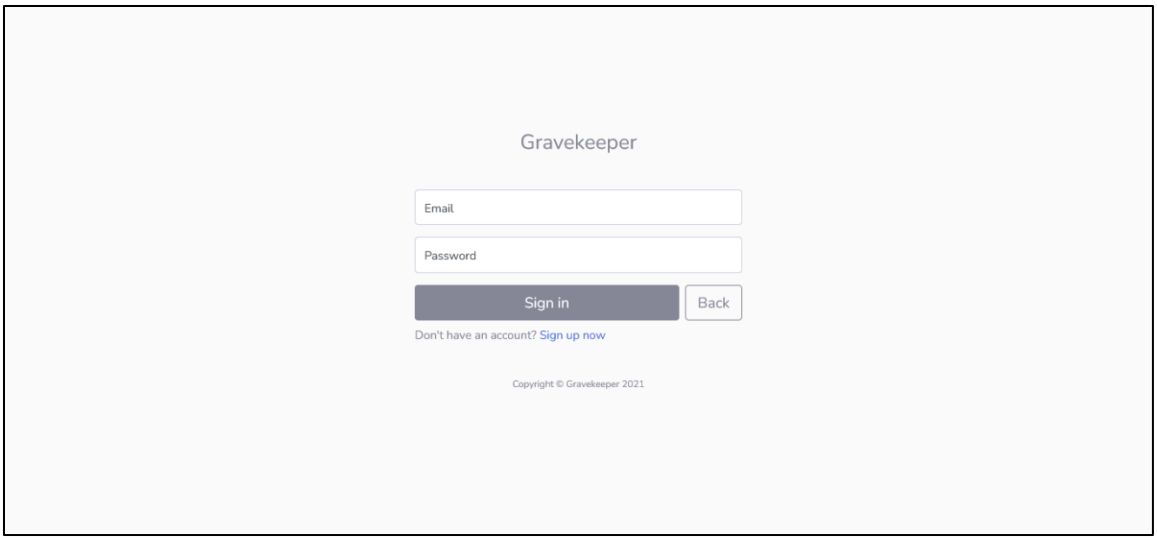
Appendix A

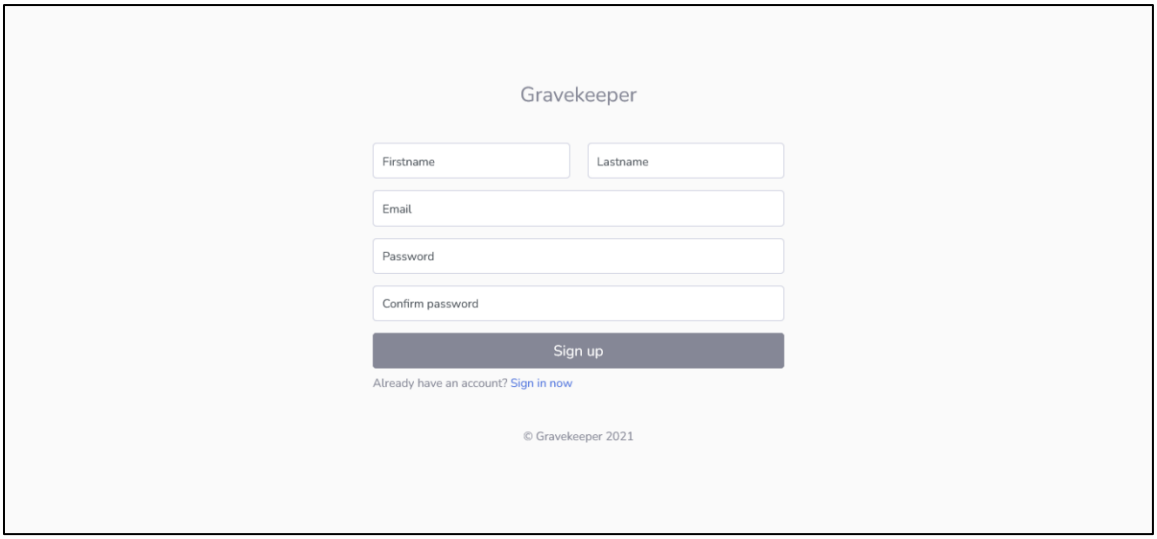
Screenshot/Picture of the System

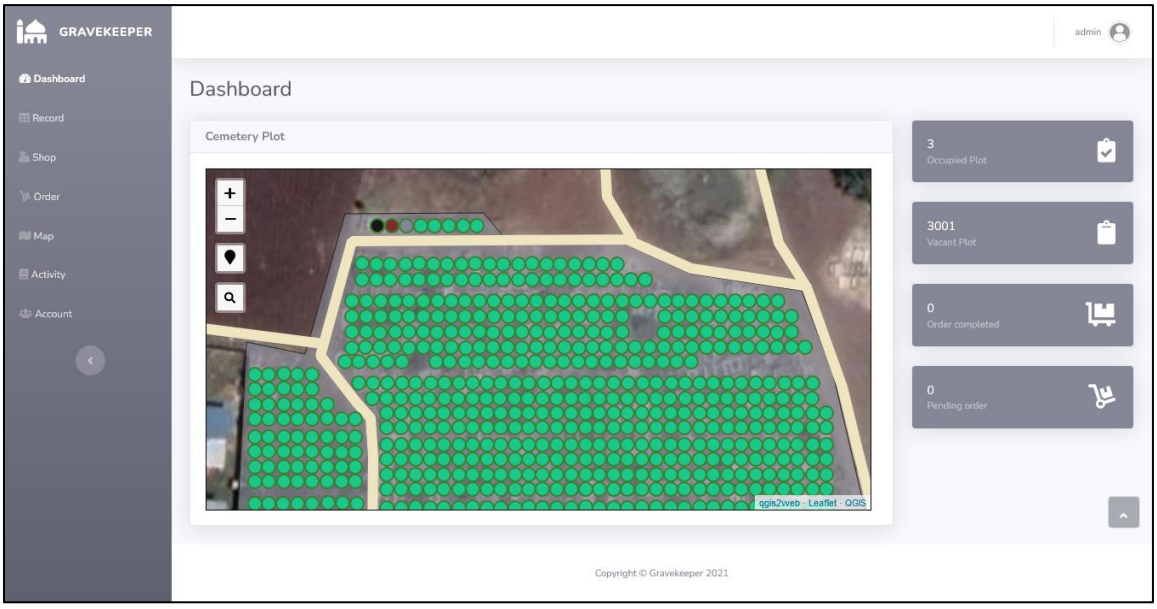


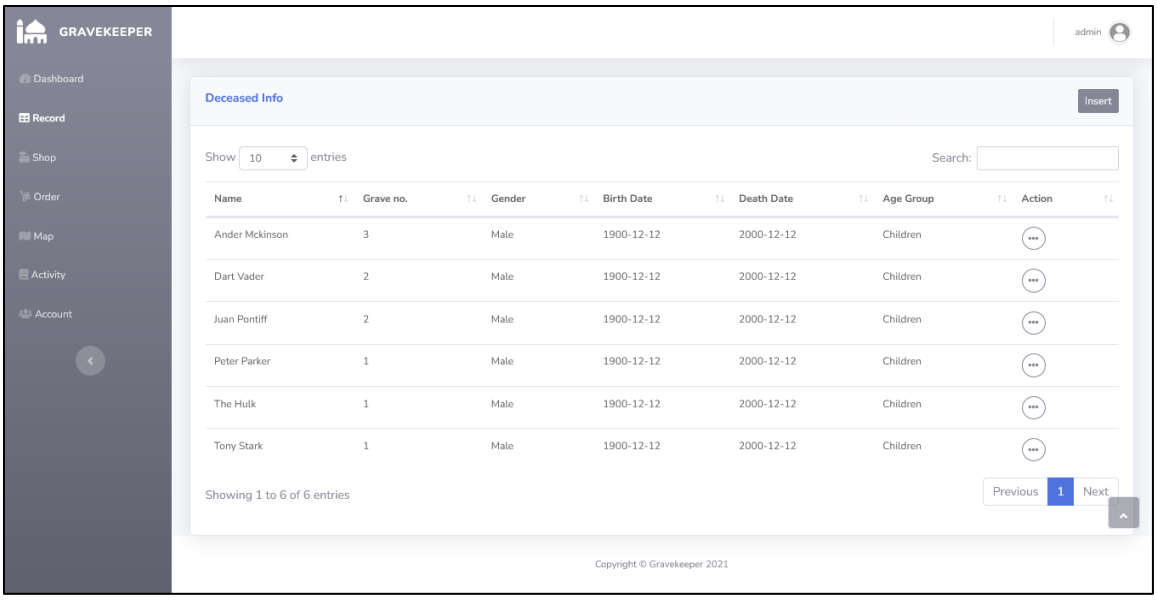

Gravekeeper
HOME
MAP
CONTACT US
LOGIN
Legend:
Vacant
Occupied by 1 person
Occupied by 2 person
Occupied by 3 person
qgis2web · Leaflet · QGIS
© 2021 Gravekeeper

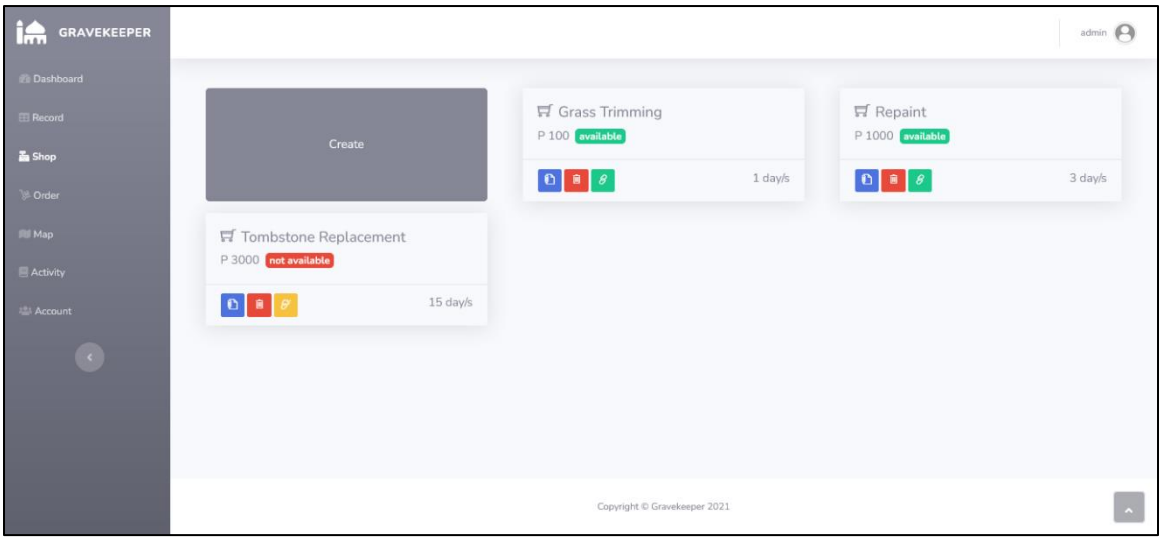

Gravekeeper
HOME
MAP
CONTACT US
LOGIN
Contact Us
Name
Email
Subject
Message
Send
© 2021 Gravekeeper

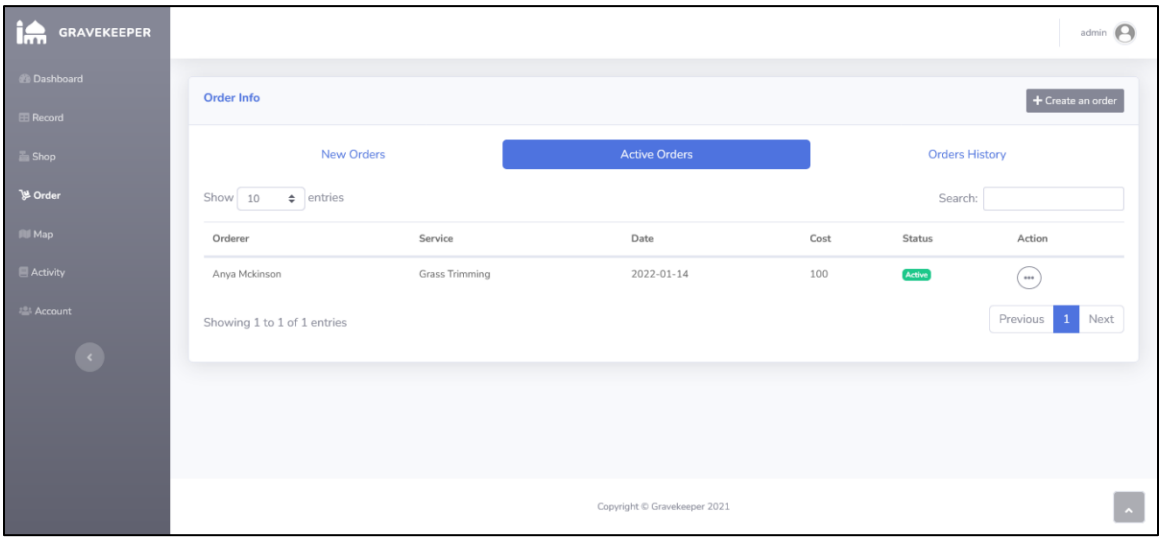

Gravekeeper
Email
Password
Sign in
Back
Don't have an account? Sign up now
Copyright © Gravekeeper 2021

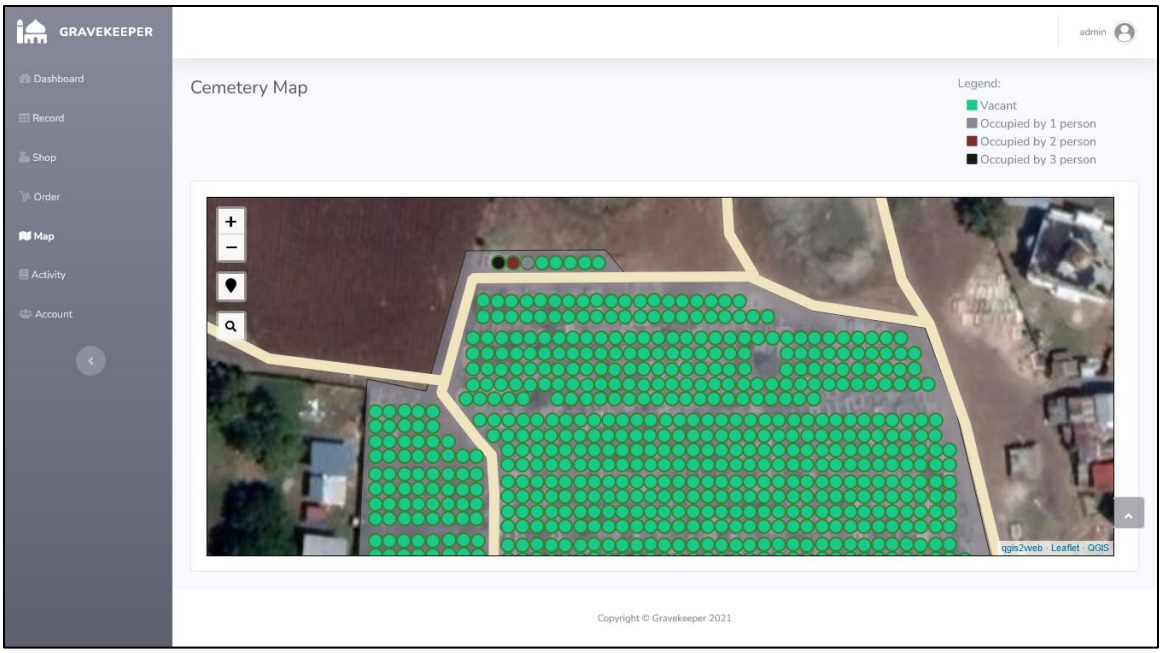

Gravekeeper
Firstname
Lastname
Email
Password
Confirm password
Sign up
Already have an account? Sign in now
© Gravekeeper 2021

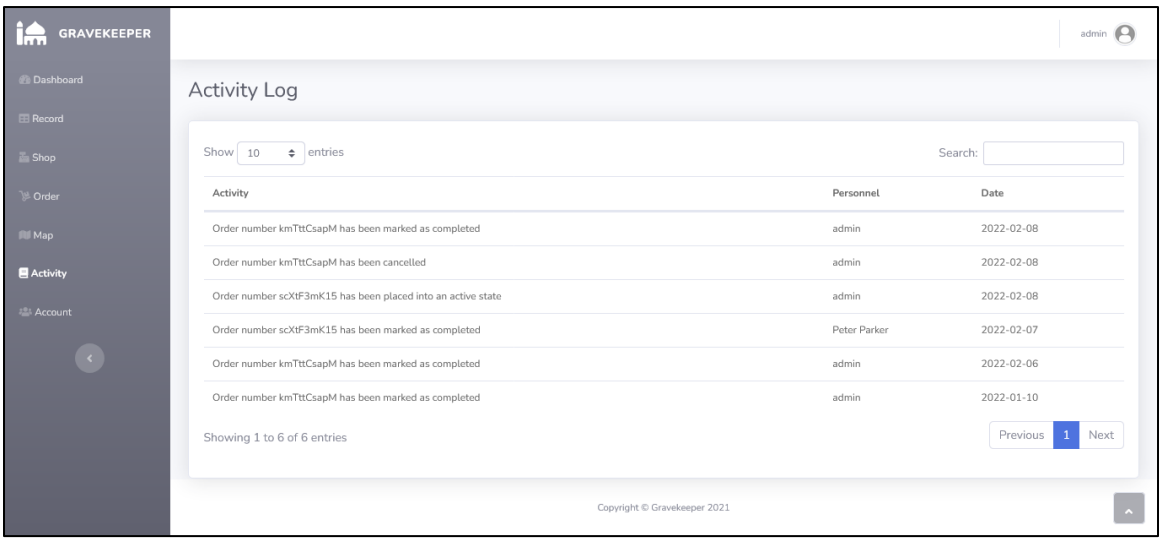

GRAVEKEEPER
admin
Dashboard
Record
Shop
Order
Map
Activity
Account
Dashboard
Cemetery Plot
qgis2web · Leaflet · QGIS
3
Occupied Plot
3001
Vacant Plot
0
Order completed
0
Pending order
Copyright © Gravekeeper 2021

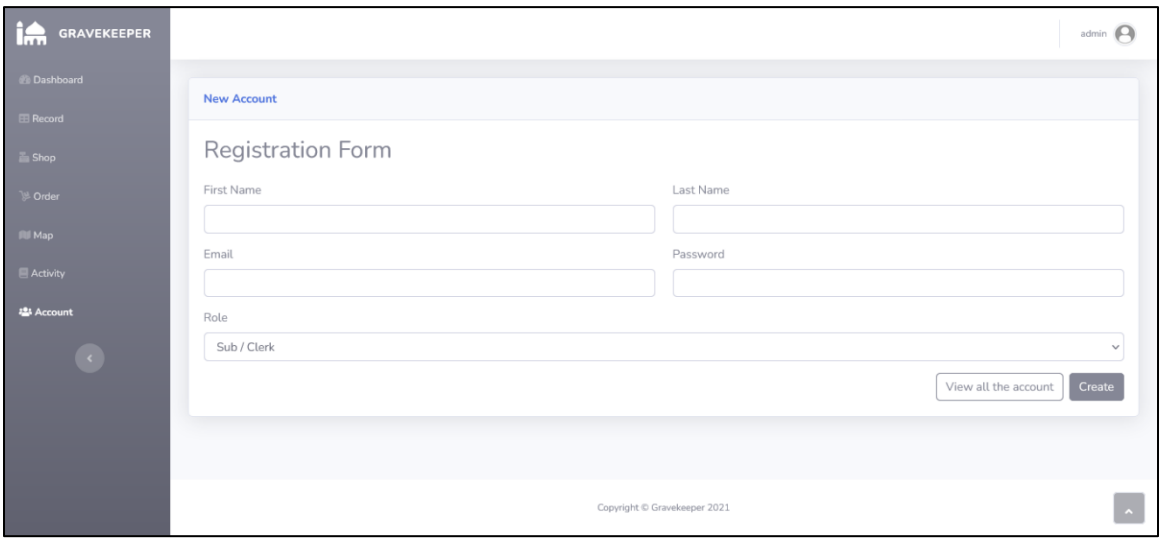

GRAVEKEEPER
admin
Dashboard
Record
Shop
Order
Map
Activity
Account
Deceased Info
Insert
Show 10 entries
Search:
Name
Grave no.
Gender
Birth Date
Death Date
Age Group
Action
Ander Mckinson 3 Male 1900-12-12 2000-12-12 Children
Dart Vader 2 Male 1900-12-12 2000-12-12 Children
Juan Pontiff 2 Male 1900-12-12 2000-12-12 Children
Peter Parker 1 Male 1900-12-12 2000-12-12 Children
The Hulk 1 Male 1900-12-12 2000-12-12 Children
Tony Stark 1 Male 1900-12-12 2000-12-12 Children
Showing 1 to 6 of 6 entries
Previous 1 Next
Copyright © Gravekeeper 2021

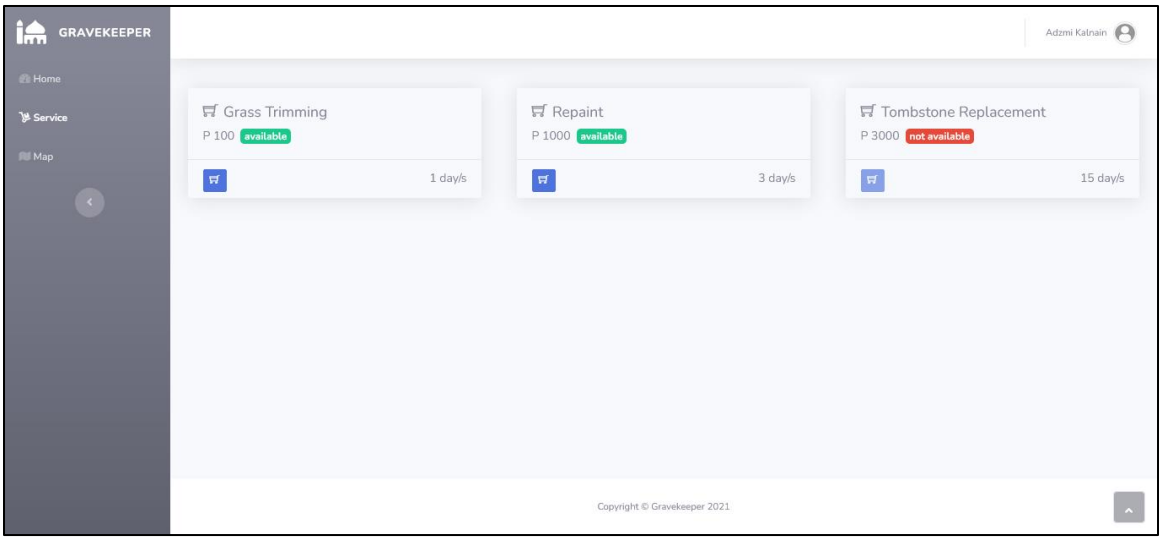

GRAVEKEEPER
admin
Dashboard
Record
Shop
Order
Map
Activity
Account
Create
Grass Trimming
P 100 available
1 day/s
Repaint
P 1000 available
3 day/s
Tombstone Replacement
P 3000 not available
15 day/s
Copyright © Gravekeeper 2021


GRAVEKEEPER
admin
Dashboard
Record
Shop
Order
Map
Activity
Account
Order Info
+ Create an order
New Orders
Active Orders
Orders History
Show 10 entries
Search:
Orderer
Service
Date
Cost
Status
Action
Anya Mckinson Grass Trimming 2022-01-14 100 Active
Showing 1 to 1 of 1 entries
Previous 1 Next
Copyright © Gravekeeper 2021


GRAVEKEEPER
admin
Dashboard
Record
Shop
Order
Map
Activity
Account
Cemetery Map
Legend:
Vacant
Occupied by 1 person
Occupied by 2 person
Occupied by 3 person
qgis2web · Leaflet · QGIS
Copyright © Gravekeeper 2021


GRAVEKEEPER
admin
Dashboard
Record
Shop
Order
Map
Activity
Account
Activity Log
Show 10 entries
Search:
Activity
Personnel
Date
Order number kmTttCsapM has been marked as completed
admin
2022-02-08
Order number kmTttCsapM has been cancelled
admin
2022-02-08
Order number scXtF3mK15 has been placed into an active state
admin
2022-02-08
Order number scXtF3mK15 has been marked as completed
Peter Parker
2022-02-07
Order number kmTttCsapM has been marked as completed
admin
2022-02-06
Order number kmTttCsapM has been marked as completed
admin
2022-01-10
Showing 1 to 6 of 6 entries
Previous
1
Next
Copyright © Gravekeeper 2021


GRAVEKEEPER
admin
Dashboard
Record
Shop
Order
Map
Activity
Account
New Account
Registration Form
First Name
Last Name
Email
Password
Role
Sub / Clerk
View all the account
Create
Copyright © Gravekeeper 2021


GRAVEKEEPER
Home
Service
Map
Adzmi Kalnain
Grass Trimming
P 100 available
1 day/s
Repaint
P 1000 available
3 day/s
Tombstone Replacement
P 3000 not available
15 day/s
Copyright © Gravekeeper 2021

Appendix B

Pre-evaluation

Questions	Choices
First Name	
Last Name	
Gender	Male, Female, Gay, prefer not to say
Age	
Marital Status	Married, Widowed, living with partner, Separated, Single
Employment Status	Employed Full-time, Employed Part-time, Retired, Student, Not Employed, Other
Income	Less than 10k, 10k – 20k, 20k- 30k, 40k or more, none

Item No.	Questions	Choices
1	Do you have a deceased family member/relative buried in a cemetery?	Yes, No
2	How often do you visit their grave/s?	Once a year, Twice a year, Thrice a year or more, other
3	Whenever you visit the cemetery, can you locate their graves immediately?	Yes, No, Sometimes
4	Does the cemetery where your deceased relatives/family buried have a management office?	Yes, No, Maybe
5	Who is responsible for maintaining the grave?	Family, Caretaker, Management, None, Other
6	Are there annual maintenance fees?	Yes, No, Sometimes
7	How much are you willing to pay for a grave annual maintenance?	1k or less, 1k to 5k, 5k to 10k, 10k or more
8	Where can you ask for help or file a complaint?	Caretaker, Family, Police, Management, None
9	How do you purchase Burial plot?	Email, Phone, Online, In person, Other

10	Did you signed a contract to purchase burial plot and other cemetery goods and services?	Yes, No, Maybe
11	Have you done comparative shopping on burial plots, burial services, or funeral services?	Yes, No, Maybe
12	Are you in favor of cemeteries having a management system? Which support grave tracking, plot management, information management, order services, and more.	Yes, No, Maybe
13	Rate your satisfaction level with the current cemetery or cemetery management if there is one. From 1 as lowest and 5 as the highest.	1, 2, 3, 4, 5

Appendix C

Beta Testing Questionnaire

Message to respondent:

The researcher are students of Western Mindanao State University taking BS Computer Science and is currently working on a thesis entitled “Zamboanga Muslim Cemetery Web-based Geo-Mapping System using Quantum Geographic Information System”.

The study aims to create a geo-mapping system to aid cemetery administration in storing and retrieving burial records and integrate a web map with a quantum graphic information system to map graves.

Please rest assured that your responses and opinions to this survey will be kept entirely confidential. The results of the survey will be examined and interpreted solely for academic reasons. Your involvement is much appreciated, as it will aid the researchers in further analyzing the efficacy of employing geo-mapping technology to manage the cemetery.

I. Respondent Profile

Direction: Please provide the information requested by writing on the space provided or by checking the box which correspond to your profile.

Name:

Gender: ☐ Male ☐ Female

II. Software Characteristic

Direction: After visiting or using the system “Grave keeper”, please kindly answer the following statement with honesty and accurately as you can by selecting your preferred choices.

Legend:

5 – Strongly agree

4 – Agree

3 – Slightly Agree

2 – Slightly Disagree

1 – Strongly Disagree

Design					
	5	4	3	2	1
1. The background color was good					
2. I like the color of the icon					
3. The size of the icons is visible enough					

Usability					
	5	4	3	2	1
1. It was simple to use					
2. I believe the grave map was very helpful					
3. It was easy to find the grave I'm searching for					
4. Sending service request was useful					
5. The interface of the system was pleasant					

Efficiency					
	5	4	3	2	1
1. Searching of grave is fast enough					
2. Search result is consistent and correct					

Reliability					
	5	4	3	2	1
1. The grave images are correct					
2. The grave image is helpful to easily find the plot					
3. The content of the system is arranged in orderly manner.					

User-friendliness					
	5	4	3	2	1
1. The system runs smoothly and quickly					
2. The cemetery map function such as zoom-in, zoom-out, search and location tracker are simple to use					
3. The text is clear and readable					
4. I need to have a manual to use the system					

Appendix D

Beta Testing Raw Data

SN	Respondent	Categories							
		Category 1			Category 2				
		Item1	Item2	Item3	Item1	Item2	Item3	Item4	Item5
1	Male 1	5	5	5	5	5	5	5	5
2	Male 2	4	4	5	4	5	5	5	4
3	Male 3	4	4	4	4	5	5	5	4
4	Male 4	4	4	4	5	5	5	5	4
5	Male 5	4	4	4	4	5	5	5	3
6	Male 6	4	3	4	3	5	5	5	4
7	Female 1	5	5	5	5	5	5	5	5
8	Female 2	4	4	4	4	4	4	4	4
9	Female 3	4	4	4	4	5	5	4	4
10	Female 4	3	4	4	4	5	4	4	4
11	Female 5	4	4	4	4	3	4	3	3
12	Female 6	4	4	5	5	4	4	5	5
13	Female 7	5	5	4	5	5	5	5	5
14	Female 8	5	5	5	5	5	5	5	5
15	Female 9	4	4	4	4	5	5	5	4
16	Female 10	4	4	4	5	5	5	4	3
17	Female 11	4	3	4	3	5	5	5	4
18	Female 12	4	4	3	4	5	5	5	5
19	Female 13	4	5	5	5	3	3	4	5
20	Female 14	3	4	4	4	5	5	4	4

SN	Respondent	Categories				
		Category 3		Category 4		
		Item1	Item2	Item1	Item2	Item3
1	Male 1	5	5	5	5	5
2	Male 2	4	5	4	5	3
3	Male 3	4	5	4	5	3
4	Male 4	3	5	4	5	3
5	Male 5	4	5	5	5	3
6	Male 6	4	5	4	3	4
7	Female 1	5	4	5	5	4
8	Female 2	4	4	4	4	4
9	Female 3	5	3	4	5	5
10	Female 4	5	4	4	3	4
11	Female 5	3	3	3	4	3
12	Female 6	4	5	4	4	5
13	Female 7	5	5	5	5	5
14	Female 8	5	5	5	5	5
15	Female 9	5	5	5	5	3
16	Female 10	5	5	4	5	3
17	Female 11	5	5	4	4	4
18	Female 12	5	5	3	5	3
19	Female 13	4	4	4	4	5
20	Female 14	5	5	4	5	4

SN	Respondent	Category 5			
		Item1	Item2	Item3	Item4
1	Male 1	5	5	5	5
2	Male 2	4	5	4	1
3	Male 3	3	5	4	2
4	Male 4	3	5	4	2
5	Male 5	3	5	4	1
6	Male 6	3	4	3	1
7	Female 1	5	5	5	5
8	Female 2	4	4	4	4
9	Female 3	4	5	5	3
10	Female 4	4	4	5	4
11	Female 5	4	4	4	4
12	Female 6	4	3	4	1
13	Female 7	5	5	5	5
14	Female 8	5	5	5	5
15	Female 9	4	5	4	1
16	Female 10	3	5	3	1
17	Female 11	3	4	4	3
18	Female 12	3	4	4	2
19	Female 13	5	4	5	2
20	Female 14	4	5	4	1

Category 1: Design

Category 2: Usability

Category 3: Efficiency

Category 4: Reliability

Category 5: User-friendliness

Appendix E

Descriptive Statistics

DESIGN CATEGORY

Descriptive Statistics

	N	Mean	Std Dev
ITEM1	20	4.10	.55
ITEM2	20	4.15	.59
ITEM3	20	4.25	.55
Valid N (listwise)	20		
Missing N (listwise)	0		

Case Processing Summary

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
ITEM1 * GENDER	20	100.0%	0	.0%	20	100.0%
ITEM2 * GENDER	20	100.0%	0	.0%	20	100.0%
ITEM3 * GENDER	20	100.0%	0	.0%	20	100.0%

ITEM1 * ITEM2 * ITEM3 * GENDER

GENDER		ITEM1	ITEM2	ITEM3
MALE	Mean	4.17	4.00	4.33
	N	6	6	6
	Std. Deviation	.41	.63	.52
FEMALE	Mean	4.07	4.21	4.21
	N	14	14	14
	Std. Deviation	.62	.58	.58
Total	Mean	4.10	4.15	4.25
	N	20	20	20
	Std. Deviation	.55	.59	.55

USABILITY CATEGORY

Descriptive Statistics

	N	Mean	Std Dev
ITEM1	20	4.30	.66
ITEM2	20	4.70	.66
ITEM3	20	4.70	.57
ITEM4	20	4.60	.60
ITEM5	20	4.20	.70
Valid N (listwise)	21		
Missing N (listwise)	1		

Case Processing Summary

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
ITEM1 * GENDER	20	95.2%	1	4.8%	21	100.0%
ITEM2 * GENDER	20	95.2%	1	4.8%	21	100.0%
ITEM3 * GENDER	20	95.2%	1	4.8%	21	100.0%
ITEM4 * GENDER	20	95.2%	1	4.8%	21	100.0%
ITEM5 * GENDER	20	95.2%	1	4.8%	21	100.0%

ITEM1 * ITEM2 * ITEM3 * ITEM4 * ITEM5 * GENDER

GENDER		ITEM1	ITEM2	ITEM3	ITEM4	ITEM5
MALE	Mean	4.17	5.00	5.00	5.00	4.00
	N	6	6	6	6	6
	Std. Deviation	.75	.00	.00	.00	.63
FEMALE	Mean	4.36	4.57	4.57	4.43	4.29
	N	14	14	14	14	14
	Std. Deviation	.63	.76	.65	.65	.73
Total	Mean	4.30	4.70	4.70	4.60	4.20
	N	20	20	20	20	20
	Std. Deviation	.66	.66	.57	.60	.70

RELIABILITY CATEGORY

Descriptive Statistics

	N	Mean	Std Dev
ITEM1	20	4.20	.62
ITEM2	20	4.55	.69
ITEM3	20	3.90	.85
Valid N (listwise)	21		
Missing N (listwise)	1		

Case Processing Summary

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
ITEM1 * GENDER	20	95.2%	1	4.8%	21	100.0%
ITEM2 * GENDER	20	95.2%	1	4.8%	21	100.0%
ITEM3 * GENDER	20	95.2%	1	4.8%	21	100.0%

ITEM1 * ITEM2 * ITEM3 * GENDER

GENDER		ITEM1	ITEM2	ITEM3
MALE	Mean	4.33	4.67	3.50
	N	6	6	6
	Std. Deviation	.52	.82	.84
FEMALE	Mean	4.14	4.50	4.07
	N	14	14	14
	Std. Deviation	.66	.65	.83
Total	Mean	4.20	4.55	3.90
	N	20	20	20
	Std. Deviation	.62	.69	.85

EFFICIENCY CATEGORY

Descriptive Statistics

	N	Mean	Std Dev
ITEM1	20	4.45	.69
ITEM2	20	4.60	.68
Valid N (listwise)	21		
Missing N (listwise)	1		

Case Processing Summary

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
ITEM1 * GENDER	20	95.2%	1	4.8%	21	100.0%
ITEM2 * GENDER	20	95.2%	1	4.8%	21	100.0%

ITEM1 * ITEM2 * GENDER

GENDER		ITEM1	ITEM2
MALE	Mean	4.00	5.00
	N	6	6
	Std. Deviation	.63	.00
FEMALE	Mean	4.64	4.43
	N	14	14
	Std. Deviation	.63	.76
Total	Mean	4.45	4.60
	N	20	20
	Std. Deviation	.69	.68

USER-FRIENDLINESS CATEGORY

Descriptive Statistics

	N	Mean	Std Dev
ITEM1	20	3.90	.79
ITEM2	20	4.55	.60
ITEM3	20	4.25	.64
ITEM4	20	2.65	1.60
Valid N (listwise)	21		
Missing N (listwise)	1		

Case Processing Summary

	Cases					
	Included		Excluded		Total	
	N	Percent	N	Percent	N	Percent
ITEM1 * GENDER	20	95.2%	1	4.8%	21	100.0%
ITEM2 * GENDER	20	95.2%	1	4.8%	21	100.0%
ITEM3 * GENDER	20	95.2%	1	4.8%	21	100.0%
ITEM4 * GENDER	20	95.2%	1	4.8%	21	100.0%

ITEM1 * ITEM2 * ITEM3 * ITEM4 * GENDER

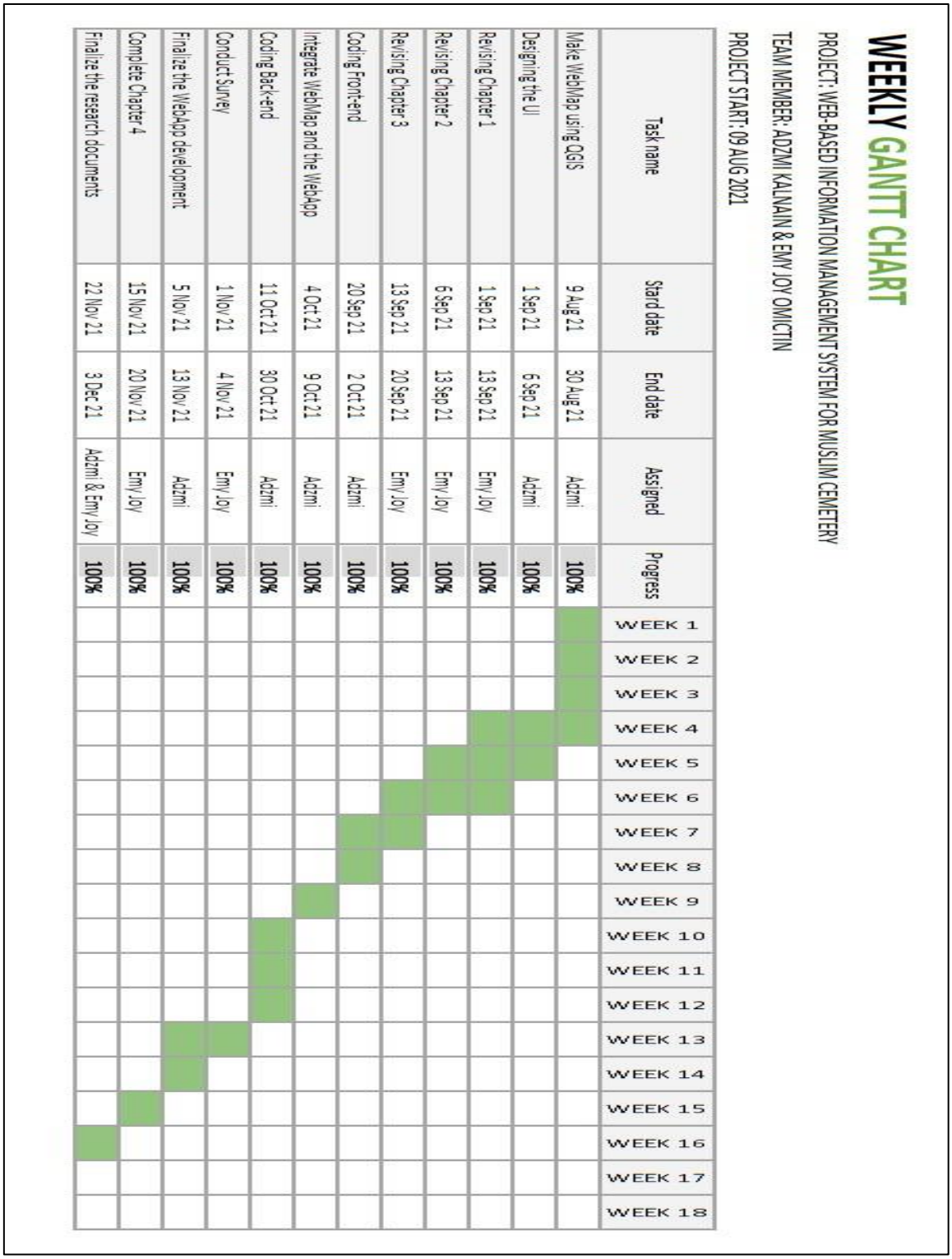
GENDER		ITEM1	ITEM2	ITEM3	ITEM4
MALE	Mean	3.50	4.83	4.00	2.00
	N	6	6	6	6
	Std. Deviation	.84	.41	.63	1.55
FEMALE	Mean	4.07	4.43	4.36	2.93
	N	14	14	14	14
	Std. Deviation	.73	.65	.63	1.59
Total	Mean	3.90	4.55	4.25	2.65
	N	20	20	20	20
	Std. Deviation	.79	.60	.64	1.60

Appendix F

Picture of some of the Unrecognizable Graves

Appendix G

Weekly Gantt Chart



WEEKLY GANTT CHART

PROJECT: WEB-BASED INFORMATION MANAGEMENT SYSTEM FOR MUSLIM CEMETERY

TEAM MEMBER: ADZMI KALNAIN & EMY JOY OMICTIN

PROJECT START: 09 AUG 2021

Task name	Stard date	End date	Assigned	Progress	WEEK 1	WEEK 2	WEEK 3	WEEK 4	WEEK 5	WEEK 6	WEEK 7	WEEK 8	WEEK 9	WEEK 10	WEEK 11	WEEK 12	WEEK 13	WEEK 14	WEEK 15	WEEK 16	WEEK 17	WEEK 18
Make WebMap using QGIS	9 Aug 21	30 Aug 21	Adzmi	100%																		
Designing the UI	1 Sep 21	6 Sep 21	Adzmi	100%																		
Revising Chapter 1	1 Sep 21	13 Sep 21	Emy Joy	100%																		
Revising Chapter 2	6 Sep 21	13 Sep 21	Emy Joy	100%																		
Revising Chapter 3	13 Sep 21	20 Sep 21	Emy Joy	100%																		
Coding Front-end	20 Sep 21	2 Oct 21	Adzmi	100%																		
Integrate WebMap and the WebApp	4 Oct 21	9 Oct 21	Adzmi	100%																		
Coding Back-end	11 Oct 21	30 Oct 21	Adzmi	100%																		
Conduct Survey	1 Nov 21	4 Nov 21	Emy Joy	100%																		
Finalize the WebApp development	5 Nov 21	13 Nov 21	Adzmi	100%																		
Complete Chapter 4	15 Nov 21	20 Nov 21	Emy Joy	100%																		
Finalize the research documents	22 Nov 21	3 Dec 21	Adzmi & Emy Joy	100%																		

Appendix H

User Manual

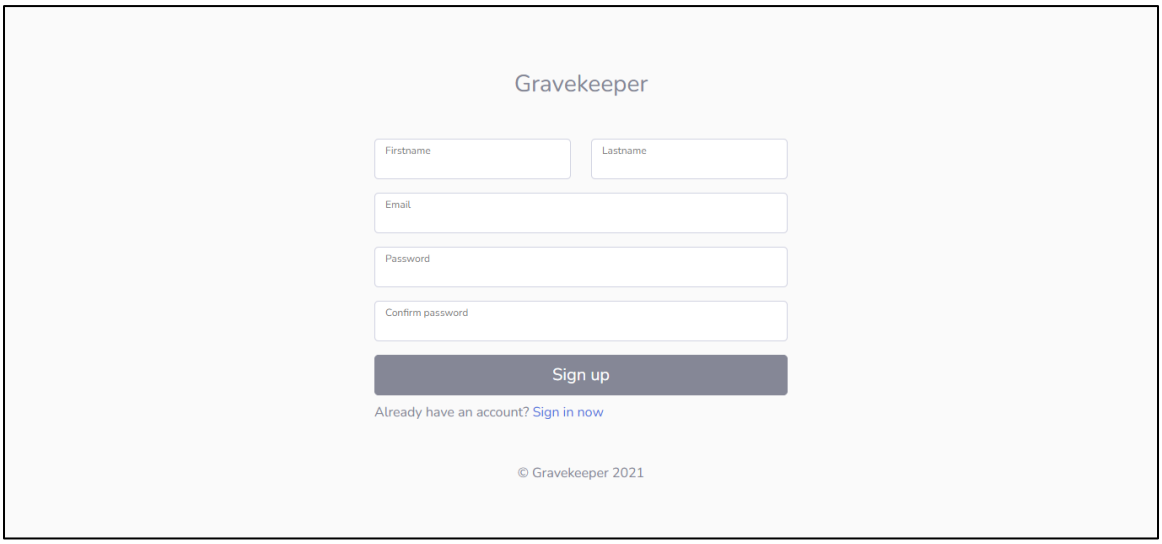
1. Introduction

The gravekeeper system aims to upgrade the inner workings of a Muslim cemetery. It can perform tasks such as plotting deceased records in a spatial object on a map. Using the map search feature, records can be quickly located. The system also supports cemetery services to facilitate the maintenance of graves. In addition, it includes features for tracking and maintaining cemetery records, such as information about the deceased, their family members, and the details of their burial plots. This allows cemetery staff to quickly access important information about graves and burial plots. The gravekeeper system also provides tools for managing and organizing other aspects of cemetery operations, such as scheduling burials, managing burial plots, and tracking available grave spaces.

2. Getting Started

To get started, the user must have an open browser, such as Google Chrome, but preferably the latest version. After opening a browser, the user must navigate to www.gravekeeper.website (note: the website may be down at the time of reading this document if hosting has already expired).

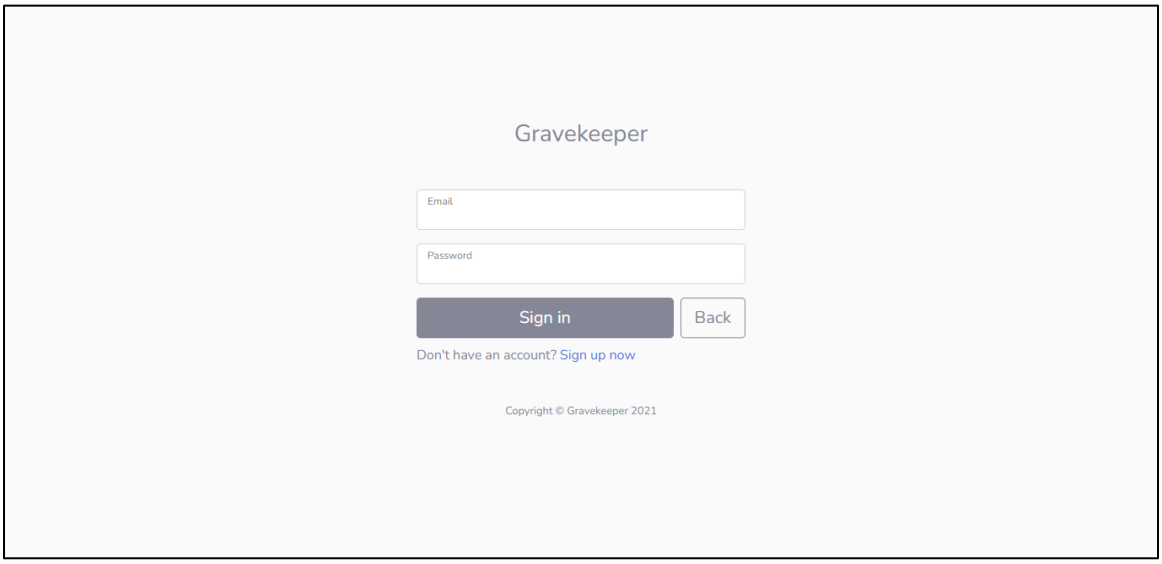
2.1. User Registration



To use the system, the user must first register to create an account. To register, the user must provide the necessary information, such as their name, email,

contact number, and the password they want to use. If registration is successful, the user will be notified with a green banner. If it is unsuccessful, the form will be marked with red borders.

2.2. Logging in

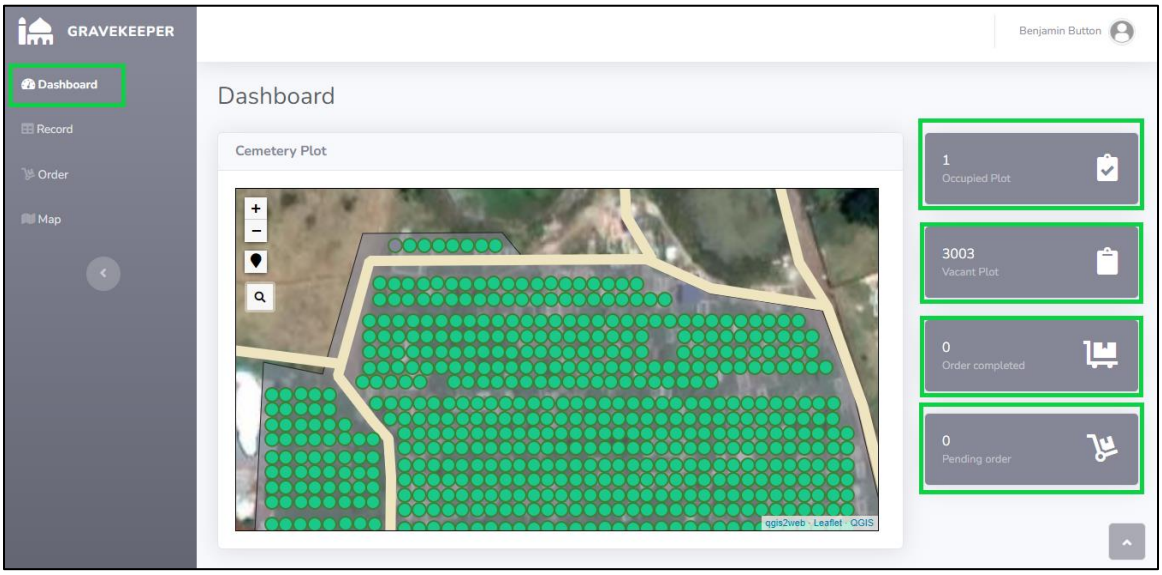


To log in, the user must have an account. In the login field, the user can input their username/email and password that they provided during registration. After entering the correct credentials, the user will be redirected to their dashboard. For admin-level users, they will be redirected to the admin/admin aide dashboard.

3. Admin / Admin Aide

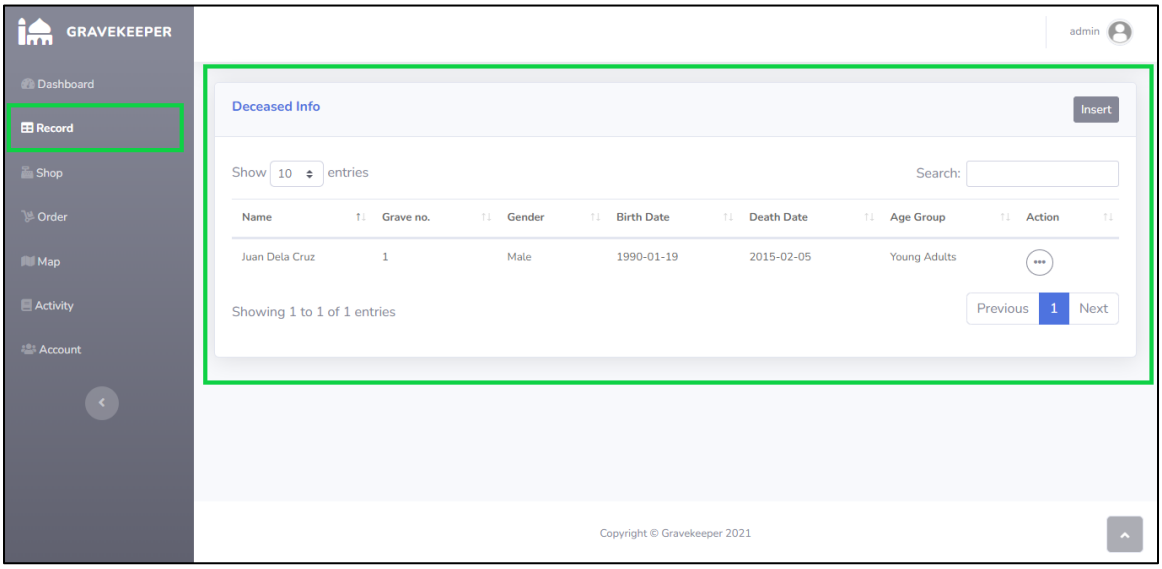
The admin role has access to the most crucial features of the system. The admin is in charge of inserting new records of the deceased, facilitating service requests, monitoring available grave spaces, and creating or setting the status of services. The admin and admin aide have almost the same functional access, with the only difference being that the admin has access to the shop and activity logs.

3.1. Dashboard



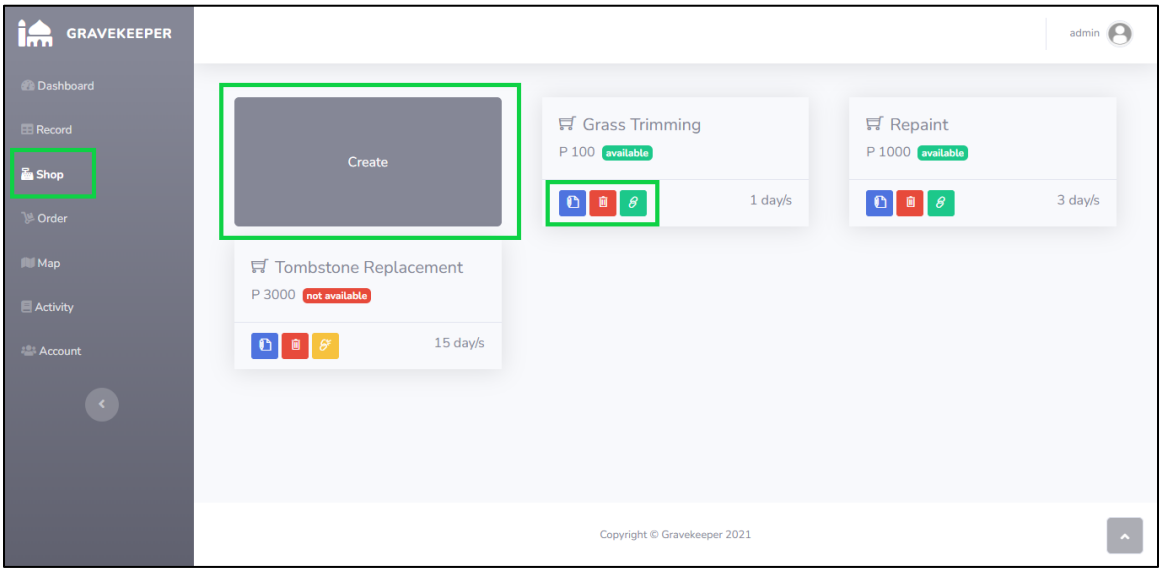
The admin dashboard contains information such as the availability of grave space, the number of occupied graves, and the number of pending and completed services. The map is also displayed as a reference to easily confirm the grave status.

3.2. Records



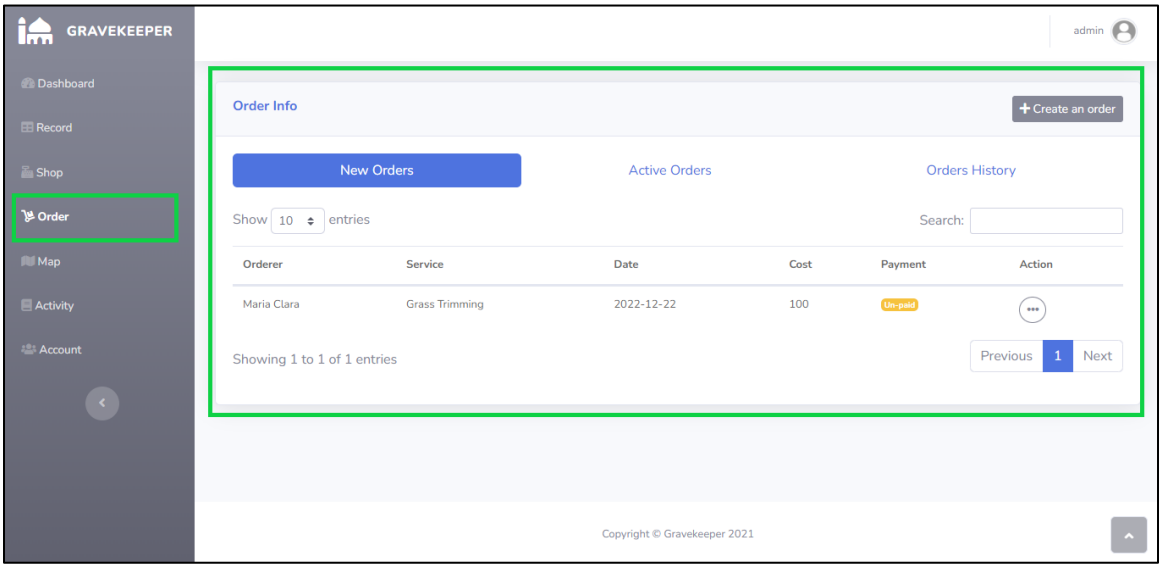
The admin can monitor all the deceased records that are registered and can insert new records or edit existing ones. Inserting a new record requires the personal information of the deceased as well as the information of the contact person or owner who will be responsible for the grave.

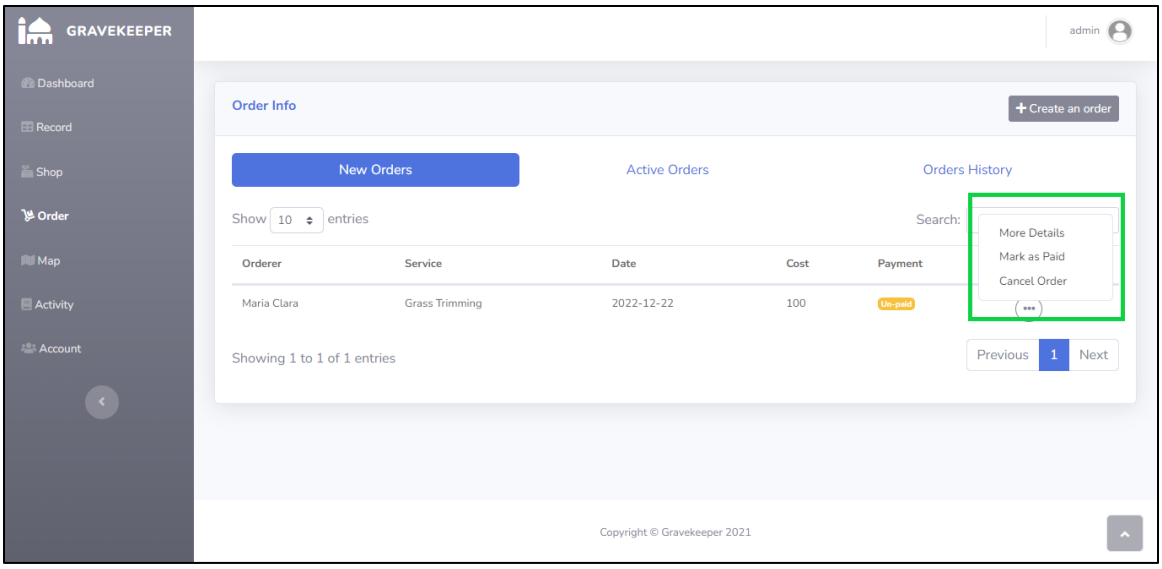
3.3. Shop



An admin can create a new service or edit an existing one. Services marked with a green label are available for users to request, while those marked with red are unavailable. Deletion is also possible. When creating a new service, the service name, fee, duration to complete, and starting availability are required.

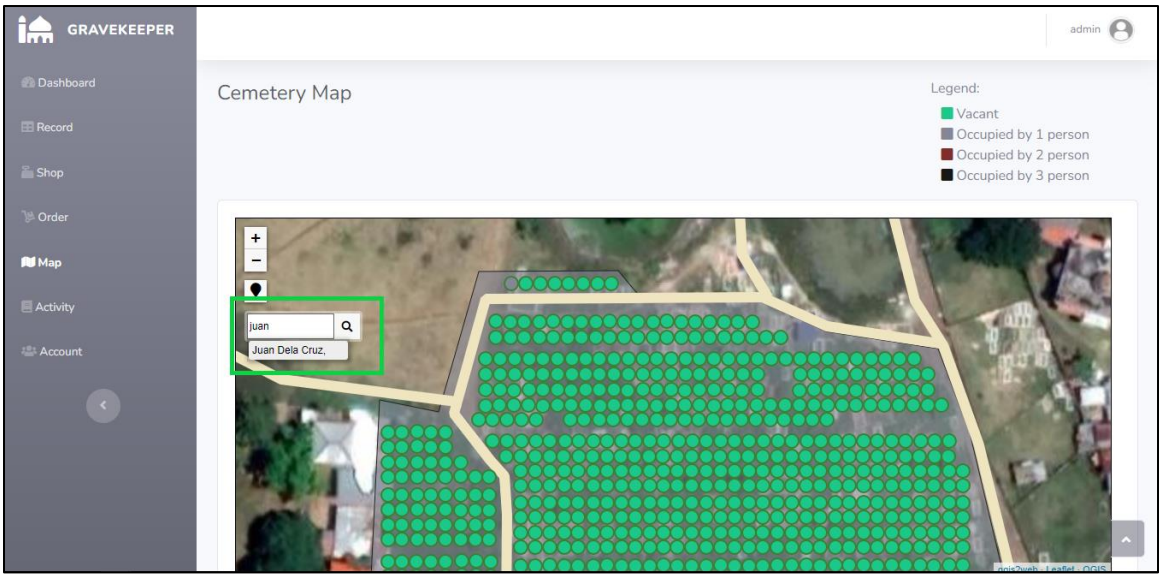
3.4. Order

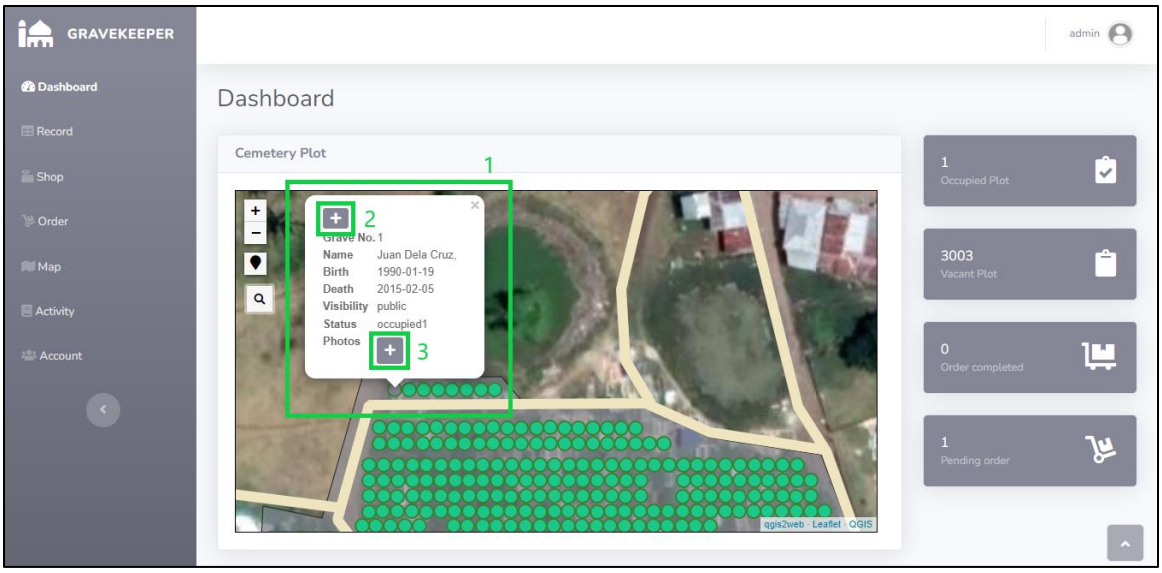




Admins and admin aides are responsible for monitoring service requests. A request can only be placed in the active state after the requestor pays for it. A request in the active state means that it is being worked on and is expected to be completed based on the duration set for each service. Marking the request as complete will notify the requestor via email, along with a digital receipt.

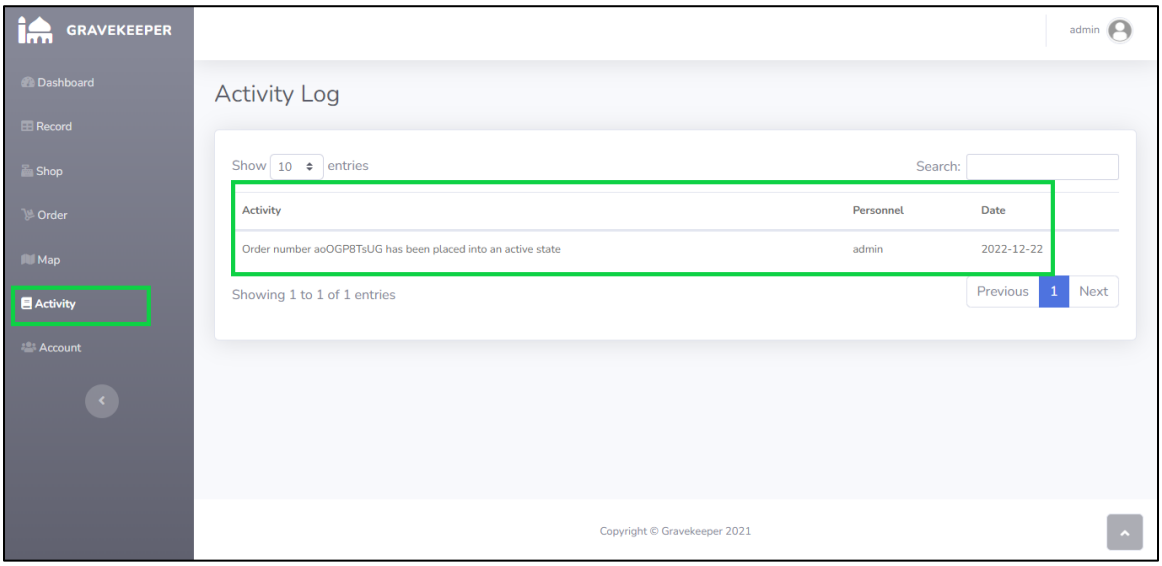
3.5. Map





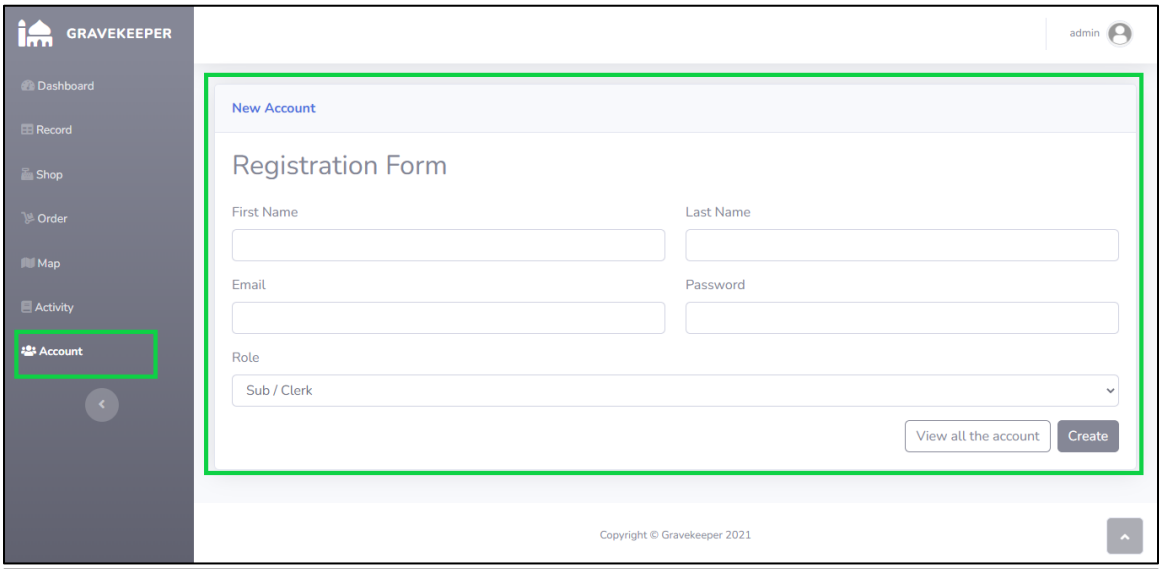
The map is programmed to be interactive; an admin can directly insert a new record by simply clicking on an empty burial plot. An image can also be inserted for extra identification, and this can also be done by just clicking on the plot. The search feature in the map is functional; the grave can be located by searching using the deceased's name, and the system will mark the grave location of the search result.

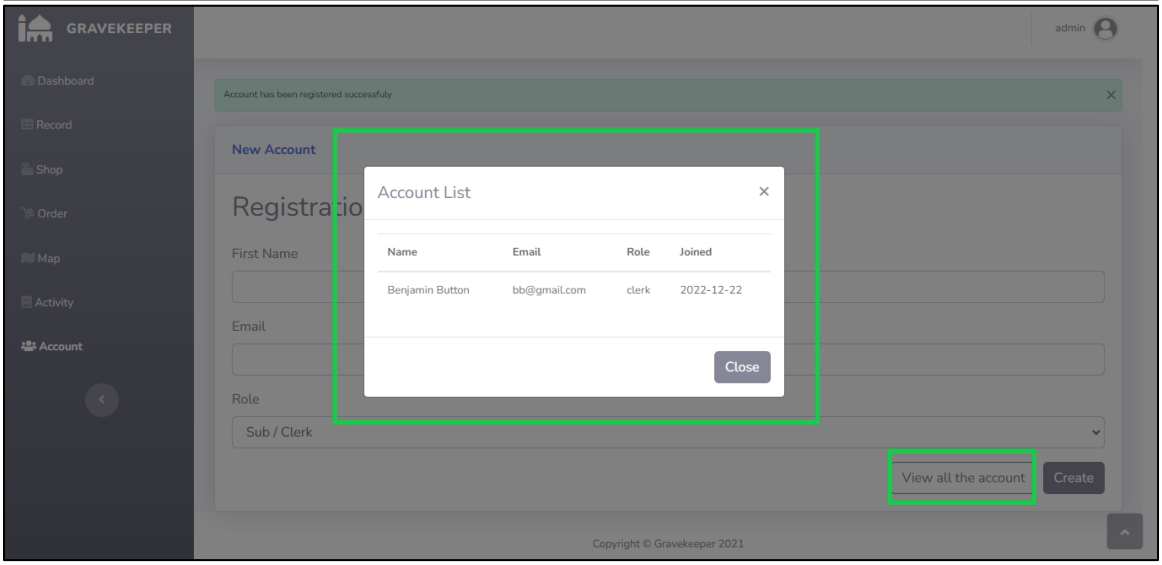
3.6. Activity



To track who interacted with whom, the activity section was created. The activity is a log of all admin and admin aide transactions and actions. This will be crucial when an issue arises, because the information in the activity log will be of utmost importance.

3.7. Account





An admin can create a new account by themselves, and the account access level is set by the admin. The admin has the highest access in the system, followed by the admin aide/clerk, and finally, users have the lowest access. However, users do not need higher access in order to make use of the system.

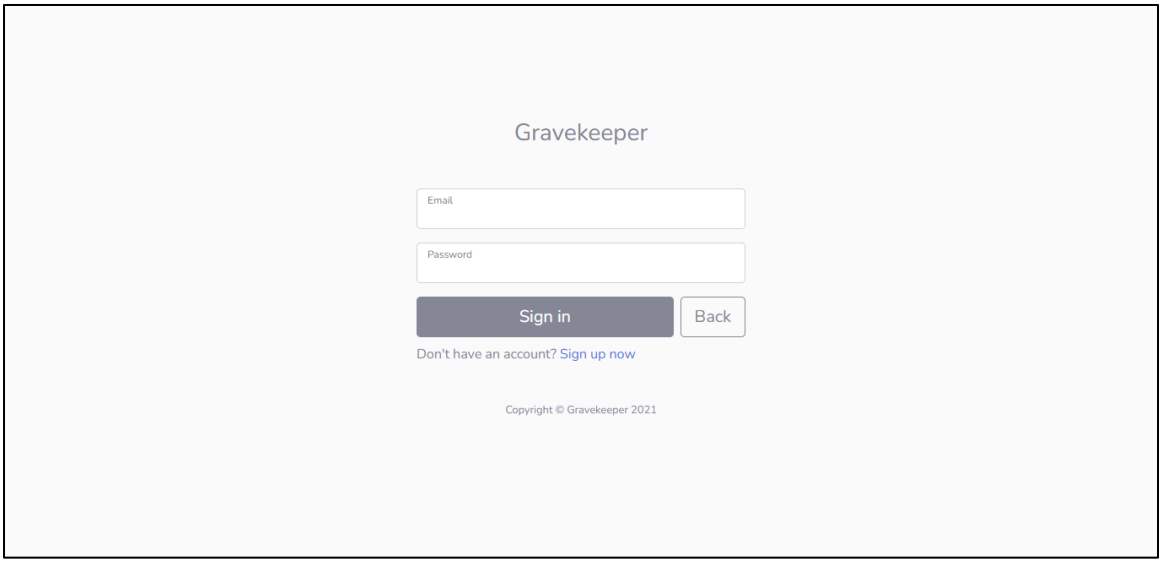
3.8. Logging out

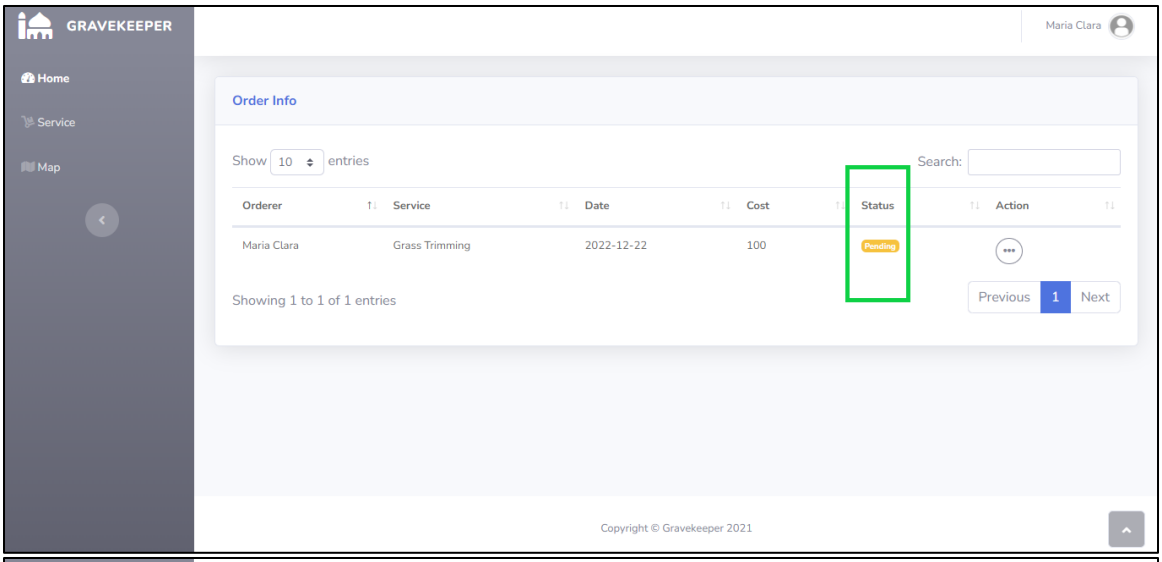
To log out, the user icon must be pressed and a dropdown menu will pop up, where the logout option is located. Logging out will redirect the admin to the login page.

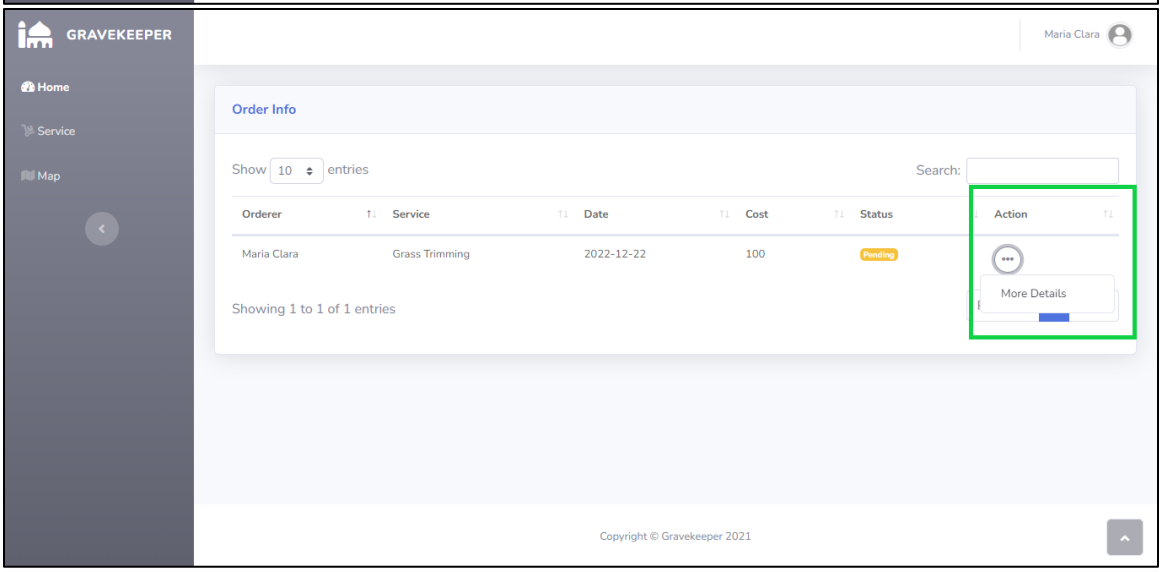
4. Users

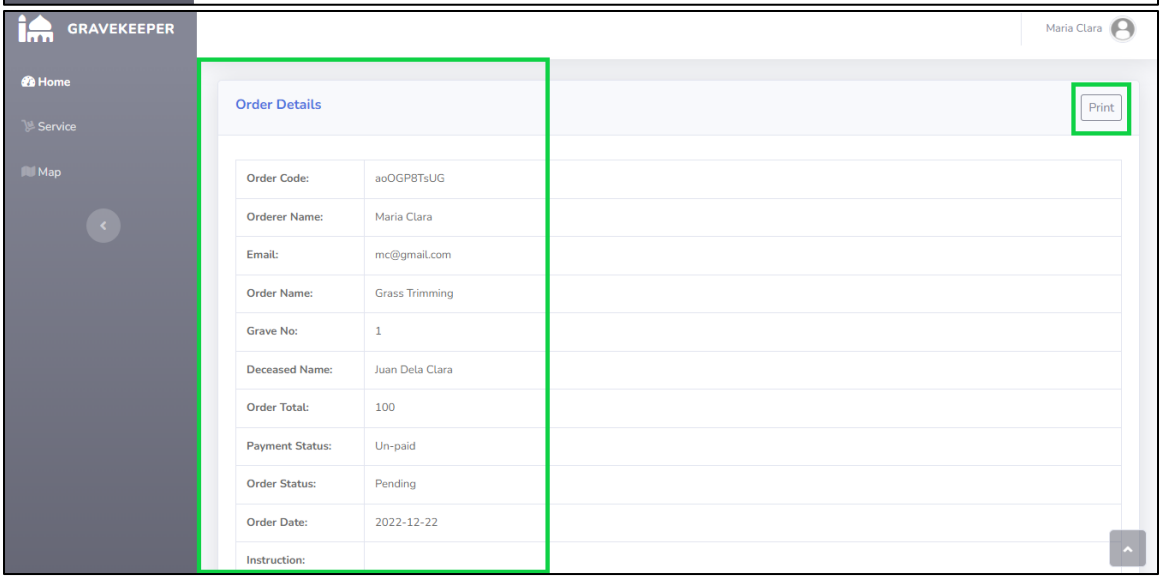
Users have relatively lower system access, but that doesn't mean the system would be useless for them. The system was designed with the needs of the users as the highest priority during development, followed by the needs of the admin.

4.1. Dashboard



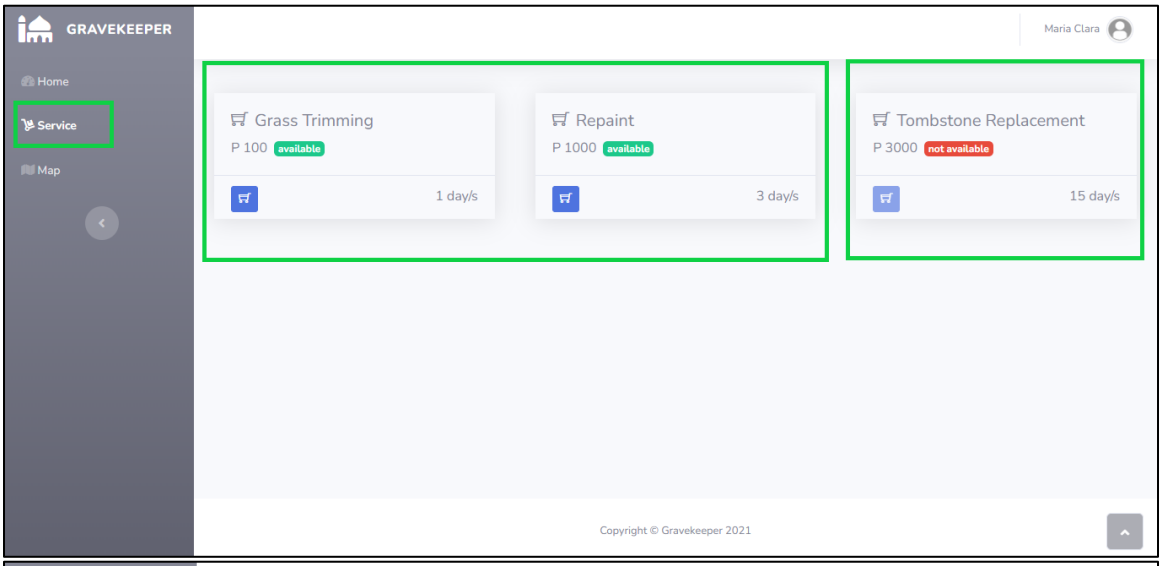


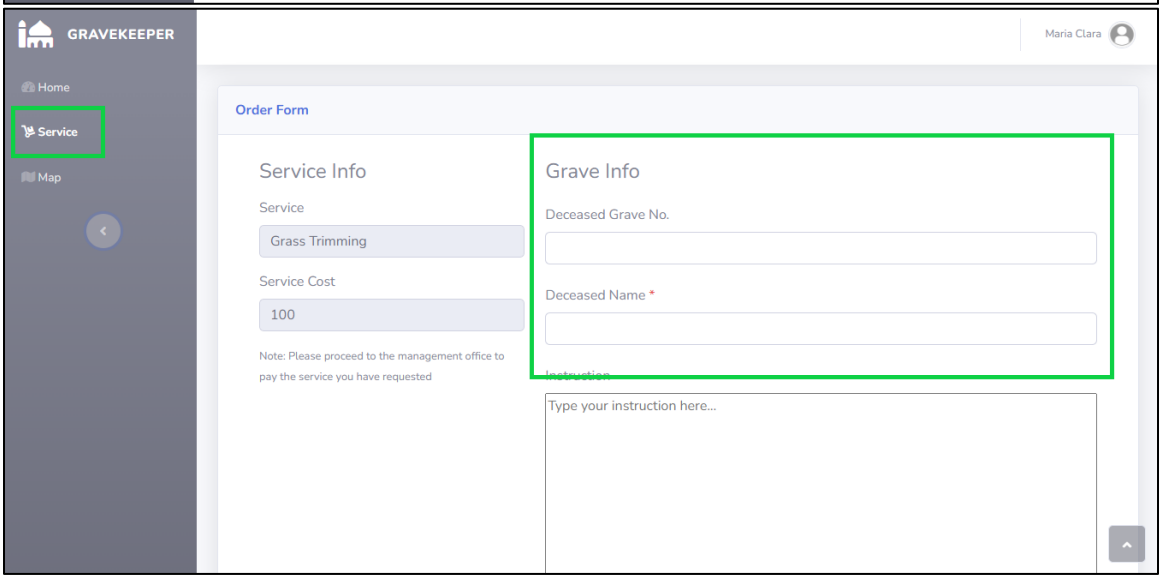




A successful login will redirect the user to the user dashboard, where the history of requested services can be seen and the status of the request can be monitored.

4.2. Request Order



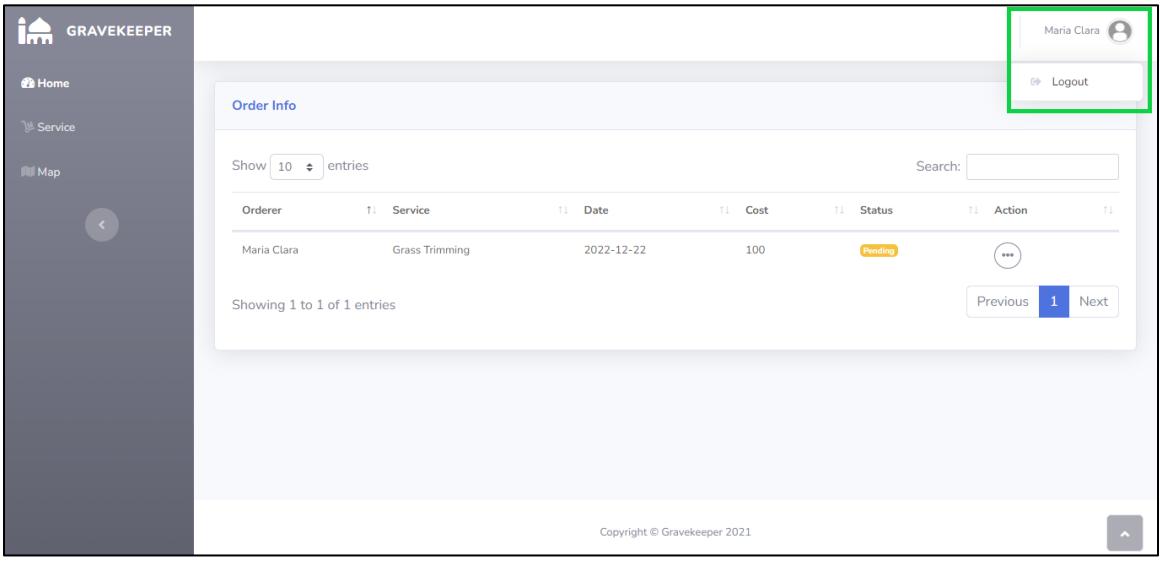


To request an order or service, the user must navigate to the shop page, which displays all available services. To submit a request, the user must first fill out all required information in the fields, such as the grave number where the service is to be performed, the name of the deceased for additional confirmation, and any instructions the user may want to convey (adding instructions is optional and may not need to be filled out depending on the user's preference).

4.3. Map

The map in the user's view is only intended for search and tracking purposes, as is the map located on the homepage. However, features such as search, zoom-out, and zoom-in are still available.

4.4. Logging out



Like the admin, users must also click the user icon and a dropdown menu will pop up, where the logout option is located. Logging out will redirect the user to the login page.

Appendix I

Certificate of Proofreading

Republic of the Philippines
Western Mindanao State University
College of Computing Studies
DEPARTMENT OF COMPUTER SCIENCE
Zamboanga City

CERTIFICATE OF PROOFREADING

THIS IS TO ACKNOWLEDGE THAT THE THESIS ENTITLED

"GRAVEKEEPER": ZAMBOANGA MUSLIM CEMETERY WEB-BASED GEO-MAPPING SYSTEM USING QUANTUM GEOGRAPHIC INFORMATION SYSTEM

WRITTEN BY

ADZMI M. KALNAIN
and
EMY JOY A. OMICTIN

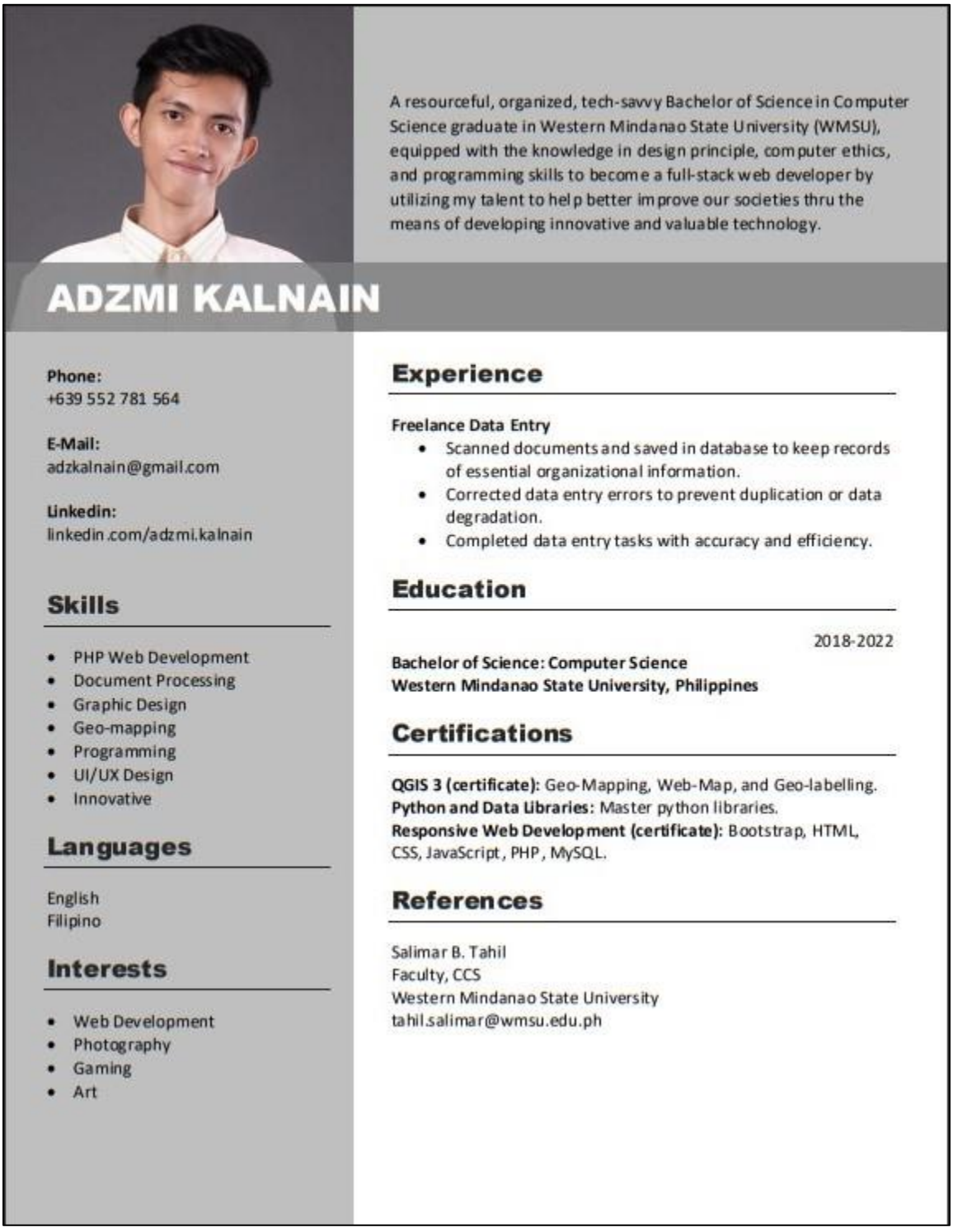
HAS BEEN PROOFREAD FOR APPROPRIATE ENGLISH LANGUAGE USAGE, GRAMMAR, PUNCTUATION, AND SPELLING BY THE UNDERSIGNED AND RETURNED TO THE CUSTOMER ON

DECEMBER 20, 2022

SALIMAR B. TAHIL
Proofreader

Appendix J

Curriculum Vitae



A resourceful, organized, tech-savvy Bachelor of Science in Computer Science graduate in Western Mindanao State University (WMSU), equipped with the knowledge in design principle, computer ethics, and programming skills to become a full-stack web developer by utilizing my talent to help better improve our societies thru the means of developing innovative and valuable technology.

ADZMI KALNAIN

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Linkedin:
linkedin.com/adzmi.kalnain

Skills

- PHP Web Development
- Document Processing
- Graphic Design
- Geo-mapping
- Programming
- UI/UX Design
- Innovative

Languages

English
Filipino

Interests

- Web Development
- Photography
- Gaming
- Art

Experience

Freelance Data Entry

- Scanned documents and saved in database to keep records of essential organizational information.
- Corrected data entry errors to prevent duplication or data degradation.
- Completed data entry tasks with accuracy and efficiency.

Education

2018-2022

Bachelor of Science: Computer Science
Western Mindanao State University, Philippines

Certifications

QGIS 3 (certificate): Geo-Mapping, Web-Map, and Geo-labelling.
Python and Data Libraries: Master python libraries.
Responsive Web Development (certificate): Bootstrap, HTML, CSS, JavaScript, PHP, MySQL.

References

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EMY JOY A. OMICTIN

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PERSONAL PROFILE

A practical, resourceful, tech-savvy Bachelor of Science in Computer Science major in Software Engineering. A graduate of Western Mindanao State University. Skilled in Front-End Designing. Aims to help the community solve a complex problems by developing software /system.

PERSONAL PROFILE

Gender : Female
Dat of Birth: October 2, 1989
Place of Birth: Datu Odin Sinsuat, Maguindanao
Address : Paraiso Drive, Mampang Zamboanga City
Nationality: Filipino
Marital Status : Married

RELATED EXPERIENCE

Intern
WMSU LIBRARY
June 2021- August 2021
Duties and Responsibilities
- Encoding the past Thesis and list them in descending order by year .
- Designing facebook post for National Book Week 2021
- Organizing the books in order.

WORK EXPERIENCE

iOPEX Technologies INC
December 2021 - April 2022

Custome Service Representative

Duties and Responsibilities
- Taking inbound and outbound call internationally.
- Providing quality customer service
- Booking, Cancelling, Rebooking an appointment for clients.

Document Audit Specialist

Duties and Responsibilities
- Responsible for auditing the documents of the HCP(Health Care Provider) .
- Doing Background Checks on HCP for the deployment on HCF (Health Care Facility).

EDUCATIONAL BACKGROUND

College
Bachelor of Science in Computer Science
Western Mindanao State University
August 2021- June 2022

HIGH SCHOOL
Zamboang CCity High School (Main)
2004-2005

ELEMENTARY
Tetuan Central School
2000-2001

SKILLS

MS Word Proficient
Graphic Designing
Photo Editing
Critical Thinking
Time Management
Team Player

REFERRENCES

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