Republic of the Philippines
Western Mindanao State University
College of Computing Studies
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Zamboanga City

REACH: MULTI-CRITERIA DECISION MAKING FOR BEACH AND RESORT SELECTION

A Thesis Presented to the Faculty of

Department of Computer Science

College of Computing Studies

In Partial Fulfillment of the Requirements for the Degree of

Bachelor of Science in Computer Science

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Approval Sheet

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Abstract

Selecting optimal beach and resort destinations in the Zamboanga Peninsula posed a multifaceted challenge due to diverse preferences and considerations. To address this complexity, a groundbreaking web-based application integrating Multi-Criteria Decision Making (MCDM) was developed. The study aimed to revolutionize decision-making methodologies by evaluating crucial factors such as cleanliness, safety, accessibility, natural beauty, recreational activities, and accommodation. The objectives encompassed not only refining decision-making processes but also engaging travel enthusiasts for continuous feedback to ensure alignment with their preferences. Moreover, the study sought to stimulate growth in the local tourism industry and offer valuable insights for academics, businesses, and policymakers. Methodologically, an Agile software process model guided the development process, while data collection utilized Google Forms for distributed questionnaires. Statistical tools, including MCDM, descriptive, and inferential statistics, were employed to analyze the collected data. Technical tools such as GPT API, APIFY, Visual Studio Code, Google Forms, and Microsoft Excel facilitated application development. The significance of the study extended beyond user satisfaction, aiming to be a catalyst for informed and enjoyable travel experiences in the region. Recommendations included further integration of Facebook web scraping and sentiment analysis for a robust decision-making system. The study not only addressed the complexity of destination selection but also contributed to the growth and enhancement of the tourism sector in the Zamboanga Peninsula. The transformative impact on travel decisions highlighted in the Results and Discussion section underscored the potential of innovative methodologies in shaping travel experiences.

Keywords: MCDM, Sentiment Analysis, OpenAI

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CHAPTER I

INTRODUCTION

Background of the Study

In today's diverse world of travel destinations, selecting the perfect beach or resort in Zamboanga Peninsula has become a puzzle for many. People's desires varied - some sought the serenity of nature, while others craved thrilling adventures. The traditional approach to choosing a destination seemed outdated and inadequate. An upgrade, a smarter method, was overdue. The researchers behind this study were committed to simplifying and injecting some fun into the process of selecting the ideal beach or resort.

It is imperative to underscore that the primary emphasis of this thesis revolved around the innovative and transformative power of the algorithmic approach. Unlike traditional methods that might lean towards web-based systems, our research was distinctly centered on harnessing the capabilities of sophisticated algorithms. The Multi-Criteria Decision Making (MCDM) algorithm stood at the forefront of our investigation, serving as a beacon for revolutionizing the decision-making process in selecting travel destinations for beaches and resorts. This research placed a deliberate focus on the algorithmic prowess of MCDM, aiming to elevate and modernize decision-making experiences for travelers. The intention was not merely to introduce a novel web-based system but to explore and harness the full potential of algorithmic decision-making, ensuring that travel decisions became not only efficient but truly extraordinary.

Now, here was the challenge - many travel enthusiasts found it difficult to decide where to go. The usual methods appeared a bit old-fashioned and out of touch with current interests. This is where the researchers stepped in. They delved into the intricacies of decision-making, working on an innovative solution to make the experience truly fantastic. Utilizing something called Multi-Criteria Decision Making (MCDM), the researchers employed a smart system to assist individuals in finding the ideal spot.

The purpose of MCDM was clear - it was like having a personal guide, helping travelers make decisions based on multiple factors. It considered things like preferences, environmental aspects, and accommodations to create a comprehensive view. What was exciting was that the algorithm the researchers used didn't just stop there. It was versatile enough to be seamlessly integrated into a Web-Based System. This meant that the same smart decision-making assistance could be accessed online, making the process even more convenient for travelers. The researchers believed that by using MCDM, the decision-making process could be not just improved but transformed. Imagine effortlessly selecting a dream destination with just a click! That was the vision – making the process simple, enjoyable, and readily accessible. This research wasn't solely about creating a superior method for choosing a beach or resort; it was about making the process incredibly user-friendly for anyone, anywhere, with a basic internet connection. Let travel decisions be as incredible as the destinations themselves.

Statement of the Problem

This study delved into the challenges inherent in the decision-making process for selecting beach or resort destinations in the Zamboanga Peninsula. Firstly, the research

targeted the issue of reliance on traditional and outdated methods, proposing the introduction of Multi-Criteria Decision Making (MCDM) and a Web-Based System to modernize and streamline the decision-making process for contemporary travelers. Secondly, the study addressed the complexity faced by travel enthusiasts in selecting the ideal destination due to a lack of user-friendly frameworks. It aimed to simplify and enrich the decision-making experience, offering a comprehensive and personalized approach aligned with individual preferences. Thirdly, the limited accessibility to decision-making tools, particularly for those without advanced resources, was tackled through the development of an accessible Web-Based System. Lastly, the research sought to improve decision-making efficiency by leveraging MCDM, a smart system designed for quicker, more informed choices.

Objectives

The research objective is to develop a web application for beach and resort selection that will enable users to make informed decisions based on their preferences and rank different alternatives according to multiple criteria and their relative importance.

Specifically, this research aims:

- To implement a multi-criteria decision-making (MCDM) approach to evaluate and compare beaches and resorts based on assessment factors such as cleanliness, safety, accessibility, natural beauty, recreational activities, and accommodation.
- To implement a scraping technique for gathering information from guest reviews through Facebook pages of existing resorts and beaches in the Zamboanga Peninsula.
- To analyze the sentiments from scraped reviews using the OpenAI model.

Scope and Limitations

The study focused its geographic scope on the Zamboanga Peninsula, recognizing the unique characteristics and preferences of individuals in this region. Its primary objective centered around the decision-making process involved in selecting beach or resort destinations. It investigated the application of Multi-Criteria Decision Making (MCDM) techniques to consider various factors, with a particular emphasis on developing, implementing, and evaluating a user-friendly Web-Based System.

While the study offers valuable insights, it is crucial to acknowledge its limitations. Generalizability is constrained to the Zamboanga Peninsula, and technological limitations related to internet access may impact the broader applicability of the proposed solution. The dynamic nature of individual preferences, resource constraints in system development, and the exclusion of external factors such as economic conditions are recognized as potential limitations.

Additionally, one of the limitations of the proposed research is the absence of beaches and resorts without a Facebook page or reviews, as they cannot be included in the scraping process. New beaches and resorts would need to have a Facebook page and reviews to be incorporated into the system.

Significance of the Study

By offering a comprehensive web application for quality assessment and comparison using multi-criteria decision-making, our web-based system aimed to simplify the process of selecting beaches and resorts, aiding users in making informed decisions based on their preferences.

Tourist Perspective: The MCDM system holds significant advantages for tourists. It assists them in choosing the most suitable beach resort or destination, enhancing the enjoyment and satisfaction of their vacation. The system proves beneficial in saving time and money by considering factors such as location, facilities, cost, and activities. Additionally, it helps in making informed decisions, preventing potential disappointment or regret during the trip.

Resort Owners' Viewpoint: Resort owners can leverage the MCDM system to identify the factors most crucial to tourists when selecting a resort. This insight enables them to develop strategies for improving services and facilities to align with these preferences. Consequently, this could enhance customer satisfaction and competitiveness in the market.

Beachgoer's Experience: For beachgoers, the MCDM system serves as a valuable tool in selecting the ideal beach destinations that align with their preferences and requirements. They can assess various criteria such as water clarity, beach amenities, safety, and accessibility to determine which destinations are suitable. This, in turn, assists them in saving time and money by avoiding destinations that don't meet their standards.

Impact on the Tourism Industry: The MCDM system also contributes to the betterment of the tourism industry by advocating for sustainable practices. It achieves this by considering factors such as environmental impact, cultural sensitivity, and social responsibility in the selection of beach resorts or destinations. This promotes responsible tourism practices, potentially yielding positive impacts on the environment and local communities.

Definition of Terms

Table 1: Definition of Terms

Term	Definition
1. Multi-Criteria	Refers to the consideration of multiple criteria or factors in decision-making. Instead of relying on a single criterion, MCDM involves evaluating options based on various factors that are relevant to the decision at hand.
2. Decision Making	The process of selecting the best course of action from available alternatives. In the context of MCDM, decision-making involves a systematic evaluation of options using multiple criteria.
3. Beach Selection	The process of choosing a beach destination. This involves considering factors such as the beach's natural beauty, climate, water quality, and recreational activities available.
4. Resort Selection	The process of choosing a resort for accommodation. Criteria for resort selection may include amenities, services, location, cost, and customer reviews.
5. Web-based system	A web-based system refers to a software application or service that is accessed and operated through a web browser over the internet. These systems rely on web technologies to provide users with functionalities such as data storage, processing, and interaction, all within the framework of a web environment. Examples include online

	banking platforms, email services, and collaborative tools like Google Workspace.
6. Weighted Sum Model	The weighted sum model is a mathematical approach that combines criteria values for each alternative, considering their assigned weights.
7. Decision-Making Literature	The body of existing knowledge, theories, and research studies related to decision-making processes in various fields, provides a foundation for understanding and improvement.
8. Iterative Enhancement	The process of making incremental improvements to a system or solution through repeated cycles of evaluation, modification, and testing.
9. Generalizability	The extent to which research findings or solutions can be applied or generalized beyond the specific conditions or context in which they were developed.
10. Phased Deployment	The gradual implementation of a system or technology in stages rather than all at once allows for controlled testing and adjustment.
11. Scalability	The ability of a system or technology to handle an increasing amount of workload or users without compromising performance.
12. Decision Support Technologies	Technologies, tools, or systems designed to assist individuals or organizations in making informed and effective decisions.
13. Preference Weighting	Preference weighting assigns importance or priority values to criteria based on their significance in the decision-making process.
14. Decision Support System (DSS):	A Decision Support System is an interactive computer-based tool that assists decision-makers in analyzing and solving complex problems.
15. Decision Matrix	A decision matrix is a systematic tool used in decision-making, where criteria are listed, and alternatives are evaluated based on those criteria.

CHAPTER II

REVIEW OF RELATED LITERATURE

Related Literature

In this chapter, an extensive exploration of the existing body of knowledge concerning the integration of sentiment analysis and Multi-Criteria Decision Making (MCDM) methodologies in the evaluation of tourism-related reviews from Facebook was undertaken, with a specific focus on beach and resort experiences in Zamboanga City. The literature review was structured around six pivotal factors or criteria crucial to comprehending the context and objectives of the study. These included Sentiment Analysis, Multi-Criteria Decision Making (MCDM) Approaches, Social Media Reviews in Tourism, Weighted Decision-Making from Facebook reviews of Beaches and Resorts, OpenAI API Applications in Sentiment Analysis, and Factors Influencing Tourist Satisfaction. This comprehensive review set the stage for the study, providing insights into the methodologies, challenges, and findings of previous research in the intersecting domains of sentiment analysis, decision-making processes, and tourism evaluations. Four topics related to the study needed understanding: Sentiment Analysis, OpenAI API, MCDM Approach, and, lastly, Facebook Scraping Reviews.

Sentiment Analysis

This chapter explored the intriguing field of sentiment analysis, which involves understanding how emotions are conveyed through language. According to [1], sentiment analysis is a method for categorizing people's viewpoints in product reviews, blogs, or

social media. It has various applications and has garnered significant research and practical interest. The specific focus was on sentiment analysis of product features - discerning whether opinions about specific product features are positive, neutral, or negative, rather than evaluating the overall sentiment of reviews or sentences. This is known as feature-based sentiment analysis. In general, sentiment analysis or opinion mining aims to identify and extract subjective information and sentiments from text, including positive, neutral, or negative opinions. With appropriate techniques, this data can be transformed into valuable insights to inform business decisions. [2] Today, sentiment analysis has emerged as an important research area in Natural Language Processing (NLP). The main goal is to identify emotions and opinions shared by users through textual content. Despite extensive research with various models, sentiment analysis remains a complex challenge with many open issues. Existing challenges stem from factors like slang, accents, grammatical errors, and spelling mistakes.

OpenAI API

OpenAI recently introduced the OpenAI API, a versatile tool developed by a leading global AI lab. Unlike many AI systems designed for specific purposes, the OpenAI API can adapt to virtually any task. Hosted on Microsoft Azure, it offers users cloud access to advanced pre-trained AI models such as DALL-E, Codex, and GPT-3. Specifically tailored for English language tasks, this API enables seamless integration of state-of-the-art AI capabilities into various applications. Unlike traditional AI limited to specific use cases, the OpenAI API functions as a flexible cloud platform for text input and output.

Developers can utilize the OpenAI API for a range of programming language tasks, including semantic search, content generation, translation, and sentiment analysis. By providing a text prompt to the API, users receive a text completion that corresponds to the input. Importantly, programming with the OpenAI API involves supplying examples of desired behavior, with success contingent on the complexity of the task [3].

Multi-Criteria Decision Making (MCDM)

Multi-criteria decision-making (MCDM) presents a significant challenge in decision theory, aiming to determine the optimal choice while considering multiple criteria. MCDM offers various tools and techniques applicable to diverse fields such as finance and engineering [4]. Multi-criteria decision analysis (MCDA), also recognized as multi-criteria decision making (MCDM), constitutes a structured approach for decision-making with multiple objectives or criteria to evaluate and select among alternatives. It proves valuable when individuals or groups need to make choices based on tradeoffs. The MCDA process comprises four key aspects: listing alternatives, establishing criteria to assess them, assigning weights to criteria by importance, and incorporating decision-maker preferences and values. This method is adaptable to any number of choices, a concise set of quantitative or qualitative criteria, and varying stakeholder input. When properly applied, MCDA can enhance the likelihood of well-informed decisions, although unanticipated events may influence outcomes [5].

Scraping (Facebook Scraping)

A Facebook scraper is a specialized web scraping tool designed for extracting data from public Facebook pages, facilitating convenient data collection without requiring an API key. With its extensive monthly user base of 2.93 billion, Facebook stands as a crucial platform for businesses aiming to reach their target audiences. Manual data gathering from Facebook can be laborious, resource-intensive, and error-prone, especially for large-scale operations. The utilization of Facebook scraping tools or scrapers addresses these challenges by streamlining and enhancing the precision of data collection for both companies and individuals [6]. Scrapers automate the process of collecting public information from Facebook pages, saving significant time and effort compared to manual approaches. This automation also improves accuracy, proving particularly beneficial for market research and competitive analysis, leveraging Facebook's unparalleled access to user data.

Related Studies

In this examination of related studies, the convergence of sentiment analysis, Multi-Criteria Decision Making (MCDM), and tourism-related reviews was explored. By synthesizing insights from current research, the study delved into the nuanced sentiments expressed in Facebook reviews of beaches and resorts, while also exploring the applications of the OpenAI API. The overarching goal was to construct a narrative that humanized the intricate interplay of emotions and decisions within the vibrant tapestry of the tourism industry.

Selecting Resort Locations (MCDM)

This research proposed a three-step approach to optimize resort site selection in Taiwan for competitive advantage. Evaluation criteria were derived from literature and expert interviews. First, a modified Delphi survey determined the relative importance of 22 criteria. Next, 19 experts used the Analytical Hierarchy Process (AHP), a subjective multi-criteria model, to assess potential resort locations and rank different resort types. Finally, sensitivity analysis examined the impact strength of various factors on selection. The analysis aimed to formulate solutions for the tourism industry [7].

The study applied AHP, a systematic organizing method, to evaluate four resorts on 22 criteria. Incorporating sensitivity analysis via simulation, it highlighted AHP's group decision-making capacity and supported goal-oriented tourism choices. By assessing input changes on output, the research sought to strengthen resort selection robustness and provide insights for tourism decision-makers [7].

StudySandboxx (scraper)

According to [8], research studies in human-computer interaction and computer-mediated behavioral psychology often relied on capturing user interaction data to analyze online behaviors. However, considerations such as Institutional Review Board (IRB) protocols, site policies, and security/privacy concerns might have compelled researchers to opt for screenshots or offline copies of pages instead of live websites. This alternative approach could compromise the fidelity and contextual realism of web content, impacting interface aesthetics with issues like broken links, missing images, and malfunctioning

scripts. StudySandboxx addressed these challenges by saving websites exactly as they appeared online, sandboxing them to remove privacy-threatening scripts. The saved websites were encapsulated into a single portable file that included all related resources, and the tool also supported certain types of permutations commonly used in research, such as changing links within a page.

StudySandboxx is a versatile tool designed for encapsulating web content for research. It actively renders JavaScript-heavy content, making it suitable for dynamic websites. Researchers could save and sandbox content, retarget links, and choose between static and JavaScript-rendered versions. The tool modified HTML files during encapsulation to eliminate potentially harmful scripts, enabling offline study while preserving interactivity. With the ability to replace links, StudySandboxx was valuable for cybersecurity and UI design experiments, providing researchers with a flexible solution for offline web content analysis [8].

ASAVACT (Sentiment Analysis)

This paper introduced the Arabic Sentiment Analysis for Vaccine-Related COVID-19 Tweets (ASAVACT) dataset, representing the first and largest hand-labeled collection of Arabic tweets related to COVID-19 vaccinations. Utilizing state-of-the-art deep learning models, including stacked gated recurrent units (SGRU), stacked bidirectional gated recurrent units (SBi-GRU), and an ensemble with AraBERT, the research aimed to determine sentiment polarity in Arabic tweets about COVID-19 vaccines. The ASAVACT dataset comprises over 32,000 annotated Arabic tweets, providing a valuable resource for analyzing sentiment specifically within the context of the pandemic [9].

Development of OpenAI API-Based Chatbot to Improve User Interaction on the JBMS Website (OpenAI)

This research introduced an advanced chatbot leveraging the capabilities of the OpenAI API, with the goal of enhancing user engagement on the Journal of Business, Management, and Social Studies (JBMS) website. The development process followed a systematic prototype methodology, including Requirement Gathering, Prototype Building, Requirement Refinement, Customer Evaluation, and Design and Implementation [10].

Empowered by the integration of the OpenAI API, the chatbot functioned similarly to ChatGPT, addressing user queries and providing detailed information. Users had the ability to request article summaries or delve into specific article details, offering a comprehensive one-stop information solution. The prototype chatbot, seamlessly incorporating the OpenAI API for the Journal of Business, Management, and Social Studies (JBMS) website, underwent successful development, testing, and evaluation [10].

Design of Decision Support System Selection of Beach Tourism Object in GunungKidul using Fuzzy AHP Method

Multi-Criteria Decision Making (MCDM) identifies optimal alternatives based on multiple criteria. To reduce uncertainty, the Fuzzy Analytical Hierarchy Process, a variant of the Analytical Hierarchy Process (AHP), is used. It incorporates fuzzy numbers on the AHP scale to improve accuracy. Successfully applied for beach resort selection in Gunungkidul, Fuzzy AHP aligned computer and manual calculations. Testing through the

Black Box method resulted in an average overall system function score of 104 (“Very Good”).

The goal was to assess Gunungkidul coastal attractions using Fuzzy AHP based on criteria like price, distance, safety, etc. Additionally, a website Decision Support System was developed for selecting beach destinations there, emphasizing fuzzy logic to handle ambiguity in tourism decisions [11].

Synthesis

Table 2: Synthesis

Titles	**Gaps**	**Improvements** (Our Study)
Selecting Resort Locations [7]	The study appeared to focus solely on resort locations and may not have considered other factors like beach destinations.	This study expanded the scope to include both resorts and beach destinations. We incorporated Multi-Criteria Decision Making (MCDM) and Sentiment Analysis to enhance the evaluation process, considering factors like customer reviews, sentiment, and preferences in the decision-making model.
StudySandboxx [8]	User Privacy: Although StudySandboxx aimed to protect user and researcher privacy, further measures could be explored to ensure comprehensive information security. Dynamic Content Handling: The tool might have faced challenges	This study leveraged the APIFY platform for web scraping. APIFY offers a versatile set of scrapers, including a specialized Facebook scraper that can target reviews of beaches and resorts, a

	in handling highly dynamic content or webpages with complex interactive elements.	crucial aspect of this study. Utilizing APIFY's capabilities, the collected data was converted into a CSV format for further analysis using sentiment analysis.
ASAVACT [9]	ASAVACT focused on Arabic sentiment analysis for COVID-19 vaccine tweets using deep learning.	In our proposed system, we will use the OpenAI API for sentiment analysis, providing a more effective way to analyze individuals' reviews for beach and resort selection. This approach is advantageous as the OpenAI API can analyze multiple languages, making it a powerful tool to determine the precise emotion conveyed in a given text.
Development of OpenAI API-Based Chatbot to Improve User Interaction on the JBMS Website. [10]	The study exclusively centers on employing the OPENAI API for a chatbot, without incorporating a Multi-Criteria Decision Making (MCDM) approach.	In our study, we leverage the OPENAI API for sentiment analysis. Additionally, we enhance the decision-making process by integrating the MCDM approach, ensuring more accurate and comprehensive results for users.
Design of Decision Support System Selection of Beach Tourism Object in GunungKidul using Fuzzy AHP Method. [11]	The study heavily relies on the Fuzzy Analytical Hierarchy Process method, potentially limiting the flexibility of the decision-making model.	In our proposed system, we enhance data collection by leveraging APIFY for scraping and employing OPEN AI for sentiment analysis, providing a comprehensive approach to beach and resort selection.

Conceptual Framework

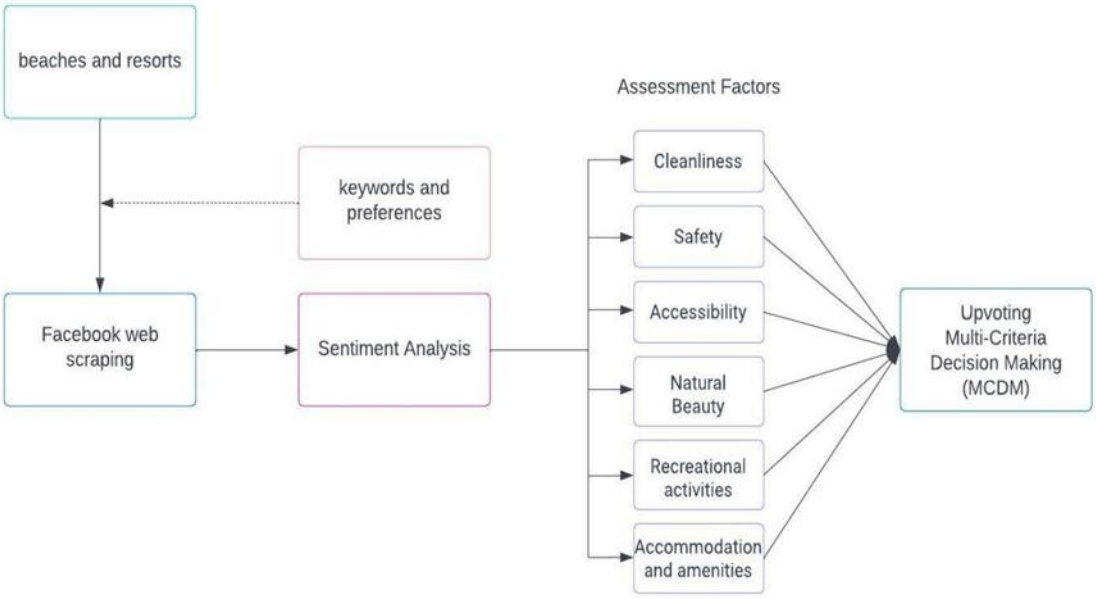


Figure 1: Conceptual Framework

Figure 1 illustrates the conceptual framework of our research, which focused on a proposed project involving beaches and resorts in the Zamboanga Peninsula. Utilizing Facebook web scraping tools such as Data API, Web extraction tools, or extensions, users had the ability to filter preferences to discover the best destinations. Following the scraping process, we applied sentiment analysis, considering factors such as cleanliness, safety, accessibility, natural beauty, recreational activities, and accommodation. These factors collectively contributed to a multi-criteria decision-making system, enabling tourists to input preferences through filters and a search bar. The output generated a scored rating system for each beach or resort based on user preferences.

CHAPTER III

METHODOLOGY

Research Design

This study employed an applied research design, chosen to facilitate a more comprehensive understanding of the research problem and to triangulate findings, thereby enhancing the validity and reliability of the results. The primary objective was to develop a web-based application for beaches and resorts using multi-criteria decision-making. The application of the applied research design in this study involved gathering data from real-world scenarios and incorporating them into the development of the web-based application, ensuring that the results were not only theoretical but also practical and applicable to the needs of the target population.

Furthermore, the study utilized web scraping techniques to collect data from Facebook and other online sources, aiming to identify the resorts and beaches considered the best by users. This information was then integrated into the multi-criteria decision analysis, contributing to a more accurate and comprehensive assessment of quality.

Research Locale

The study was conducted in the Zamboanga Peninsula with a specific focus on beach and resort destinations. The researchers collected data from various online sources, primarily social media platforms, where users could provide ratings and reviews assessing the quality of these destinations. Subsequently, the gathered data underwent

analysis using multi-criteria decision analysis. The objective was to develop a web-based system capable of assessing and comparing the quality of different beach and resort options within the Zamboanga Peninsula.

Respondents

The study centered on beach and resort selection in the Zamboanga Peninsula. The researchers aimed to employ a purposive sampling technique to select potential participants who were beachgoers in the Zamboanga Peninsula. These potential participants were identified through various social media platforms. The sample size was determined using a formula for calculating sample size within a population, with a confidence level of 95% and a margin of error of 5%. Subsequently, the selected participants were invited to take part in the study through an online survey and by utilizing the web-based application developed for the study.

Data Gathering Instruments, Techniques, and Procedures

The researchers utilized questionnaires to collect information regarding the factors influencing respondents' choices of beaches and resorts, along with their perceptions of the usability and functionality of the web-based application. The survey questions were meticulously crafted to gather descriptive insights into how respondents made their decisions and the experiences they encountered while selecting a beach or resort destination in the Zamboanga Peninsula. These questionnaires were distributed online using Google Forms.

Statistical Tools and Analytical Tools

As part of the study on developing a web-based system for beach and resort selection in the Zamboanga Peninsula, the researchers utilized a combination of statistical and analytical tools to ensure a comprehensive and insightful analysis. The following tools played a pivotal role in the evaluation process.

The analytical capabilities of the study were enhanced by incorporating OPENAI for sentiment analysis. The integration of this potent natural language processing tool into the analysis of user reviews' sentiments resulted in an improved decision-making model, offering a thorough understanding of feelings and preferences.

The best beach and resort choice were selected from a collection of possibilities using a sophisticated approach called multi-criteria decision-making (MCDM), which considered several important aspects. By incorporating various parameters influencing the choice of beach and resort, MCDM allowed for a thorough and nuanced decision-making process.

Survey data were analyzed, and patterns were depicted using descriptive statistics. These statistical methods facilitated the identification of patterns and connections in the dataset, resulting in a clear and succinct representation of user preferences and attitudes. This encouraged a deeper understanding of the survey data to better inform decisions.

Technical Tools

In the development and completion of the system, a suite of technical tools was employed, including a laptop for coding and overall project management, the GPT API to leverage advanced natural language processing capabilities, the APIFY platform for web scraping and data extraction (reviews), Visual Studio Code (VS Code) as the integrated development environment, Google Forms for data collection and user input, and Microsoft Excel for data analysis and organization.

Software Process Model

In this study, the researchers utilized the Agile model due to its iterative and adaptive approach, which was well-suited for managing complex and rapidly evolving situations such as the dynamic nature of beach and resort selection criteria and the diverse preferences of tourists.

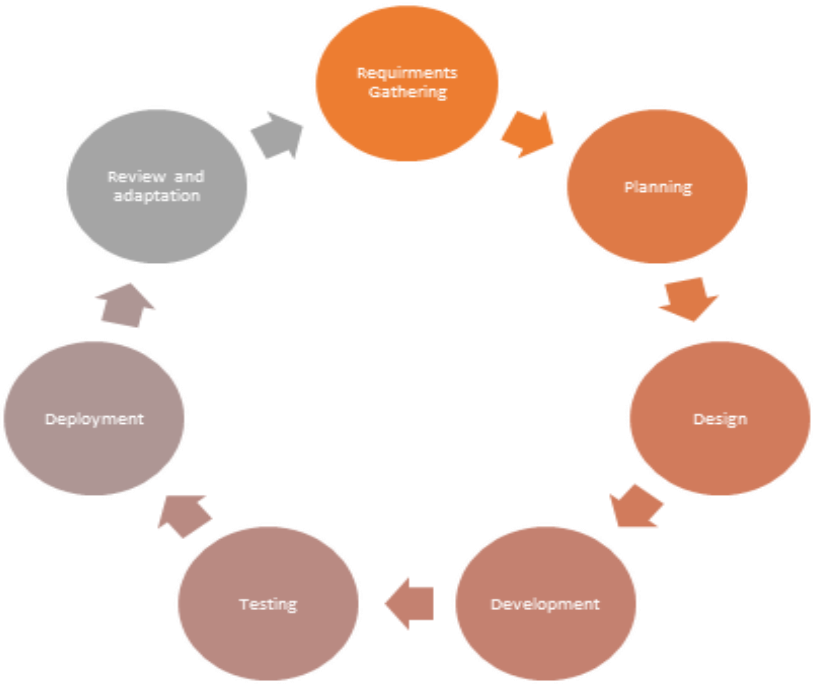


Figure 2: Agile Methodology

System Architecture

The system architecture is composed of three layers: the User Interface, the Server, and the Database. The User Interface, built with HTML, JS, and CSS, is where users interact with the landing page and filter page to select their preferred beach or resort. Once a selection is made, the request is processed by the Server, which is developed using Django and Python scripts. The Server contains the logic and algorithms to compute the overall rating data for each beach or resort. It performs sentiment analysis and computes weights based on data from a CSV file, accessed through the OPENAI API. The Database is the final layer that stores essential details such as images, names, locations, ratings, keywords, Facebook IDs, and place identifiers. The server retrieves this data to generate a visual response on the User Interface for the end-users.

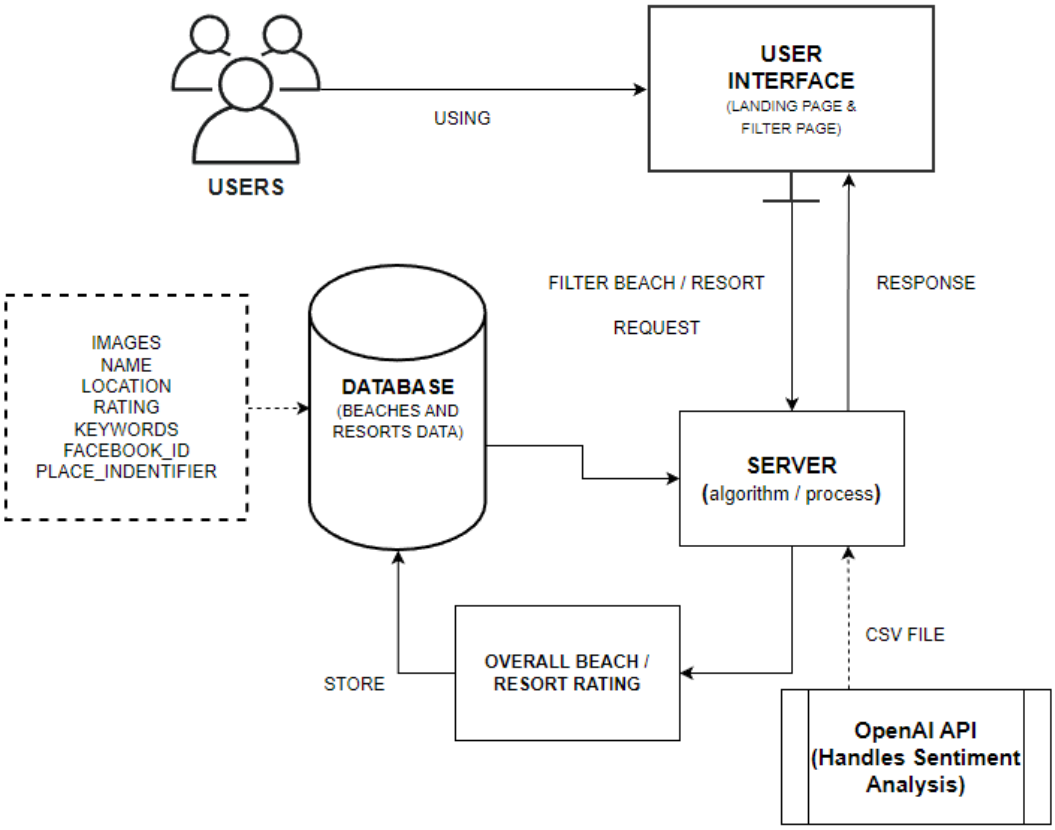


Figure 3: System Architecture

CHAPTER IV

RESULTS AND DISCUSSION

Implementation of Multi-Criteria Decision Making (MCDM)

The researchers employed a weighted sum model for the multi-criteria decision-making (MCDM) process. This model involves assigning weights to each criterion based on their relative importance, as determined through expert consultations and user surveys. The cleanliness, safety, accessibility, natural beauty, recreational activities, and accommodation criteria were carefully weighted to reflect their significance in user preferences. For the third objective, the researcher utilized web scraping techniques to gather guest reviews from Facebook pages of resorts and beaches in the Zamboanga Peninsula. Python scripts were developed to navigate through the pages, extract relevant text data, and store it in a structured database. And last, the objective involved sentiment analysis using the OpenAI model. The scraped reviews were preprocessed to remove irrelevant information.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Cleanliness	Natural Beauty	Safety	Accommodations	Recreational Activities	Accessibility	Cleanliness	Natural Beauty	Safety	Accommodations	Recreational Activities	Accessibility	
2	6th	5th	4th	3rd	2nd	1st	1	2	3	4	5	6	
3	2nd	5th	1st	3rd	6th	4th	5	2	6	4	1	3	
4	5th	6th	4th	3rd	2nd	1st	2	1	3	4	5	6	
5	1st	2nd	3rd	4th	6th	5th	6	5	4	3	1	2	
6	1st	2nd	3rd	4th	5th	6th	6	5	4	3	2	1	
7	4th	5th	1st	3rd	6th	2nd	3	2	6	4	1	5	
8	3rd	4th	1st	2nd	6th	5th	4	3	6	5	1	2	
9	2nd	1st	3rd	5th	6th	4th	5	6	4	2	1	3	
10	1st	2nd	3rd	4th	5th	6th	6	5	4	3	2	1	
11	2nd	3rd	1st	5th	6th	4th	5	4	6	2	1	3	
12	3rd	1st	2nd	4th	6th	5th	4	6	5	3	1	2	
13	5th	6th	4th	1st	2nd	3rd	2	1	3	6	5	4	
14	2nd	3rd	1st	4th	6th	5th	5	4	6	3	1	2	
15	1st	3rd	2nd	4th	6th	5th	6	4	5	3	1	2	
16	1st	2nd	3rd	4th	5th	6th	6	5	4	3	2	1	
17	1st	4th	3rd	2nd	6th	5th	6	3	4	5	1	2	
18	1st	4th	2nd	3rd	6th	5th	6	3	5	4	1	2	
19	1st	5th	2nd	3rd	6th	4th	6	2	5	4	1	3	
20	3rd	2nd	1st	4th	6th	5th	4	5	6	3	1	2	
21	1st	3rd	2nd	4th	6th	5th	6	4	5	3	1	2	
22	6th	3rd	4th	5th	1st	2nd	1	4	3	2	6	5	
23	2nd	3rd	1st	4th	6th	5th	5	4	6	3	1	2	
24	5th	4th	2nd	6th	1st	3rd	2	3	5	1	6	4	
25	2nd	3rd	1st	4th	5th	6th	5	4	6	3	2	1	
26	2nd	1st	3rd	5th	6th	4th	5	6	4	2	1	3	
27	1st	5th	2nd	3rd	6th	4th	6	2	5	4	1	3	
28	2nd	4th	3rd	1st	6th	5th	5	3	4	6	1	2	
29	2nd	3rd	1st	5th	6th	4th	5	4	6	2	1	3	
30	1st	2nd	3rd	4th	5th	6th	6	5	4	3	2	1	
31	2nd	3rd	1st	4th	6th	5th	5	4	6	3	1	2	
32	1st	2nd	3rd	4th	5th	6th	6	5	4	3	2	1	
33	2nd	3rd	1st	6th	5th	4th	5	4	6	1	2	3	
34	3rd	2nd	1st	6th	5th	4th	4	5	6	1	2	3	
35	1st	3rd	2nd	5th	6th	4th	6	4	5	2	1	3	
36	3rd	2nd	1st	4th	5th	6th	4	5	6	3	2	1	
37	3rd	2nd	1st	4th	5th	6th	4	5	6	3	2	1	
38	2nd	5th	1st	4th	6th	3rd	5	2	6	3	1	4	
39	2nd	3rd	1st	4th	5th	6th	5	4	6	3	2	1	

Figure 4: Survey Score and Points

To determine the contribution of each criterion based on rankings, the Borda Count method is employed. In this process, points are assigned to criteria according to their ranking, and these points are then totaled for each criterion. The criterion with the highest sum is deemed the most important. Firstly, for every respondent, points are allocated to criteria based on their rankings. For instance, in a scenario with six criteria, the top-ranked criterion receives 6 points, the second 5 points, and so forth, down to 1 point for the lowest-ranked criterion. Next, the total points for each criterion are calculated by summing up the points across all respondents. Following this, the average points for each criterion are determined by dividing the total points by the number of respondents. To express the importance as a percentage, the scores are normalized. This is achieved by dividing each criterion's average points by the total possible points, which is the sum of the points for each rank (1+2+3+4+5+6 = 21). The resulting normalized scores provide a percentage-based representation of the importance of each criterion in the overall ranking.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
34	3rd	2nd	1st	6th	5th	4th	4	5	6	1	2	3		
35	1st	3rd	2nd	5th	6th	4th	6	4	5	2	1	3		
36	3rd	2nd	1st	4th	5th	6th	4	5	6	3	2	1		
37	3rd	2nd	1st	4th	5th	6th	4	5	6	3	2	1		
38	2nd	5th	1st	4th	6th	3rd	5	2	6	3	1	4		
39	2nd	3rd	1st	4th	5th	6th	5	4	6	3	2	1		
40	2nd	3rd	1st	4th	5th	6th	5	4	6	3	2	1		
41	4th	2nd	3rd	5th	6th	1st	3	5	4	2	1	6		
42	2nd	4th	1st	3rd	5th	6th	5	3	6	4	2	1		
43	4th	2nd	3rd	5th	6th	1st	3	5	4	2	1	6		
44	2nd	5th	1st	3rd	6th	4th	5	2	6	4	1	3		
45	2nd	4th	1st	5th	6th	3rd	5	3	6	2	1	4		
46	1st	3rd	2nd	6th	5th	4th	6	4	5	1	2	3		
47	1st	3rd	2nd	4th	6th	5th	6	4	5	3	1	2		
48	2nd	3rd	1st	4th	6th	5th	5	4	6	3	1	2		
49	3rd	2nd	1st	4th	5th	6th	4	5	6	3	2	1		
50	2nd	3rd	1st	5th	6th	4th	5	4	6	2	1	3		
51	1st	3rd	2nd	4th	5th	6th	6	4	5	3	2	1		
52	1st	3rd	2nd	4th	5th	6th	6	4	5	3	2	1		
53							242	196	258	154	90	131		
54							4.745098039	3.843137255	5.058824	3.019608	1.764706	2.568627		
55							0.225957049	0.183006536	0.240896	0.143791	0.084034	0.122316		
56														
57						**Constant Weight**	**22.60**	**18.30**	**24.09**	**14.38**	**8.40**	**12.23**		**16.67**
58														
59														
60							**Constant Weight**	**Sentiment Base on Reviews**						
61					**Jaydee Beach**	**Cleanliness**	22.60	4	90.38					
62						**Natural Beauty**	18.30	5	91.50					
63						**Safety**	24.09	2	48.18					
64						**Accommodation**	14.38	5	71.90					
65						**Recreational Activity**	8.40	1	8.40					
66						**Accesibility**	12.23	3	36.69					
67									347.06					
68									57.84314					
69									**3.470588**					
70														

Figure 5: Process and Weight Points

For each criterion, the points were assigned based on the rank given by each respondent. The 1st place received 6 points, the 2nd place received 5 points, and so on, with the 6th place receiving 1 point. The total Borda count for each option was then calculated by summing up the points across all criteria. The researcher summed up the rates of the respondents and then divided it up to the total of respondents, in our case the researchers had 51 total respondents to normalize it and to get the weight of each factor. This is achieved by dividing each criterion's average points by the total possible points, which is the sum of the points for each rank (1+2+3+4+5+6 = 21). And the result after dividing it we will multiply it by 100 to get a whole number.

For every aspect, we assigned points based on how each participant ranked it. First place got 6 points, second place got 5 points, and so on, down to 6th place receiving 1 point. To calculate the total Borda count for each option, we added up the points across all aspects. Next, the researcher tallied up the scores given by the participants and divided the total by the number of participants, which in our case was 51. This normalization process helps determine the weight of each factor. To do this, the researcher divided the average points for each criterion by the total possible points, which is the sum of the points for each rank (1+2+3+4+5+6 = 21). The result was then multiplied by 100 to yield a whole number.

The points come from OPENAI's sentiment analysis and are based on five emotions. The emotions used for sentiment analysis are anger, which scores 1 point; sadness, which corresponds to 2 points; neutrality, which is assigned 3 points; happiness, with 4 points; and overwhelming positivity, earning 5 points. These five emotions are applied in the sentiment analysis of each beach or resort review. OPENAI analyzes the

points based on the sentiment expressed in each review and multiplies them by the weights assigned to six criteria or factors. This process generates the total rating for the beach or resort.

Implementation of scraping technique

In our research, we had utilized the Apify platform for web scraping. Although Apify had offered a variety of scraping tools, we had specifically chosen the Facebook Reviews Scraper for our project on the beaches and resorts of the Zamboanga Peninsula.

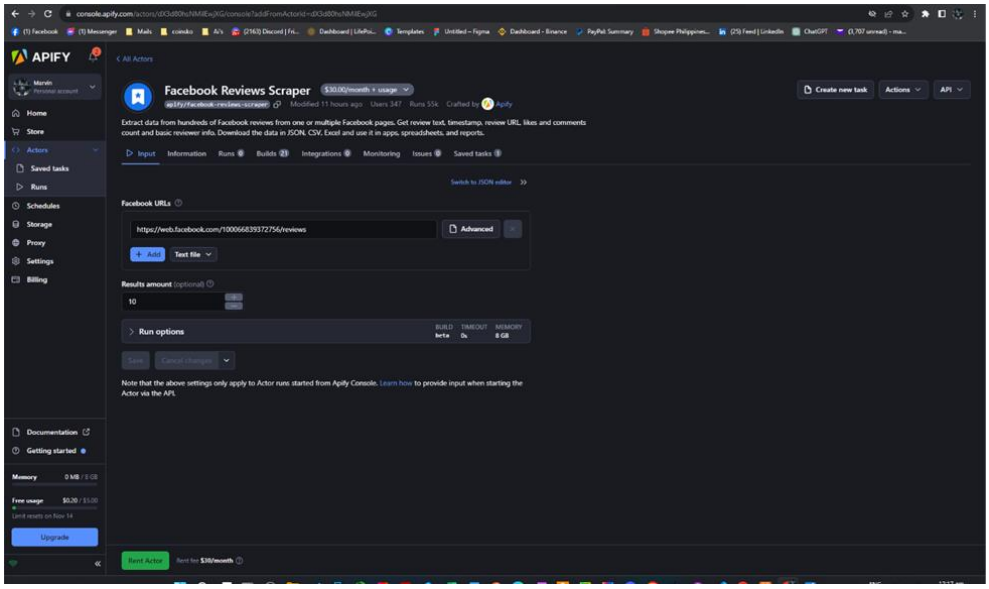
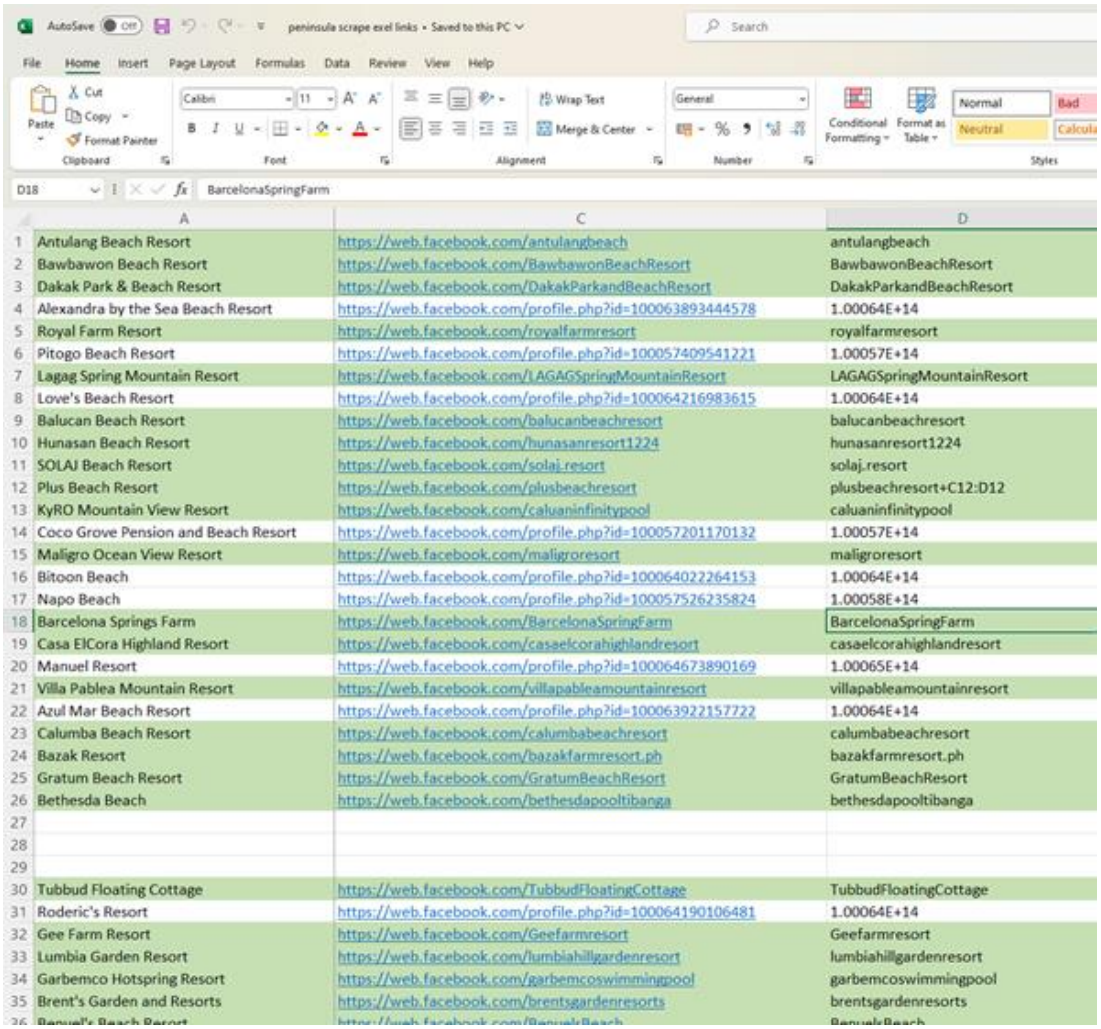


Figure 6: APIFY Platform Landing Page.

Initially, we had manually searched for beaches and resorts in Zamboanga City on Facebook, obtaining their Facebook IDs, which were required by Apify to locate and target the reviews of specific pages. To better track our search, we had also used Google Maps to locate each beach and resort in the Zamboanga Peninsula. Subsequently, we had

conducted a detailed search for each beach on Facebook. We checked each Facebook page for a reviews section where beach-goers could comment on their experiences. If we found that a particular Facebook page had a reviews section, we noted it in an Excel sheet. This information was later used in Apify for scraping.



	A	C	D
1	Antulang Beach Resort	https://web.facebook.com/antulangbeach	antulangbeach
2	Bawbawon Beach Resort	https://web.facebook.com/BawbawonBeachResort	BawbawonBeachResort
3	Dakak Park & Beach Resort	https://web.facebook.com/DakakParkandBeachResort	DakakParkandBeachResort
4	Alexandra by the Sea Beach Resort	https://web.facebook.com/profile.php?id=100063893444578	1.00064E+14
5	Royal Farm Resort	https://web.facebook.com/royalfarmresort	royalfarmresort
6	Pitogo Beach Resort	https://web.facebook.com/profile.php?id=100057409541221	1.00057E+14
7	Lagag Spring Mountain Resort	https://web.facebook.com/LAGAGSpringMountainResort	LAGAGSpringMountainResort
8	Love's Beach Resort	https://web.facebook.com/profile.php?id=100064216983615	1.00064E+14
9	Balucan Beach Resort	https://web.facebook.com/balucanbeachresort	balucanbeachresort
10	Hunasan Beach Resort	https://web.facebook.com/hunasanresort1224	hunasanresort1224
11	SOLAJ Beach Resort	https://web.facebook.com/solaj.resort	solaj.resort
12	Plus Beach Resort	https://web.facebook.com/plusbeachresort	plusbeachresort+C12:D12
13	KyRO Mountain View Resort	https://web.facebook.com/caluaninfinitypool	caluaninfinitypool
14	Coco Grove Pension and Beach Resort	https://web.facebook.com/profile.php?id=100057201170132	1.00057E+14
15	Maligro Ocean View Resort	https://web.facebook.com/maligroresort	maligroresort
16	Bitoon Beach	https://web.facebook.com/profile.php?id=100064022264153	1.00064E+14
17	Napo Beach	https://web.facebook.com/profile.php?id=100057526235824	1.00058E+14
18	Barcelona Springs Farm	https://web.facebook.com/BarcelonaSpringFarm	BarcelonaSpringFarm
19	Casa ElCora Highland Resort	https://web.facebook.com/casaelcorahighlandresort	casaelcorahighlandresort
20	Manuel Resort	https://web.facebook.com/profile.php?id=100064673890169	1.00065E+14
21	Villa Pablea Mountain Resort	https://web.facebook.com/villapableamountainresort	villapableamountainresort
22	Azul Mar Beach Resort	https://web.facebook.com/profile.php?id=100063922157722	1.00064E+14
23	Calumba Beach Resort	https://web.facebook.com/calumbabeachresort	calumbabeachresort
24	Bazak Resort	https://web.facebook.com/bazakfarmresort.ph	bazakfarmresort.ph
25	Gratum Beach Resort	https://web.facebook.com/GratumBeachResort	GratumBeachResort
26	Bethesda Beach	https://web.facebook.com/bethesdapooltibanga	bethesdapooltibanga
27			
28			
29			
30	Tubbud Floating Cottage	https://web.facebook.com/TubbudFloatingCottage	TubbudFloatingCottage
31	Roderic's Resort	https://web.facebook.com/profile.php?id=100064190106481	1.00064E+14
32	Gee Farm Resort	https://web.facebook.com/Geefarmresort	Geefarmresort
33	Lumbia Garden Resort	https://web.facebook.com/lumbiahillgardenresort	lumbiahillgardenresort
34	Garbemco Hotspring Resort	https://web.facebook.com/garbemcoswimmingpool	garbemcoswimmingpool
35	Brent's Garden and Resorts	https://web.facebook.com/brentsgardenresorts	brentsgardenresorts

Figure 7: Exel List of Beaches and Resorts

In our Excel sheet, we had recorded every beach and resort we found on Facebook, along with their addresses and the links where we found them. After this, we had input the Facebook link or the Facebook ID of each beach and resort into Apify. We

then ran the program to obtain at least 10 reviews for each beach and resort. These reviews were used in our algorithm and computations for validation purposes.

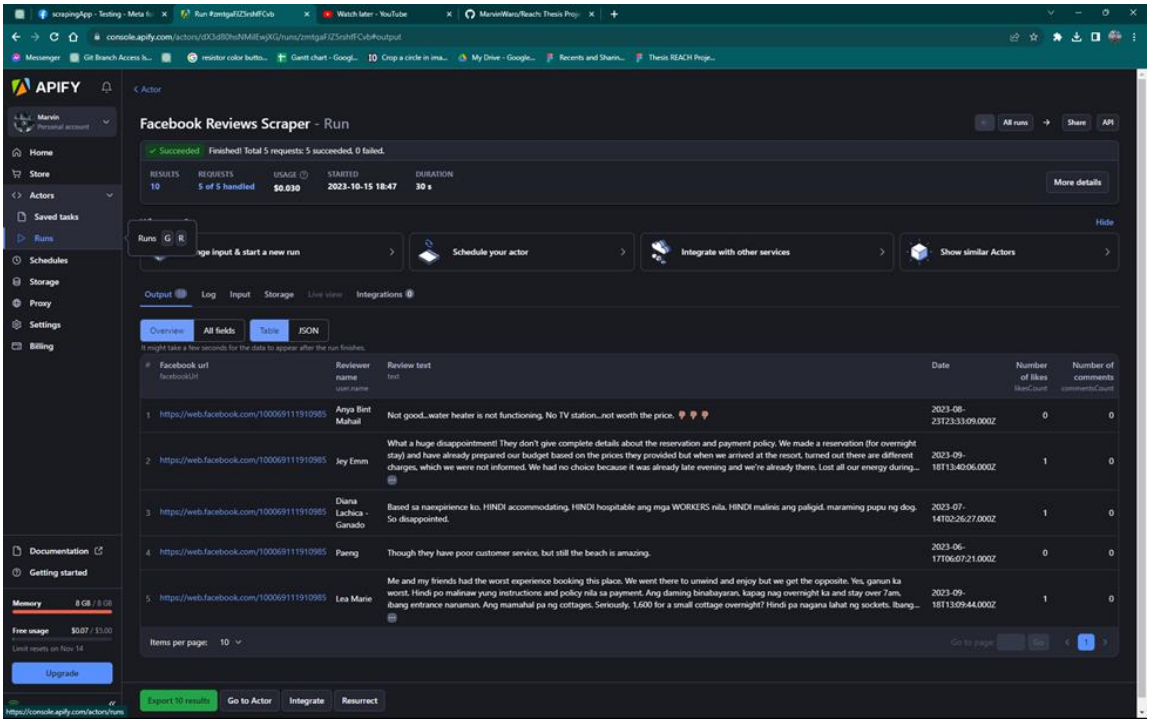


Figure 8: APIFY Facebook Scraper

After we had input the Facebook IDs of the validated beaches and resorts from the Excel sheet, we ran the scraper on Apify to gather all the reviews from each Facebook page. Once we had collected all the reviews for a specific beach or resort, we converted this data into a CSV file. We then cleaned the data using Anaconda's Jupyter Notebook. We used Anaconda's Jupyter Notebook to concatenate all the CSV files, each containing reviews of different beaches and resorts produced by Apify. We combined these files into a single CSV file. This consolidated file was then used by the server-side algorithm in Django's backend, which read and computed the sentiment of the reviews collectively.

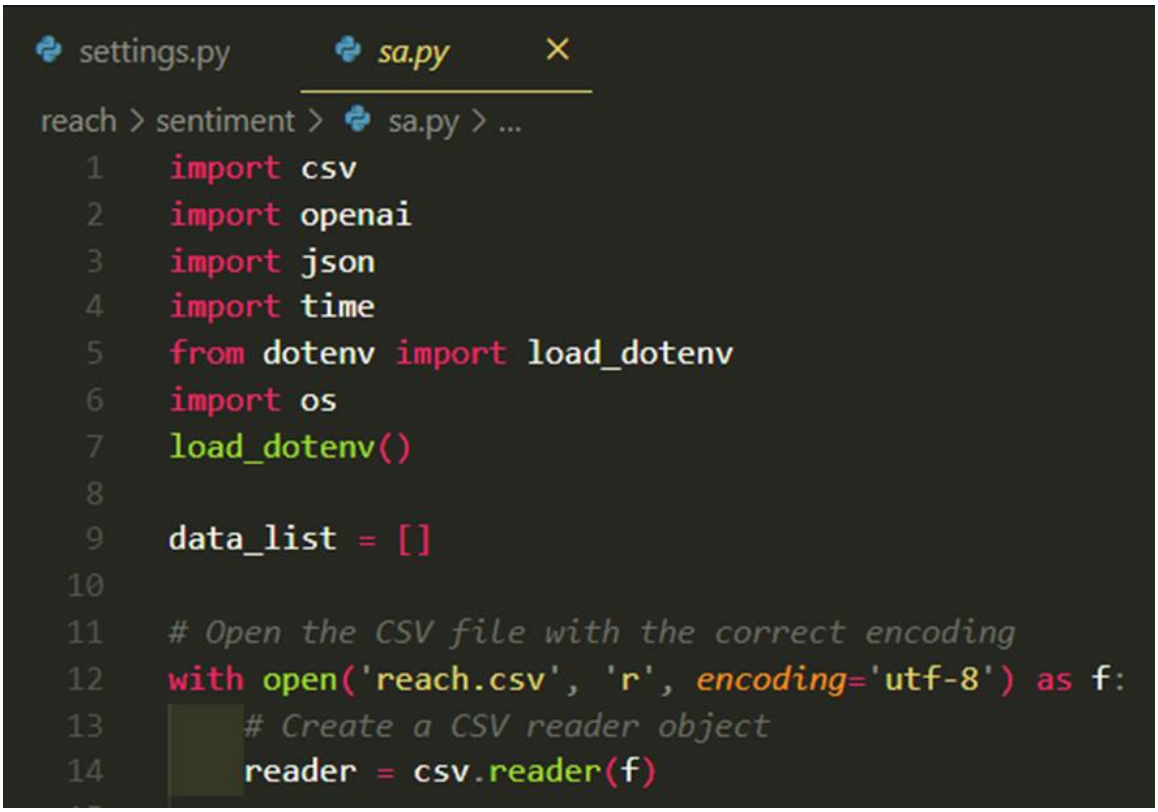


Figure 9: Importing csv file to the Backend

In Visual Studio Code, we had included the overall CSV file that we had exported from Anaconda. As you can see in the picture above, that is the CSV file. The main purpose of this was for OpenAI to read each one of the reviews in the CSV file. OpenAI then scored them based on six factors: cleanliness, safety, natural beauty, accommodation, recreational activity, and accessibility.

Sentiment analysis using OPENAI API

OpenAI had conducted sentiment analysis based on a point system that corresponded to five distinct emotions. These emotions included anger, which was assigned 1 point; sadness, which earned 2 points; neutrality, which was given 3 points;

happiness, which was worth 4 points; and overwhelming positivity, which scored the highest at 5 points. These emotions were used to analyze each review of the beaches and resorts. OpenAI evaluated the sentiment expressed in each review and assigned points accordingly. These points were then multiplied by the weights of six different criteria or factors. The culmination of this process resulted in the generation of an overall rating for each beach or resort.

In our backend framework, we imported OpenAI to read the sentiments of each beach and resort review from the CSV file. To do this, we created a prompt for the backend. The OpenAI API read this prompt and exported the result in a JSON file. You can see the process in the picture below.

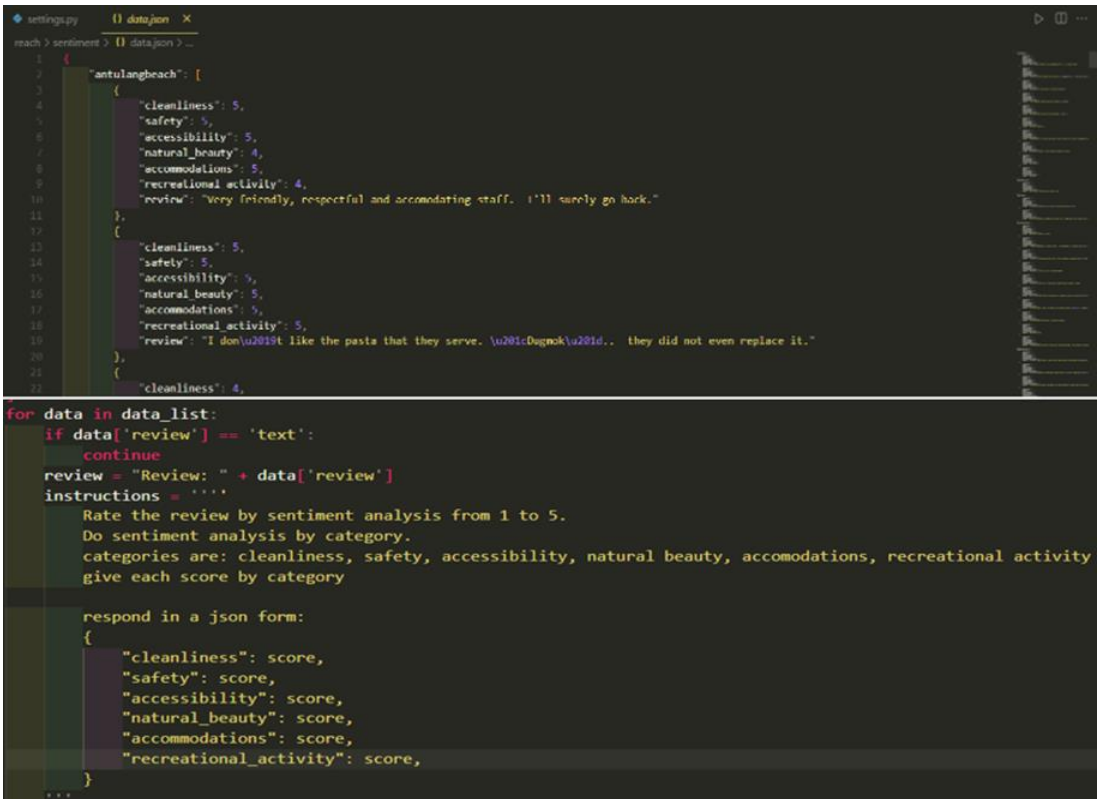


Figure 10: Sentiment Analysis Prompt

CHAPTER V

CONCLUSION AND RECOMMENDATIONS

Conclusion

The integration of Multi-Criteria Decision Making (MCDM) into the evaluation of beaches and resorts in the Zamboanga Peninsula had significantly revolutionized the selection process, demonstrating a sophisticated approach to destination choice. Through a meticulous weighted sum model, the study had effectively assigned importance to various criteria—cleanliness, safety, accessibility, natural beauty, recreational activities, and accommodation—reflecting the preferences and priorities of users. The innovative application of web scraping techniques to harvest guest reviews from social media and the adept use of sentiment analysis via the OpenAI model had collectively enhanced the accuracy and relevance of the data analysis, grounding the decision-making process in real, user-generated content.

The methodological rigor was further evidenced by employing the Borda Count method for ranking criteria, ensuring that each factor's contribution to the decision-making process was quantitatively assessed and validated by a comprehensive survey of 51 respondents. This approach had not only quantified the relative importance of each criterion but also normalized the data to present a clear hierarchy of user preferences, thereby guiding potential travelers towards making informed choices based on a blend of subjective and objective considerations.

The strategic implementation of the Apify platform for web scraping had ensured a robust collection of data, meticulously gathered from the Facebook pages of selected beaches and resorts. This methodical collection process, followed by the detailed analysis using Anaconda's Jupyter Notebook and the Django backend, exemplified the study's commitment to leveraging advanced technological tools for data management and analysis.

Furthermore, the application of sentiment analysis through the OpenAI API had illuminated the nuanced perceptions of travelers, categorizing their experiences into a spectrum of emotions from anger to overwhelming positivity. By intertwining these sentiments with the weighted criteria, the study had not only identified Alintanaqa Beach and Lagag Spring Mountain Resort as exemplary destinations but also showcased a model for understanding consumer satisfaction in a nuanced and comprehensive manner.

In summary, this research had adeptly combined the theoretical framework of MCDM with practical, cutting-edge tools like web scraping and sentiment analysis to offer a novel approach to selecting travel destinations in the Zamboanga Peninsula. By transcending traditional selection methods, this study had not only aided travelers in their quest for the ideal vacation spot but also contributed to the broader field of decision-making literature. The implications of this research were profound, promising not just an enhanced travel planning experience but also a potential uplift in local tourism through a more informed and satisfied visitor base. This pioneering effort had set a precedent for future studies, aspiring to refine and expand the methodologies for destination selection, thereby enriching the tourism industry and the quality of travel experiences worldwide.

Recommendations

In light of the comprehensive exploration and analysis undertaken in this study, the following recommendations aimed to further elevate the effectiveness and user experience of the proposed system. These suggestions addressed specific areas for enhancement, providing valuable insights for future researchers and developers seeking to refine and expand upon the current framework.

To enhance effectiveness, future researchers could integrate a dynamic data scraping mechanism using APIFY's Facebook Reviews Scraper to automatically retrieve new reviews in real time. This would enable continuous sentiment analysis and updating of beach and resort ratings, guaranteeing comprehensive and up-to-date evaluations. Additionally, the user interface could be improved by adding filters to break down ratings into specific criteria like cleanliness and safety, facilitating a tailored search experience. Lastly, the Facebook scraping functionality could be extended to incorporate comments alongside reviews to capture a richer spectrum of user sentiments for more accurate evaluations. To summarize, the implementation of automated data collecting, interface enhancements, and inclusive comment scraping will result in an increasingly resilient and constantly evolving system that offers accurate and customized information to individuals seeking to make well-informed travel decisions.

These recommendations collectively contribute to the system's adaptability, user-friendliness, and depth of sentiment analysis, reinforcing its potential as a robust tool for beach and resort selection.

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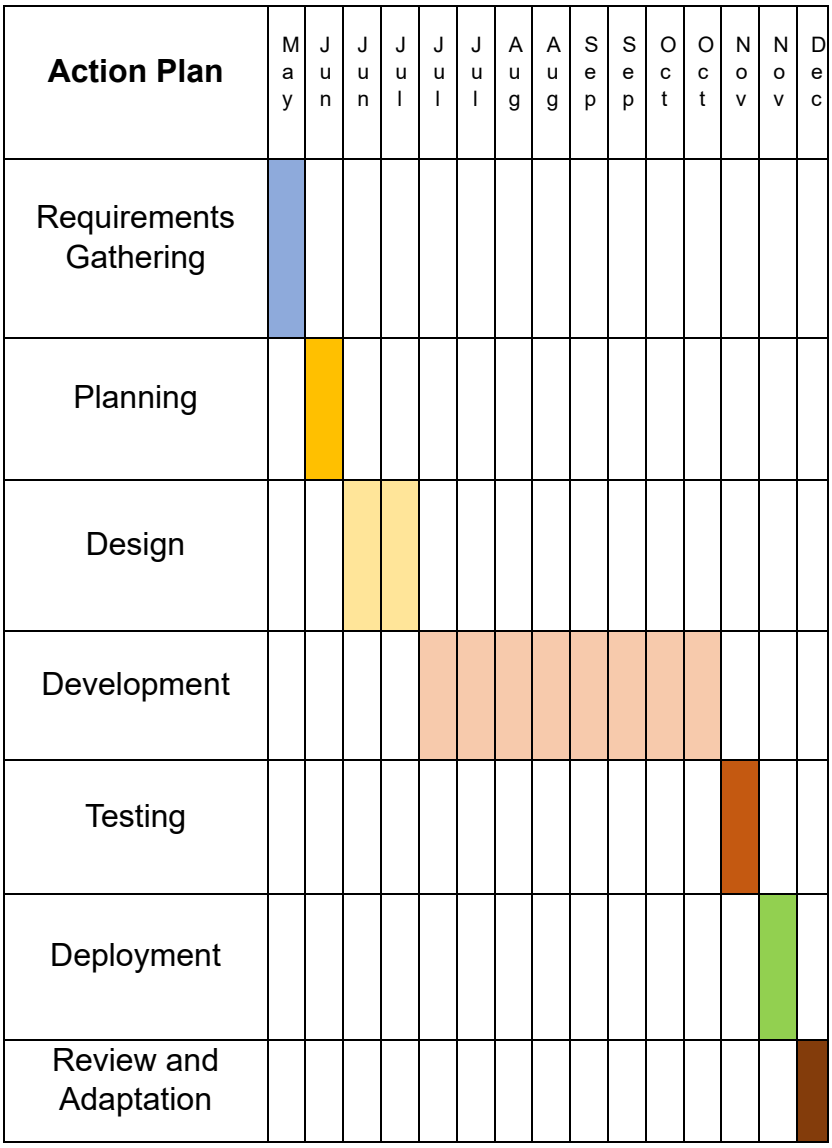
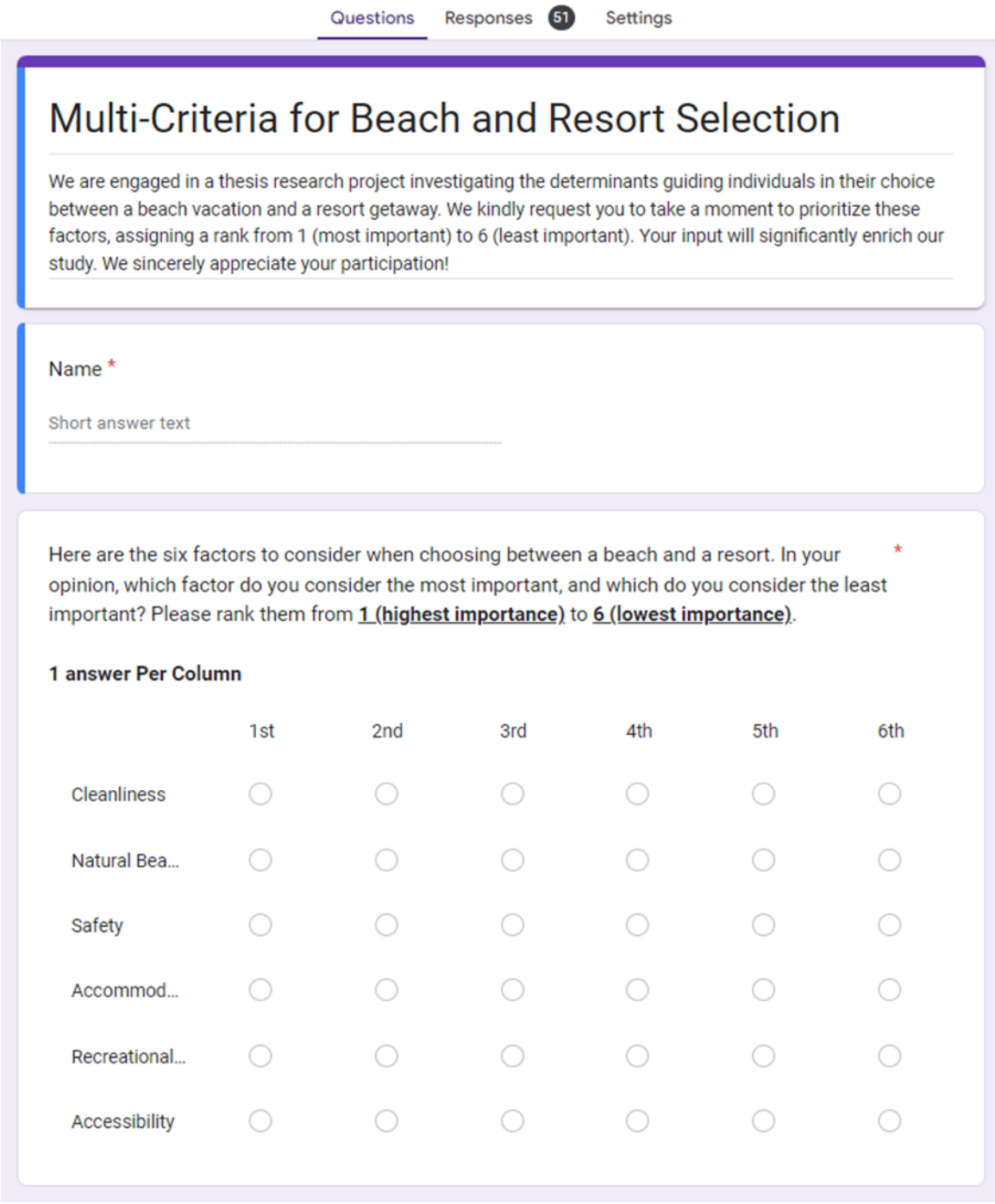
Appendix A: Gantt Chart



Appendix B: Survey Form



Questions Responses 51 Settings

Multi-Criteria for Beach and Resort Selection

We are engaged in a thesis research project investigating the determinants guiding individuals in their choice between a beach vacation and a resort getaway. We kindly request you to take a moment to prioritize these factors, assigning a rank from 1 (most important) to 6 (least important). Your input will significantly enrich our study. We sincerely appreciate your participation!

Name *

Short answer text

Here are the six factors to consider when choosing between a beach and a resort. In your opinion, which factor do you consider the most important, and which do you consider the least important? Please rank them from **1 (highest importance)** to **6 (lowest importance)**. *

1 answer Per Column

	1st	2nd	3rd	4th	5th	6th
Cleanliness	○	○	○	○	○	○
Natural Bea...	○	○	○	○	○	○
Safety	○	○	○	○	○	○
Accommod...	○	○	○	○	○	○
Recreational...	○	○	○	○	○	○
Accessibility	○	○	○	○	○	○

51 responses

View in Sheets

Accepting responses

Summary | Question | Individual

Name

51 responses

Licera, Richard O.

Maria Fatima S.Mendeja

Ikoh Arceo

Dats@gmail.com

TJ Torrico

Ragdi, Jean Christian S.

Roselyn Tarroza

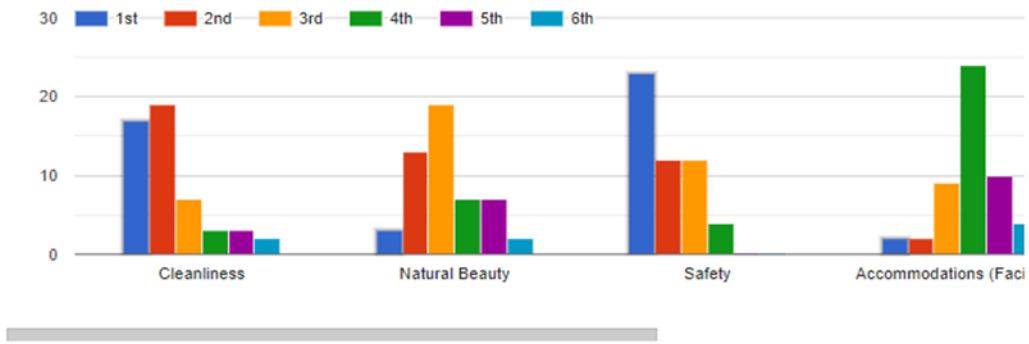
Daph Nagatsuki

SIDRICK YODICO CADUNGOG

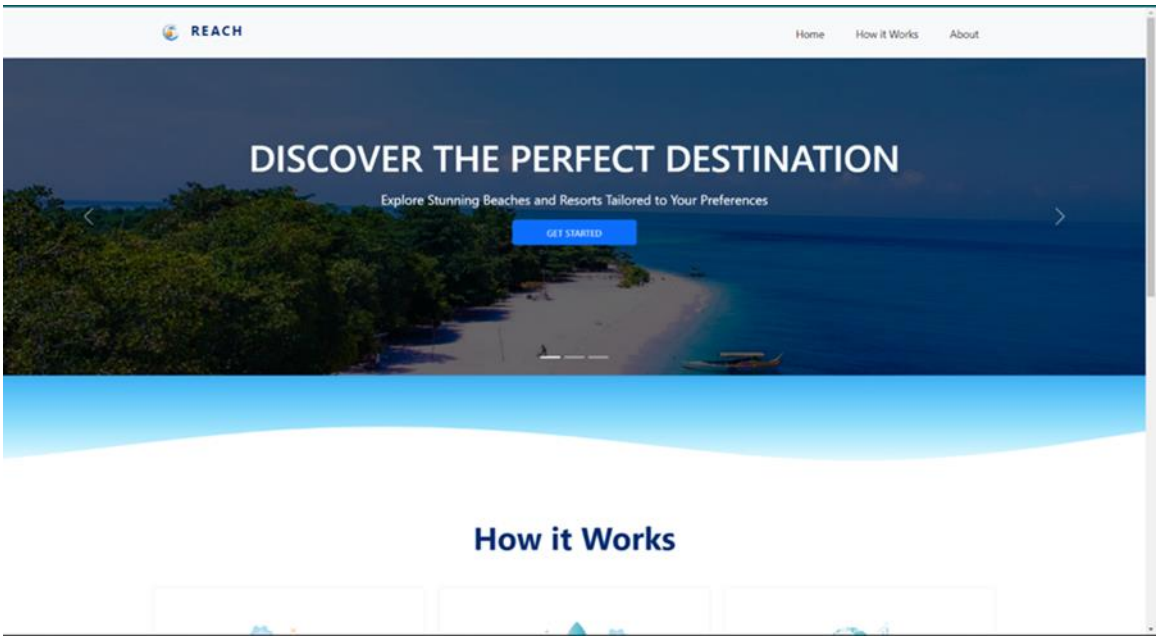
Here are the six factors to consider when choosing between a beach and a resort. In your opinion, which factor do you consider the most important, and which do you consider the least important? Please rank them from **1 (highest importance)** to **6 (lowest importance)**.

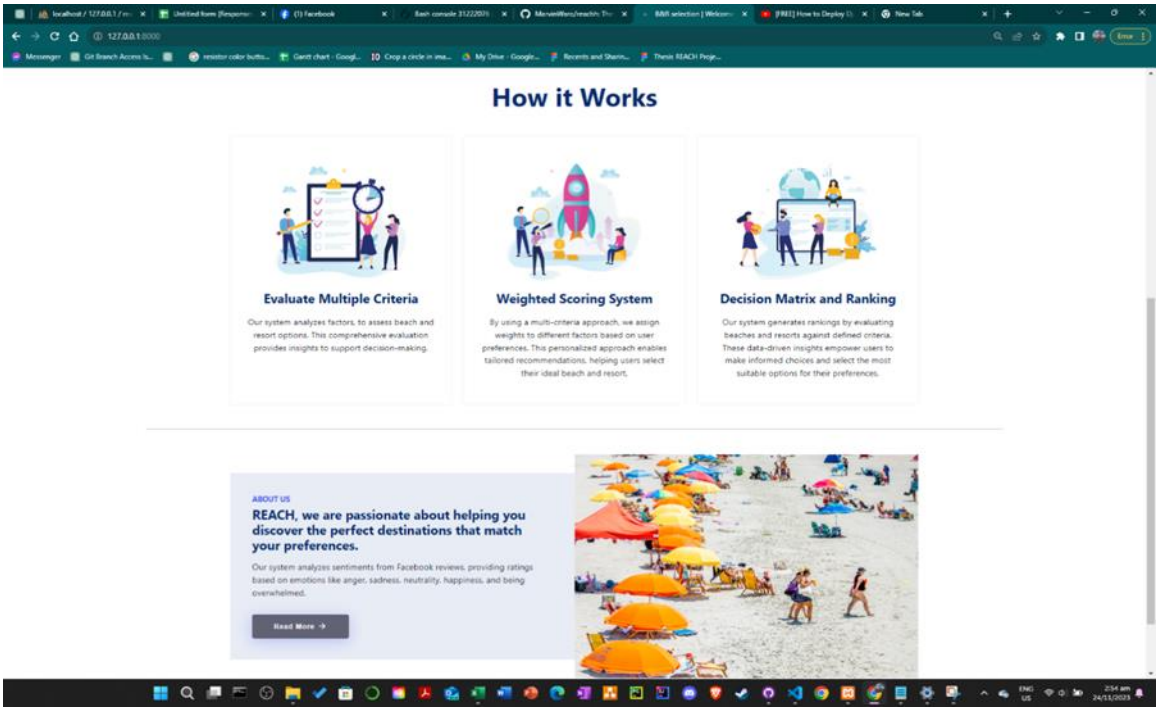
Copy

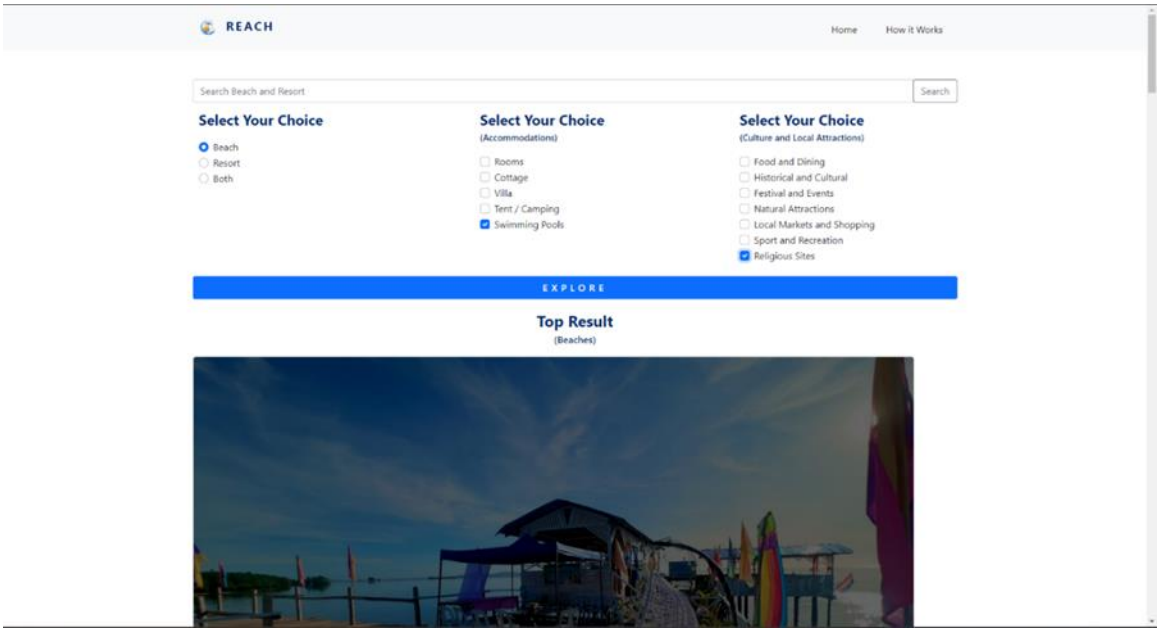
1 answer Per Column

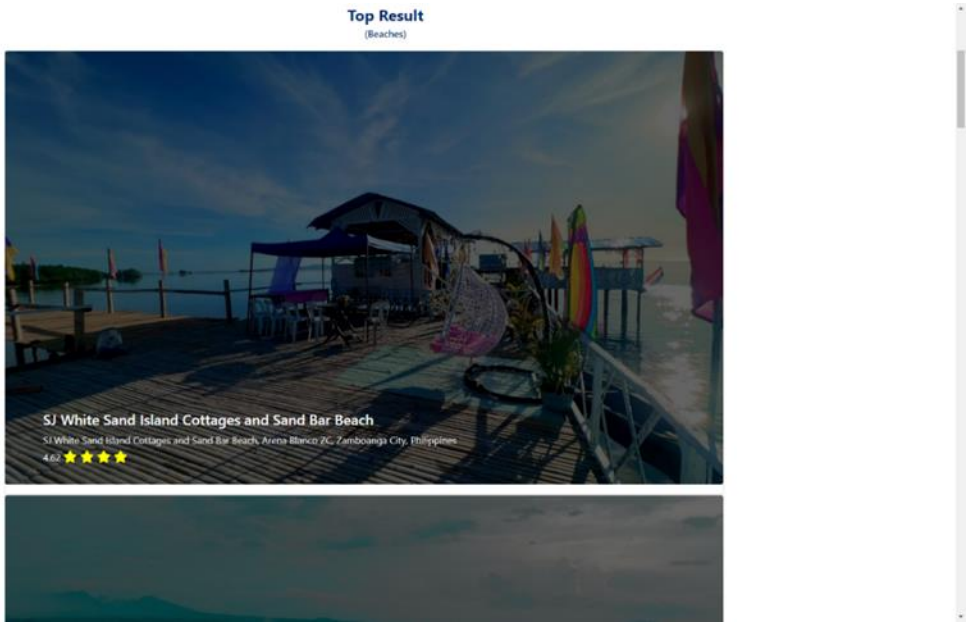


Appendix C: User Interface

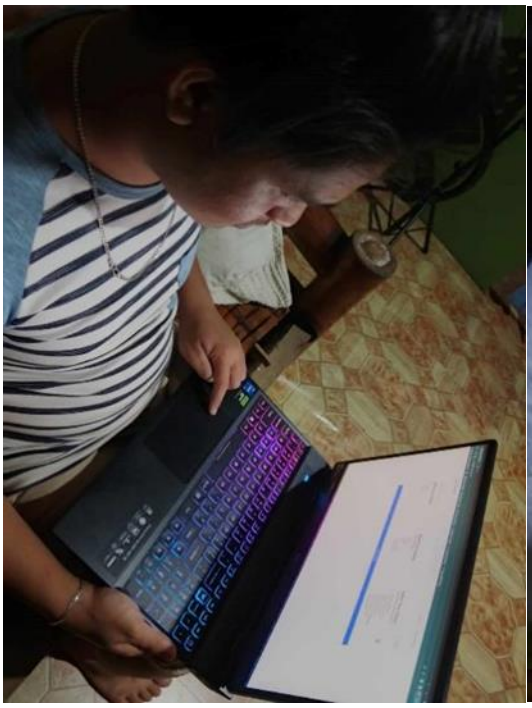


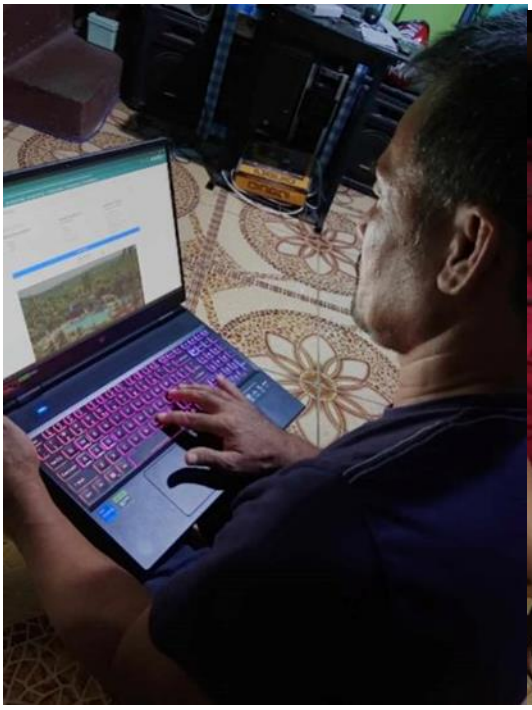


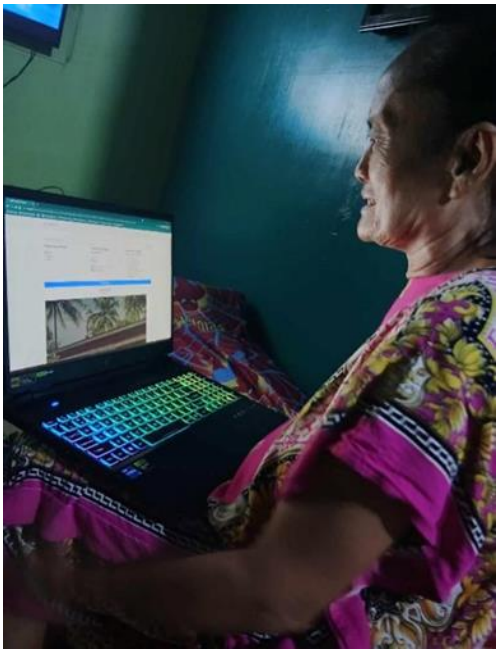

REACH
Home
How it Works
Search Beach and Resort
Search
Select Your Choice
Beach
Resort
Both
Select Your Choice
(Accommodations)
Rooms
Cottage
Villa
Tent / Camping
Swimming Pools
Select Your Choice
(Culture and Local Attractions)
Food and Dining
Historical and Cultural
Festival and Events
Natural Attractions
Local Markets and Shopping
Sport and Recreation
Religious Sites
EXPLORE
Top Result
(Beaches)

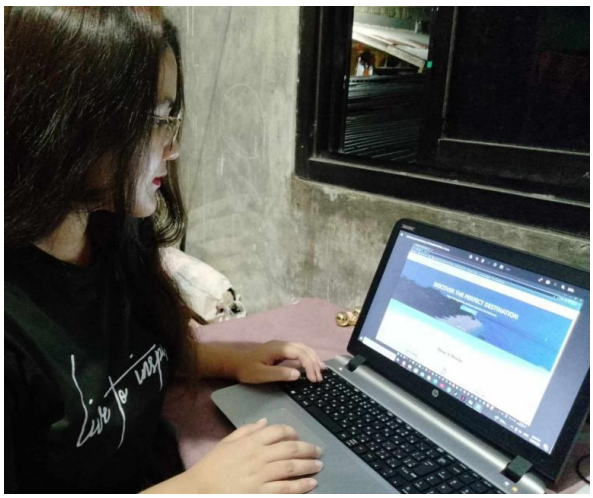

Top Result
(Beaches)
SJ White Sand Island Cottages and Sand Bar Beach
SJ White Sand Island Cottages and Sand Bar Beach, Arena Blanco ZC, Zamboanga City, Philippines
4.6

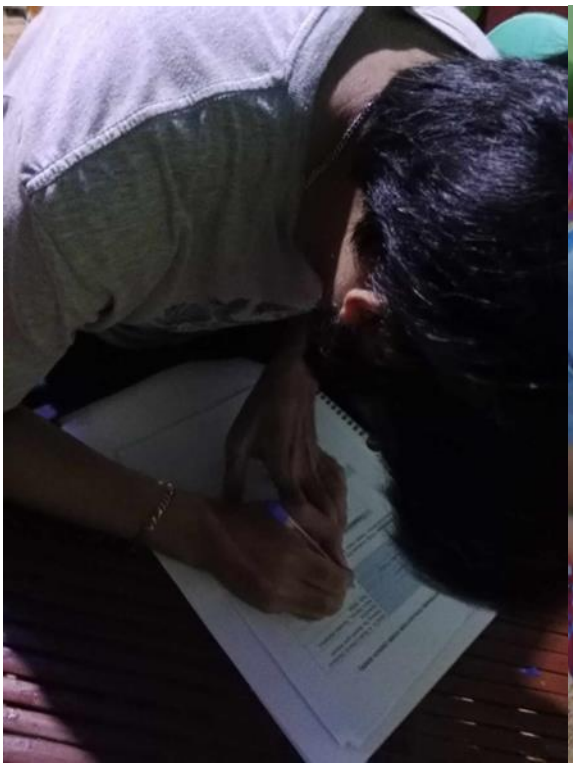
Appendix D: Test Cases

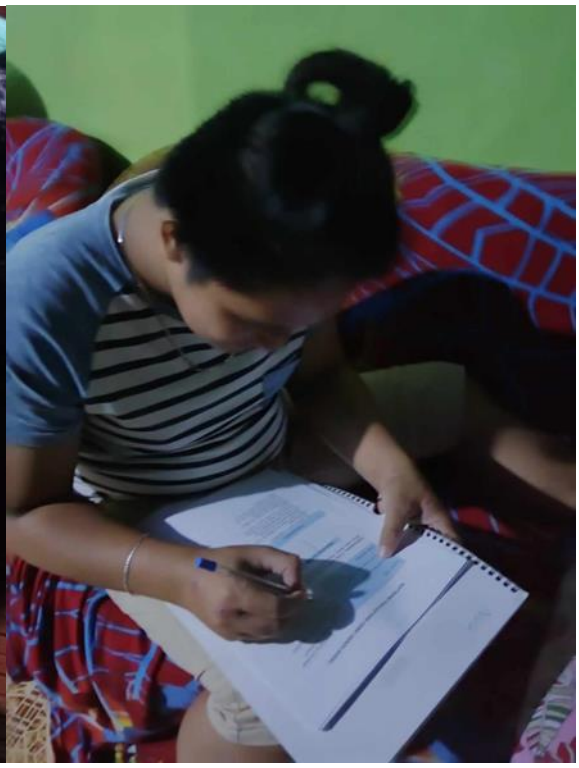












Appendix E: Evaluation Tool

SOFTWARE EVALUATION FORM (BEACH GOER)

Project Title	REACH: A Multi Criteria Decision Making for Beach and Resort Selection
Name of Developer/s	Waro Marvin, Tawasil Aldasher, Talib Abdar
Name of Evaluator (Tester)	
Email Address	

Instructions: Kindly evaluate the Multi-Criteria Decision Making for Beach and Resort Selection based on the numerical rating scale below. Please check the box that corresponds to your rating.

Numerical Rating	Description
5	Strongly Agree
4	Agree
3	Somehow Agree
2	Disagree
1	Strongly Disagree

Functionality	5	4	3	2	1
1. The system has a responsive landing page					
2. The system data are gathered from sentiment analysis accurately					
3. The System has database of all beaches and resort of Zamboanga peninsula that only have Facebook pages					
4. The system has a filter for beach and resort preferences					
5. The system has a search bar for easy navigation and looking for beach or resort					

Reliability	5	4	3	2	1
1. The system is accessible 24/7 except during maintenance.					
2. The system effectively handles errors, displaying appropriate error messages.					
3. The system is designed to handle a high load of users maintaining performance even when multiple users or beach goer are accessing it simultaneously.					
4. The system rating has its weights and reliable for accurate data from sentiments of users					

Usability	5	4	3	2	1
1. The system is intuitive and can be easily learned by any person or beach goer.					
2. The system is user-friendly and easy to operate, requiring minimal technical expertise.					
3. The system has radio button and checkbox for easy filtering preferences					
4. The system interface is visually appealing and professionally designed.					
5. The system's color scheme is consistent with the organization's branding and visual identity.					

SOFTWARE EVALUATION FORM (BEACH GOER)

Project Title	REACH: A Multi Criteria Decision Making for Beach and Resort Selection
Name of Developer/s	Waro Marvin, Tawasil Aldasher, Talib Abdar
Name of Evaluator (Tester)	Daphny O. Asong
Email Address	

Instructions: Kindly evaluate the Multi-Criteria Decision Making for Beach and Resort Selection based on the numerical rating scale below. Please check the box that corresponds to your rating.

Numerical Rating	Description
5	Strongly Agree
4	Agree
3	Somehow Agree
2	Disagree
1	Strongly Disagree

Functionality	5	4	3	2	1
1. The system has a responsive landing page	/				
2. The system data are gathered from sentiment analysis accurately	/				
3. The System has database of all beaches and resort of Zamboanga peninsula that only have Facebook pages	/				
4. The system has a filter for beach and resort preferences	/				
5. The system has a search bar for easy navigation and looking for beach or resort	/				

Reliability	5	4	3	2	1
1. The system is accessible 24/7 except during maintenance.	/				
2. The system effectively handles errors, displaying appropriate error messages.	/				
3. The system is designed to handle a high load of users maintaining performance even when multiple users or beach goer are accessing it simultaneously.		/			
4. The system rating has its weights and reliable for accurate data from sentiments of users	/				

Usability	5	4	3	2	1
1. The system is intuitive and can be easily learned by any person or beach goer.		/			
2. The system is user-friendly and easy to operate, requiring minimal technical expertise.	/				
3. The system has radio button and checkbox for easy filtering preferences	/				
4. The system interface is visually appealing and professionally designed.	/				
5. The system's color scheme is consistent with the organization's branding and visual identity.	/				

SOFTWARE EVALUATION FORM (BEACH GOER)

Project Title	REACH: A Multi Criteria Decision Making for Beach and Resort Selection
Name of Developer/s	Waro Marvin, Tawasil Aldasher, Talib Abdar
Name of Evaluator (Tester)	Shatri Sajili
Email Address	

Instructions: Kindly evaluate the Multi-Criteria Decision Making for Beach and Resort Selection based on the numerical rating scale below. Please check the box that corresponds to your rating.

Numerical Rating	Description
5	Strongly Agree
4	Agree
3	Somehow Agree
2	Disagree
1	Strongly Disagree

Functionality	5	4	3	2	1
1. The system has a responsive landing page	✓				
2. The system data are gathered from sentiment analysis accurately	✓				
3. The System has database of all beaches and resort of Zamboanga peninsula that only have Facebook pages	✓				
4. The system has a filter for beach and resort preferences	✓				
5. The system has a search bar for easy navigation and looking for beach or resort	✓				

Reliability	5	4	3	2	1
1. The system is accessible 24/7 except during maintenance.	/				
2. The system effectively handles errors, displaying appropriate error messages.	/				
3. The system is designed to handle a high load of users maintaining performance even when multiple users or beach goer are accessing it simultaneously.	/				
4. The system rating has its weights and reliable for accurate data from sentiments of users	/				

Usability	5	4	3	2	1
1. The system is intuitive and can be easily learned by any person or beach goer.	/				
2. The system is user-friendly and easy to operate, requiring minimal technical expertise.	/				
3. The system has radio button and checkbox for easy filtering preferences	/				
4. The system interface is visually appealing and professionally designed.	/				
5. The system's color scheme is consistent with the organization's branding and visual identity.	/				

SOFTWARE EVALUATION FORM (BEACH GOER)

Project Title	REACH: A Multi Criteria Decision Making for Beach and Resort Selection
Name of Developer/s	Waro Marvin, Tawasil Aldasher, Talib Abdar
Name of Evaluator (Tester)	Zeya Ismael
Email Address	

Instructions: Kindly evaluate the Multi-Criteria Decision Making for Beach and Resort Selection based on the numerical rating scale below. Please check the box that corresponds to your rating.

Numerical Rating	Description
5	Strongly Agree
4	Agree
3	Somehow Agree
2	Disagree
1	Strongly Disagree

Functionality	5	4	3	2	1
1. The system has a responsive landing page	✓				
2. The system data are gathered from sentiment analysis accurately	✓				
3. The System has database of all beaches and resort of Zamboanga peninsula that only have Facebook pages	✓				
4. The system has a filter for beach and resort preferences	✓				
5. The system has a search bar for easy navigation and looking for beach or resort	✓				

Reliability	5	4	3	2	1
1. The system is accessible 24/7 except during maintenance.	/				
2. The system effectively handles errors, displaying appropriate error messages.	/				
3. The system is designed to handle a high load of users maintaining performance even when multiple users or beach goer are accessing it simultaneously.	/				
4. The system rating has its weights and reliable for accurate data from sentiments of users	/				

Usability	5	4	3	2	1
1. The system is intuitive and can be easily learned by any person or beach goer.	/				
2. The system is user-friendly and easy to operate, requiring minimal technical expertise.	/				
3. The system has radio button and checkbox for easy filtering preferences	/				
4. The system interface is visually appealing and professionally designed.	/				
5. The system's color scheme is consistent with the organization's branding and visual identity.	/				

SOFTWARE EVALUATION FORM (BEACH GOER)

Project Title	REACH: A Multi Criteria Decision Making for Beach and Resort Selection
Name of Developer/s	Waro Marvin, Tawasil Aldasher, Talib Abdar
Name of Evaluator (Tester)	NEIL SAJILI
Email Address	

Instructions: Kindly evaluate the Multi-Criteria Decision Making for Beach and Resort Selection based on the numerical rating scale below. Please check the box that corresponds to your rating.

Numerical Rating	Description
5	Strongly Agree
4	Agree
3	Somehow Agree
2	Disagree
1	Strongly Disagree

Functionality	5	4	3	2	1
1. The system has a responsive landing page	/				
2. The system data are gathered from sentiment analysis accurately	/				
3. The System has database of all beaches and resort of Zamboanga peninsula that only have Facebook pages	/				
4. The system has a filter for beach and resort preferences	/				
5. The system has a search bar for easy navigation and looking for beach or resort	/				

Reliability	5	4	3	2	1
1. The system is accessible 24/7 except during maintenance.	√				
2. The system effectively handles errors, displaying appropriate error messages.	√				
3. The system is designed to handle a high load of users maintaining performance even when multiple users or beach goer are accessing it simultaneously.	√				
4. The system rating has its weights and reliable for accurate data from sentiments of users	√				

Usability	5	4	3	2	1
1. The system is intuitive and can be easily learned by any person or beach goer.	√				
2. The system is user-friendly and easy to operate, requiring minimal technical expertise.	√				
3. The system has radio button and checkbox for easy filtering preferences	√				
4. The system interface is visually appealing and professionally designed.	√				
5. The system's color scheme is consistent with the organization's branding and visual identity.	√				

SOFTWARE EVALUATION FORM (BEACH GOER)

Project Title	REACH: A Multi Criteria Decision Making for Beach and Resort Selection
Name of Developer/s	Waro Marvin, Tawasil Aldasher, Talib Abdar
Name of Evaluator (Tester)	Weng Amsirabi
Email Address	

Instructions: Kindly evaluate the Multi-Criteria Decision Making for Beach and Resort Selection based on the numerical rating scale below. Please check the box that corresponds to your rating.

Numerical Rating	Description
5	Strongly Agree
4	Agree
3	Somehow Agree
2	Disagree
1	Strongly Disagree

Functionality	5	4	3	2	1
1. The system has a responsive landing page	✓				
2. The system data are gathered from sentiment analysis accurately	✓				
3. The System has database of all beaches and resort of Zamboanga peninsula that only have Facebook pages	✓				
4. The system has a filter for beach and resort preferences	✓				
5. The system has a search bar for easy navigation and looking for beach or resort	✓				

Reliability	5	4	3	2	1
1. The system is accessible 24/7 except during maintenance.	/				
2. The system effectively handles errors, displaying appropriate error messages.	/				
3. The system is designed to handle a high load of users maintaining performance even when multiple users or beach goer are accessing it simultaneously.	/				
4. The system rating has its weights and reliable for accurate data from sentiments of users	/				

Usability	5	4	3	2	1
1. The system is intuitive and can be easily learned by any person or beach goer.	/				
2. The system is user-friendly and easy to operate, requiring minimal technical expertise.	/				
3. The system has radio button and checkbox for easy filtering preferences	/				
4. The system interface is visually appealing and professionally designed.	/				
5. The system's color scheme is consistent with the organization's branding and visual identity.	/				

SOFTWARE EVALUATION FORM (BEACH GOER)

Project Title	REACH: A Multi Criteria Decision Making for Beach and Resort Selection
Name of Developer/s	Waro Marvin, Tawasil Aldasher, Talib Abdar
Name of Evaluator (Tester)	Ibrahim Sahidjuan
Email Address	

Instructions: Kindly evaluate the Multi-Criteria Decision Making for Beach and Resort Selection based on the numerical rating scale below. Please check the box that corresponds to your rating.

Numerical Rating	Description
5	Strongly Agree
4	Agree
3	Somehow Agree
2	Disagree
1	Strongly Disagree

Functionality	5	4	3	2	1
1. The system has a responsive landing page	✓				
2. The system data are gathered from sentiment analysis accurately	✓				
3. The System has database of all beaches and resort of Zamboanga peninsula that only have Facebook pages	✓				
4. The system has a filter for beach and resort preferences	✓				
5. The system has a search bar for easy navigation and looking for beach or resort	✓				

Reliability	5	4	3	2	1
1. The system is accessible 24/7 except during maintenance.	✓				
2. The system effectively handles errors, displaying appropriate error messages.	✓				
3. The system is designed to handle a high load of users maintaining performance even when multiple users or beach goer are accessing it simultaneously.	✓				
4. The system rating has its weights and reliable for accurate data from sentiments of users	✓				

Usability	5	4	3	2	1
1. The system is intuitive and can be easily learned by any person or beach goer.	✓				
2. The system is user-friendly and easy to operate, requiring minimal technical expertise.	✓				
3. The system has radio button and checkbox for easy filtering preferences	✓				
4. The system interface is visually appealing and professionally designed.	✓				
5. The system's color scheme is consistent with the organization's branding and visual identity.	✓				

SOFTWARE EVALUATION FORM (BEACH GOER)

Project Title	REACH: A Multi Criteria Decision Making for Beach and Resort Selection
Name of Developer/s	Waro Marvin, Tawasil Aldasher, Talib Abdar
Name of Evaluator (Tester)	Sahara Gadjala
Email Address	

Instructions: Kindly evaluate the Multi-Criteria Decision Making for Beach and Resort Selection based on the numerical rating scale below. Please check the box that corresponds to your rating.

Numerical Rating	Description
5	Strongly Agree
4	Agree
3	Somehow Agree
2	Disagree
1	Strongly Disagree

Functionality	5	4	3	2	1
1. The system has a responsive landing page	✓				
2. The system data are gathered from sentiment analysis accurately	✓				
3. The System has database of all beaches and resort of Zamboanga peninsula that only have Facebook pages	✓				
4. The system has a filter for beach and resort preferences	✓				
5. The system has a search bar for easy navigation and looking for beach or resort	✓				

Reliability	5	4	3	2	1
1. The system is accessible 24/7 except during maintenance.	✓				
2. The system effectively handles errors, displaying appropriate error messages.	✓				
3. The system is designed to handle a high load of users maintaining performance even when multiple users or beach goer are accessing it simultaneously.	✓				
4. The system rating has its weights and reliable for accurate data from sentiments of users	✓				

Usability	5	4	3	2	1
1. The system is intuitive and can be easily learned by any person or beach goer.	✓				
2. The system is user-friendly and easy to operate, requiring minimal technical expertise.	✓				
3. The system has radio button and checkbox for easy filtering preferences	✓				
4. The system interface is visually appealing and professionally designed.	✓				
5. The system's color scheme is consistent with the organization's branding and visual identity.	✓				

SOFTWARE EVALUATION FORM (BEACH GOER)

Project Title	REACH: A Multi Criteria Decision Making for Beach and Resort Selection
Name of Developer/s	Waro Marvin, Tawasil Aldasher, Talib Abdar
Name of Evaluator (Tester)	Al-Fitri H. Sajili
Email Address	alfitrisajili@gmail.com

Instructions: Kindly evaluate the Multi-Criteria Decision Making for Beach and Resort Selection based on the numerical rating scale below. Please check the box that corresponds to your rating.

Numerical Rating	Description
5	Strongly Agree
4	Agree
3	Somehow Agree
2	Disagree
1	Strongly Disagree

Functionality	5	4	3	2	1
1. The system has a responsive landing page	✓				
2. The system data are gathered from sentiment analysis accurately	✓				
3. The System has database of all beaches and resort of Zamboanga peninsula that only have Facebook pages	✓				
4. The system has a filter for beach and resort preferences	✓				
5. The system has a search bar for easy navigation and looking for beach or resort	✓				

Reliability	5	4	3	2	1
1. The system is accessible 24/7 except during maintenance.		✓			
2. The system effectively handles errors, displaying appropriate error messages.	✓				
3. The system is designed to handle a high load of users maintaining performance even when multiple users or beach goer are accessing it simultaneously.	✓				
4. The system rating has its weights and reliable for accurate data from sentiments of users	✓				

Usability	5	4	3	2	1
1. The system is intuitive and can be easily learned by any person or beach goer.	✓				
2. The system is user-friendly and easy to operate, requiring minimal technical expertise.	✓				
3. The system has radio button and checkbox for easy filtering preferences	✓				
4. The system interface is visually appealing and professionally designed.	✓				
5. The system's color scheme is consistent with the organization's branding and visual identity.	✓				

SOFTWARE EVALUATION FORM (BEACH GOER)

Project Title	REACH: A Multi Criteria Decision Making for Beach and Resort Selection
Name of Developer/s	Waro Marvin, Tawasil Aldasher, Talib Abdar
Name of Evaluator (Tester)	Sapura Awadi
Email Address	

Instructions: Kindly evaluate the Multi-Criteria Decision Making for Beach and Resort Selection based on the numerical rating scale below. Please check the box that corresponds to your rating.

Numerical Rating	Description
5	Strongly Agree
4	Agree
3	Somehow Agree
2	Disagree
1	Strongly Disagree

Functionality	5	4	3	2	1
1. The system has a responsive landing page		✓			
2. The system data are gathered from sentiment analysis accurately	✓				
3. The System has database of all beaches and resort of Zamboanga peninsula that only have Facebook pages	✓				
4. The system has a filter for beach and resort preferences	✓				
5. The system has a search bar for easy navigation and looking for beach or resort	✓				

Reliability	5	4	3	2	1
1. The system is accessible 24/7 except during maintenance.		✓			
2. The system effectively handles errors, displaying appropriate error messages.	✓				
3. The system is designed to handle a high load of users maintaining performance even when multiple users or beach goer are accessing it simultaneously.	✓				
4. The system rating has its weights and reliable for accurate data from sentiments of users	✓				

Usability	5	4	3	2	1
1. The system is intuitive and can be easily learned by any person or beach goer.	✓				
2. The system is user-friendly and easy to operate, requiring minimal technical expertise.	✓				
3. The system has radio button and checkbox for easy filtering preferences	✓				
4. The system interface is visually appealing and professionally designed.	✓				
5. The system's color scheme is consistent with the organization's branding and visual identity.	✓				

SOFTWARE EVALUATION FORM (BEACH GOER)

Project Title	REACH: A Multi Criteria Decision Making for Beach and Resort Selection
Name of Developer/s	Waro Marvin, Tawasil Aldasher, Talib Abdar
Name of Evaluator (Tester)	ALDIMAR AMSIRABI
Email Address	

Instructions: Kindly evaluate the Multi-Criteria Decision Making for Beach and Resort Selection based on the numerical rating scale below. Please check the box that corresponds to your rating.

Numerical Rating	Description
5	Strongly Agree
4	Agree
3	Somehow Agree
2	Disagree
1	Strongly Disagree

Functionality	5	4	3	2	1
1. The system has a responsive landing page		✓			
2. The system data are gathered from sentiment analysis accurately	✓				
3. The System has database of all beaches and resort of Zamboanga peninsula that only have Facebook pages	✓				
4. The system has a filter for beach and resort preferences	✓				
5. The system has a search bar for easy navigation and looking for beach or resort	✓				

Reliability	5	4	3	2	1
1. The system is accessible 24/7 except during maintenance.	✓				
2. The system effectively handles errors, displaying appropriate error messages.		✓			
3. The system is designed to handle a high load of users maintaining performance even when multiple users or beach goer are accessing it simultaneously.		✓			
4. The system rating has its weights and reliable for accurate data from sentiments of users		✓			

Usability	5	4	3	2	1
1. The system is intuitive and can be easily learned by any person or beach goer.	✓				
2. The system is user-friendly and easy to operate, requiring minimal technical expertise.	✓				
3. The system has radio button and checkbox for easy filtering preferences	✓				
4. The system interface is visually appealing and professionally designed.	✓				
5. The system's color scheme is consistent with the organization's branding and visual identity.	✓				

Appendix F: Relevant Source Code

```python
from pathlib import Path
import os
from decouple import config


# Build paths inside the project like this: BASE_DIR / 'subdir'.
BASE_DIR = Path(__file__).resolve().parent.parent


# Quick-start development settings - unsuitable for production
# See https://docs.djangoproject.com/en/4.2/howto/deployment/checklist/

#GPT_API_SECRET_KEY
OPENAI_KEY = config('OPENAI_KEY')

# SECURITY WARNING: keep the secret key used in production secret!
SECRET_KEY = config('SECRET_KEY')

# SECURITY WARNING: don't run with debug turned on in production!
DEBUG = True

ALLOWED_HOSTS = []


# Application definition

INSTALLED_APPS = [
    'django.contrib.admin',
    'django.contrib.auth',
    'django.contrib.contenttypes',
    'django.contrib.sessions',
    'django.contrib.messages',
    'django.contrib.staticfiles',
    'algo.apps.AlgoConfig',
]
```

In the provided code snippet for a Django project's settings, several key elements were configured. BASE_DIR was set to the resolved parent directory of the current file, serving as a reference point for other paths. The config function from the decouple module was utilized to manage environment variables, and it retrieved the values for OPENAI_KEY and SECRET_KEY from the project's environment. The DEBUG setting was enabled for development purposes, while ALLOWED_HOSTS remained empty, allowing any host during development. The project included the 'algo' app in its installed apps, specifying the components and functionality available in the Django project.

To perform sentiment analysis, we needed to provide OpenAI with a prompt so that GPT could understand the task at hand. First, we needed a CSV file from the Facebook pages we scraped. We then fed this CSV file into our code for reading.

```
# Open the CSV file with the correct encoding
with open('reach.csv', 'r', encoding='utf-8') as f:
    # Create a CSV reader object
    reader = csv.reader(f)

    # Iterate over each row in the CSV file
    for row in reader:
        # Print each column value
        fbid = row[0]
        pagename = row[1]
        review = row[2]

        # Create an object and store it in a dictionary
        data_object = {
            'fbid': fbid,
            'pagename': pagename,
            'review': review
        }

        # Append the object to the data_list
        data_list.append(data_object)



openai.api_key = os.getenv("OPENAI_KEY")
```

In the picture above, you can see the CSV file 'reach.csv' being referenced. It consisted of three columns: fbid, page name, and review, which we utilized later in the sentiment analysis. Additionally, we called the 'openai.api_key' from the settings; this was intended for use in the sentiment analysis process.

```
for data in data_list:
    if data['review'] == 'text':
        continue
    review = "Review: " + data['review']
    instructions = '''
        Rate the review by sentiment analysis from 1 to 5.
        Do sentiment analysis by category.
        categories are: cleanliness, safety, accessibility, natural beauty, accomodations, recreational activity
        give each score by category

        respond in a json form:
        {
            "cleanliness": score,
            "safety": score,
            "accessibility": score,
            "natural_beauty": score,
            "accommodations": score,
            "recreational_activity": score,
        }
    '''
```

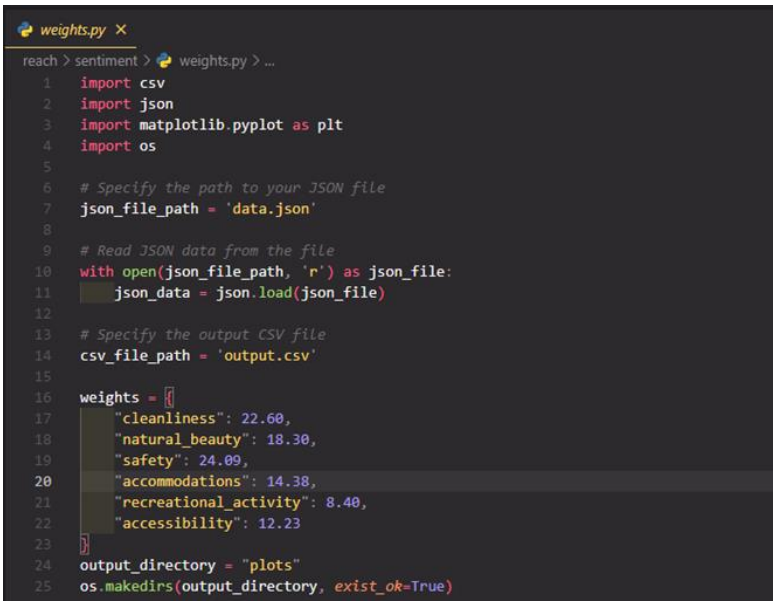
In this code snippet, as you can see, the prompt was the instruction that we researchers gave to GPT. We tasked it to rate reviews from a CSV file containing Facebook reviews from various beaches and resorts in Zamboanga Peninsula. From its own generated reviews, GPT assigned scores, which we later used to calculate the average.

```
file_path = "data.json"

with open(file_path, "w") as json_file:
    json_file.write(json_data)
```

In this snippet, the data was processed, and the results were stored in a 'data.json' file. Within this file, you can examine the sentiment generated by GPT for each review from the Facebook pages of beaches and resorts, along with the corresponding scores for each criterion or factor. Finally, the dictionary was written to a JSON file. The OpenAI

API played a crucial role in generating responses based on the provided reviews and instructions.

In this code snippet, the 'data.json' file was accessed to retrieve sentiment analyses for each beach, encompassing their respective reviews and corresponding scores for individual criteria.



In this code snippet, the 'CSV' module was imported, along with the 'matplotlib' library for creating pie charts to visualize the data. The variable 'csv_file_path,' representing the path to the CSV file where the rating results were displayed, was defined. Additionally, constant weights assigned to each criterion, obtained from the survey ranking and the Borda Count method discussed in Chapter 4, were defined. These weights were used in multiplying the GPT sentiment analysis results.

```
# Write data rows
for hotel, reviews in json_data.items():
    for review in reviews:
        weighted_cleanliness = round(review["cleanliness"] * weights["cleanliness"],2)
        weighted_safety = round(review["safety"] * weights["safety"],2)
        weighted_accessibility = round(review["accessibility"] * weights["accessibility"],2)
        weighted_natural_beauty = round(review["natural_beauty"] * weights["natural_beauty"],2)
        weighted_accommodations = round(review["accommodations"] * weights["accommodations"],2)
        weighted_recreational_activity = round(review["recreational_activity"] * weights["recreational_activity"],2)

        weighted_sum = weighted_cleanliness + weighted_safety + weighted_accessibility + weighted_natural_beauty + weighted_accommodations + weighted_recreational_activity

        weighted_avg = weighted_sum / 6.0
        weighted_avg_percentage = weighted_avg / 16.67
        weighted_avg_percentage = round(weighted_avg_percentage, 2)
```

This for loop calculated the average of each review by multiplying the sentiment analysis score from OpenAI with the corresponding weight score. The sum of these results was then divided by 6 (representing the 6 criteria). Finally, to obtain the resulting rating for that particular review, it was divided by 16.67.

ratings.py

reach > sentiment > ratings.py > ...

```
1  import pandas as pd
2  import json
3
4  csv_file = 'output.csv'
5  df = pd.read_csv(csv_file)
6  grouped_df = df.groupby('hotel')['weighted_rating'].mean().round(2)
7  result_dict = grouped_df.to_dict()
8  json_output_file = 'ratings.json'
9  with open(json_output_file, 'w') as json_file:
10     json.dump(result_dict, json_file, indent=4)
11 print(f"The data has been saved to {json_output_file}")
```

The purpose of this script (ratings.py) was to process the 'output.csv' file, calculate the average weighted ratings for each beach or resort, and save the results in a JSON file named 'ratings.json'. This JSON file (ratings.json) provided the average ratings for each Beach or Resort based on the weighted reviews obtained from the sentiment analysis data.

```
for data in data_list:
    if data['review'] == 'text':
        continue
    keywords = "These are the keywords to choose from:  [rooms, cottage, villa, tent, camping, pools] \n"
    review = "Review: " + data['review']
    instructions = '''

Analyze the review, which of the keywords provided above applies to the review? only select one keyword and if there is none then only output empty
respond in only one word,
do not add explanations
    '''
    message = ({"role": "user", "content": keywords + review + instructions})

    retries = 3
```

The purpose of the provided code was to analyze reviews related to accommodations at various beaches and resorts. It processed a CSV file containing Facebook reviews, utilized the OpenAI API for sentiment analysis, and identified specific keywords related to accommodations in each review. The keywords were then aggregated for each beach or resort and saved in a JSON file. The final result was a mapping of beaches or resorts to the accommodation-related keywords mentioned in their reviews. The code considered various accommodations such as rooms, cottages, villas, tents, camping, and pools. The output was stored in "accommodation_final.json" files.

```
for data in data_list:
    if data['review'] == 'text':
        continue
    keywords = "These are the keywords to choose from:  [food, dining, historical, cultural, festivals, events, attractions, market, shopping, sports, recreation, religion] \n"
    review = "Review: " + data['review']
    instructions = '''

Analyze the review, which of the keywords provided above applies to the review? only select one keyword and if there is none then only output empty
respond in only one word,
do not add explanations
    '''
    message = ({"role": "user", "content": keywords + review + instructions})
    retries = 3
```

The purpose of the provided code was to extract insights from Facebook reviews related to cultural aspects at different beaches and resorts. By processing a CSV file containing these reviews, the code utilized the OpenAI API for sentiment analysis to identify specific cultural keywords associated with each review. The identified keywords were then aggregated for each beach or resort and stored in a JSON file named 'culture.json'. The code employed a set of predefined cultural keywords such as food, dining, historical, cultural, festivals, events, attractions, markets, shopping, sports, recreation, and religion. The resulting JSON file provided a mapping of beaches or resorts to the cultural keywords mentioned in their reviews. Additionally, a final version of the output was saved in 'culture_final.json'. This code aimed to offer a comprehensive overview of the cultural characteristics associated with various destinations based on sentiment analysis of user reviews.

```
import json

def load_json_file(file_path):
    with open(file_path, 'r') as file:
        data = json.load(file)
        cleaned_data = {key: [item.strip().lower().strip('"').strip('.').replace(' ', '') for item in value] for key, value in data.items()}
    return cleaned_data

json_data_accomodations = load_json_file('accomodation_final.json')
json_data_culture = load_json_file('culture_final.json')
json_data = {}
for key in json_data_accomodations:
    json_data[key] = json_data_accomodations[key] + json_data_culture[key]


valid = ['rooms', 'cottage', 'villa', 'tent', 'camping', 'pools', 'food', 'dining', 'historical', 'cultural', 'festivals', 'events', 'attractions',

def isValidKeyword(keyword):
    for word in valid:
        if(keyword == word):
            return True
    return False

def isDuplicate(word, dict):
    for w in dict:
        if word == w:
            return True
    return False
```

In this script or code snippet, it functioned as a data cleaner, specifically in the 'accommodation.py' and 'culture.py' scripts. The primary purpose was to clean the data obtained through OpenAI, filtering out unnecessary words and retaining only valid content. Additionally, the script ensured the removal of duplicate entries. For instance, in 'accommodation.py' and 'culture.py', it refined the information extracted by OpenAI, eliminating irrelevant terms and maintaining the validity of the data. This data-cleaning process was crucial for enhancing the accuracy and reliability of the sentiment analysis results and the subsequent categorization of keywords.

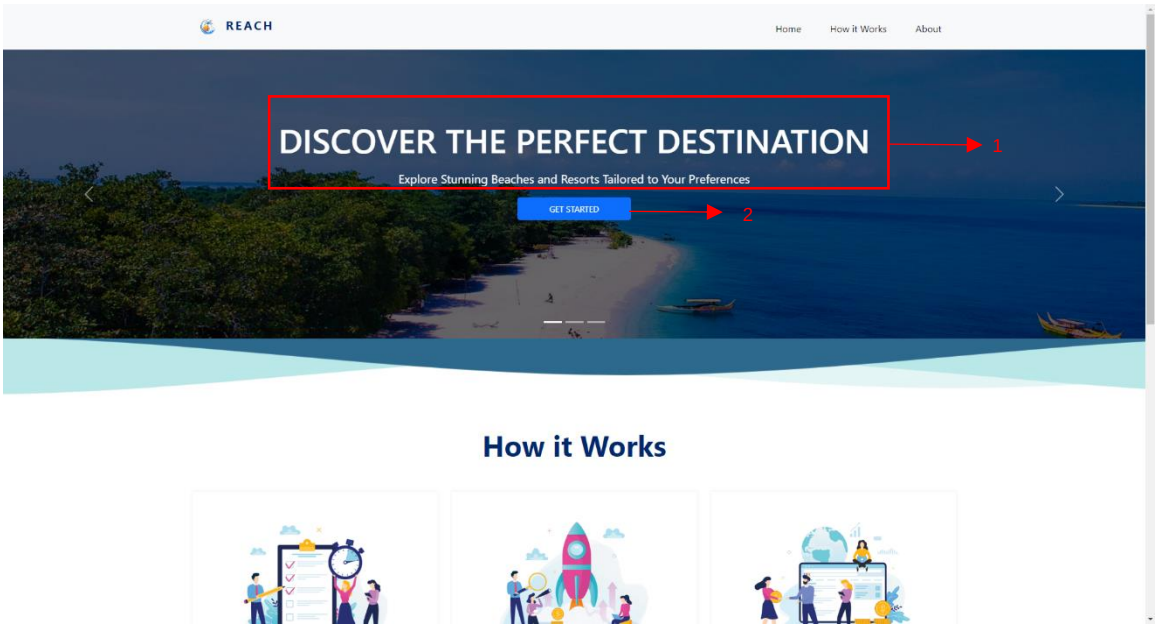
```
from algo.models import Place

def load_json_file(file_path):
    with open(file_path, 'r') as file:
        data = json.load(file)
        # cleaned_data = {key: [item.strip().lower().strip('"').stri
    return data

keywords_data = load_json_file("./sentiment/cleaned_data.json")
ratings_data = load_json_file("./sentiment/ratings.json")

print(keywords_data)
print(ratings_data)

for key in keywords_data:
    search_result = Place.objects.filter(place_identifier=key)
    if(len(search_result) == 0):
        continue
    place = search_result[0]
    place.keywords = ', '.join(keywords_data[key])
    place.rating = ratings_data[key]
    place.save()
    print(key,place.name)

print('keywords are added to db')
print('ratings are added to db')
```

The purpose of this code snippet was to amalgamate all JSON files and store the compiled data in the database, with each record corresponding to a specific beach or resort.

Appendix G: User Manual

Introduction

The website, named 'REACH,' was an innovative platform at the intersection of 'REsort' and 'beACH,' embodying the essence of both seaside retreats and coastal paradises. 'REACH' not only referred to reaching a destination but also signified a personalized journey, allowing users to tailor their experiences based on individual preferences. This user manual provided comprehensive guidance on navigating and maximizing the features of the 'REACH' system, ensuring users could effortlessly explore, plan, and enjoy their ideal beach or resort destination.



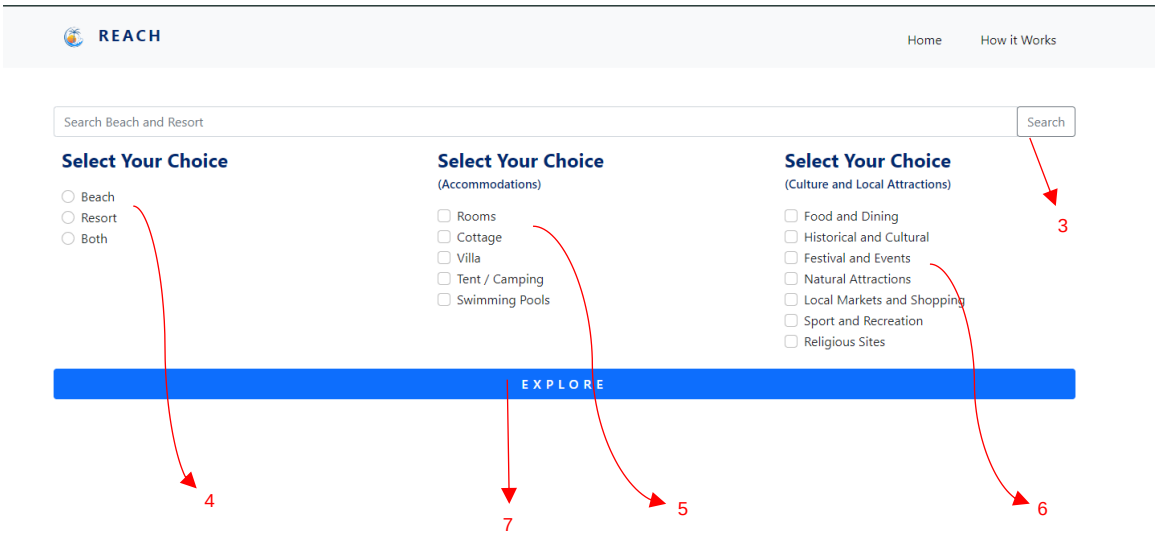
Landing Page

[1] - A static message inside the carousel that welcomed the user.

[2] – Getting Started: a button that redirects you to the main page of the system where you can do the filtering.

Main Page

This was the main page. It consisted of a search bar for searching a particular beach from Zamboanga Peninsula. Below that were the radio buttons and also checkboxes that users could use to filter beaches or resorts based on their preferences.



[3] – Search bar: Here, you can search for beaches and resorts in Zamboanga Peninsula, as long as they are in the database or scraped from Facebook pages.

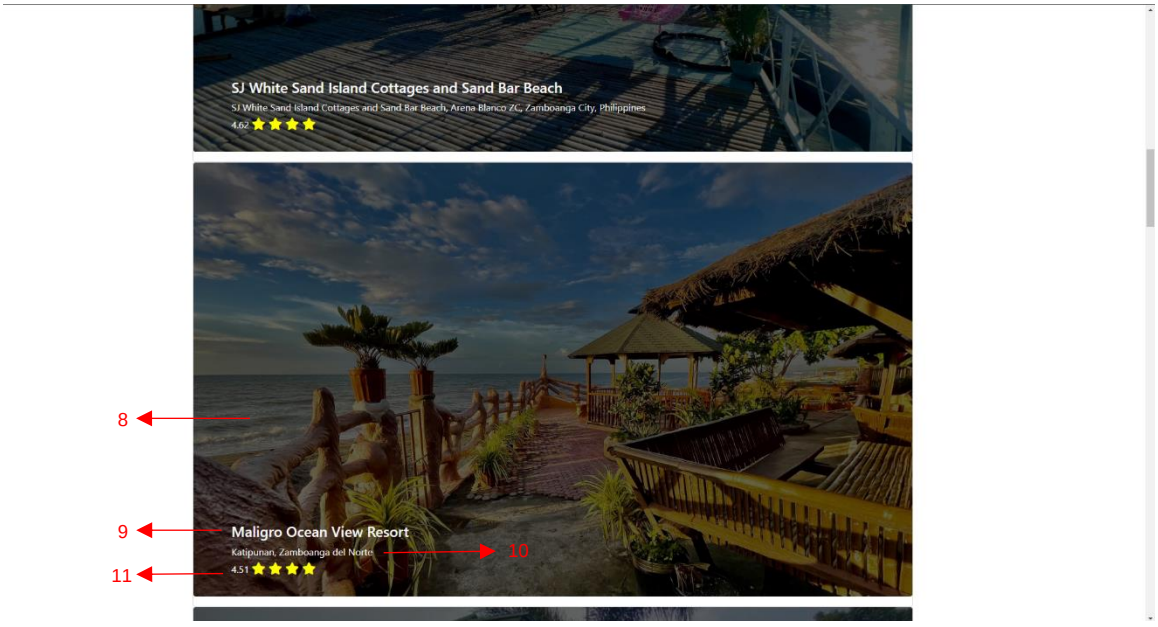
[4] – Choose your preferred destination: Options include Beach, Resort, or Both.

[5] – Select your accommodation: Users can choose from Rooms, Cottages, Villas, Tents/Camping, and Swimming Pools to decide the type of accommodation they desire for their destination.

[6] – Pick your favorite cultural attractions: Pick your favorite cultural attractions: In this section, users could select the local attractions they wanted to explore at their destination.

[7] – EXPLORE button: After checking the boxes and radio buttons of their preferences, users clicked the button to display results that were related or targeted to their selections.

After clicking the “EXPLORE” button, the results were displayed in descending order from highest to lowest rating.



[8] – Beach/Resort Image: This image represents the resort or beach tailored to your preferences.

[9] – Name: Here, you can view the name of the beach or resort.

[10] – Address/Location: This provided the address of the beach or resort.

[11] – Ratings: The rating ranged from 1 (the lowest) to 5 (the highest), reflecting the rating of a particular beach or resort.

Appendix H: Plagiarism Certificate

Western Mindanao State University
Research, Extension Services & External Linkages
Research Development & Evaluation Center
Research Utilization, Publication & Information Dissemination

CERTIFICATION

This is to certify that the research manuscript of **ALDASHER A. TAWASIL, MARVIN B. WARO, and ABDAR G. TALIB** entitled **'REACH: MULTI-CRITERIA DECISION MAKING FOR BEACH AND RESORT SELECTION'** has been subjected to similarity test using *Turnitin*.

It was determined that the full manuscript was identified to bear a **similarity index of 5%** noted to be within the threshold of accepted percentage for an **undergraduate thesis** (BOR No. 97, S. 2022). In consideration of the foregoing, the research proponent may proceed with **thesis binding.**

Issued this **16th day of February 2024**, Research Department, Research Utilization, Publication & Information Dissemination Office, WMSU, Zamboanga City.

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Appendix I: Research Critique and Editing Certificate

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

Research Critique and Editing Certificate

This is to certify that the research entitled **"REACH: MULTI-CRITERIA DECISION MAKING FOR BEACH AND RESORT SELECTION"** authored by **Marvin B. Waro, Aldasher A. Tawasil, and Abdar G. Talib** for the program **Bachelor of Science in Computer Science** has undergone meticulous critique and editing. The editor has thoroughly examined the document, and it is deemed satisfactory in the following aspects: research validity, grammar, organization, and style.

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Appendix J: Curriculum Vitae

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Senior High School:
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2011-2012