Caraga Tourist Spots Interactive Map Portal (CTSIMP)

A Capstone by

CRISTIAN JAY T. BUQUIS

RODELIZA O. BURDEOS

LOWIE VINCENT A. CANONIGO

Submitted to the Department of Information System
College of Computing and Information Sciences (CCIS) Caraga State University-
Main Campus

In Partial Fulfillment of the Requirements for the Degree
Bachelor of Science in Information Systems (BSIS)

May 2025

APPROVAL SHEET

This capstone entitled **Caraga Tourist Spot Interactive Map Portal**, prepared and submitted by **Mr. Cristian Jay T. Buquis**, **Ms. Rodeliza O. Burdeos** and **Mr. Lowie Vincent A. Canonigo** in partial fulfillment of the requirements for the degree Bachelor of Science in Information System is hereby accepted.

JABEZ IAN CHRIS D. PENALVER
Capstone Adviser

ELBERT S. MOYON, MSc.
Chair, Oral Examination Panel

JAYRHOM R. AMONTEROS, MSc.
Panel Member

JESTERLYN Q. TIMOSAN, MSc.
Panel Member

Accepted and approved for the conferral of the degree **Bachelor of Science in Bachelor of Science in Information System** in the 2nd semester of SY 2024-2025.

JAYMER M. JAYOMA, DIT
Dean, CCIS

DEDICATION

This capstone is humbly and wholeheartedly dedicated to our beloved families whose unconditional love, unwavering support, endless sacrifices, and constant encouragement served as our greatest inspiration, to our esteemed panels and thesis adviser, for their invaluable guidance, profound insights, constructive criticisms, and unwavering patience and to our dear friends and classmates, for the camaraderie, shared laughter, collaborative spirit, and moral support that made the demanding process more manageable and enjoyable, and to all those who believed in us, offered a helping hand, or contributed in any way, big or small, to the successful completion of this capstone. To our Almighty God, for his divine guidance, unwavering strength, boundless wisdom, and countless blessings that sustained us throughout this challenging yet fulfilling journey, to our. This work is a testament to perseverance, dedication, and the collective effort of many.

ACKNOWLEDGMENT

Our sincere appreciation goes to our capstone adviser, Mr. Jabez Ian Chris Penalver, whose mentorship, insightful critiques, and unwavering patience greatly shaped the direction and quality of this research. We are equally grateful to our panelists, Sir Elbert S. Moyon (Chairperson), Ma'am Jesterlyn Timosan, and Sir Jayrhom R. Almonteros, for their constructive feedback, challenging questions, and rigorous evaluation, all of which significantly enhanced the depth and rigor of our study. To the administration and faculty of the College of Computing and Information Sciences, Caraga State University–Main Campus, we thank you for providing the resources and academic environment that facilitated our learning and research. We owe our deepest appreciation to our families for their endless love, unwavering support, and countless sacrifices, your belief in our abilities served as our constant motivation. To our friends and classmates, thank you for your camaraderie, shared insights, and moral support; your encouragement made every challenge more manageable and every success more meaningful. Finally, to all individuals and organizations who contributed through cooperation, thank you for your invaluable assistance. This capstone is the culmination of a collective effort, and we are truly blessed to have been supported by so many dedicated individuals.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABSTRACT

The Caraga Tourist Spots Interactive Map Portal addresses the need for a reliable, government-endorsed platform to showcase the region's cultural and natural attractions. By integrating 360° virtual tours with Google Maps routing and a user-friendly carousel of approved destinations, the portal enhances trip planning and promotes lesser-known sites. Developed using React.js, Tailwind CSS, and a Laravel backend under an Agile methodology, the system supports three roles—administrators, Local Tourism Officers, and tourists—for content submission, approval workflows, and exploration. User Acceptance Testing with the Department of Tourism confirmed that core functions such as account management, content moderation, virtual tours, and map routing operate as intended. A System Usability Scale evaluation yielded an average score above 68.5, demonstrating high usability and satisfaction. The portal's success suggests it can boost tourism, evenly distribute visitor traffic, and serve as a model for sustainable, technology-driven regional promotion in Caraga.

Keywords: Caraga Region, Interactive Map Portal, 360° Virtual Tour, Tourism Promotion, User Usability Scale.

CHAPTER 1. INTRODUCTION

1.1 Background of the Study

Tourism, as a service-oriented sector, has significant potential to benefit both the economy and society by generating employment, reducing poverty, and promoting environmental conservation. The tourism industry contributes to government revenue through foreign exchange earnings and taxes, fostering opportunities for local economic development (Servoz, 2016). However, while Caraga's tourism industry has seen growth, it has not kept pace with other regions (Regional Travelers, 2021).

Social media has strongly changed tourism, influencing how tourists pick places to visit, promoting sustainable tourism, and encouraging engagement. Platforms like Facebook, Instagram, and TikTok are important in shaping destination popularity (Sigala & Gretzel, 2017; Tourism Journal, 2024; Springer, 2024).

The Department of Tourism (DOT) Caraga has implemented several initiatives over the past five years to boost regional tourism by promoting its natural beauty, rich culture, and hidden destinations. Notably, the Philippine Experience Program in 2023 showcased attractions such as Lusong Cold Spring and the Enchanted River, aiming to highlight the region's lesser-known sites (Department of Tourism [DOT], 2023). DOT Caraga has also worked with local governments and agencies to improve accessibility

facilitating new flight routes and validating major infrastructure projects like the proposed Balangay Cruise Docking Facility in Butuan City (Molde, 2025). In support of ecotourism, Surigao City transformed a former rebel encampment into a nature and family park through the "Green, Green, Green" initiative (Ragas, 2025). Community-based efforts complement these strategies: on Siargao Island, local cooperatives and NGOs promote sustainable tourism through homestay programs, mangrove replanting, and environmental education campaigns (Siargao.ph, 2025). Despite these gains, persistent challenges remain, including financial constraints, limited infrastructure in rural areas, and the lack of centralized, updated digital travel information (Lopez, 2020; Go, 2016). Compared to other regions, Caraga's tourism efforts emphasize grassroots ecotourism and cultural preservation, while areas like Bicol focus on sustainable infrastructure (e.g., eco-friendly Tourist Rest Areas), and Ilocos prioritizes connectivity and digital convenience (DOT, 2024; Ancheta, 2025). Central Visayas leverages airport expansion to drive high visitor volumes, while Davao Region integrates nature-based tourism through agri-eco parks (DOT, 2023; Provincial Government of Davao del Sur, 2021). These varied regional approaches reflect the broader national shift toward inclusive, sustainable tourism under the Philippine National Tourism Development Plan (DOT, 2025).

This is where the Caraga Tourist Spots Interactive Map Portal comes into play. The objective of this project is to provide a digital solution that showcases the rich cultural and natural beauty of Caraga, making it easier for tourists to discover and navigate the region. By offering 360-degree virtual tours and utilizing Google Maps for

easy navigation of tourist spots, the portal seeks to enhance the overall tourism experience, promote lesser-known destinations, and boost Caraga's visibility in the competitive tourism landscape.

Importantly, the portal serves as an official, government-endorsed platform, addressing tourists' concerns about the credibility of online travel information. By featuring only tourist spots reviewed by Local Tourism Officers (LTOs) and approved by the Department of Tourism, visitors can trust that the information presented is accurate, safe, and up to date aligning with the DOT's mandate to regulate and promote Philippine tourism (Department of Tourism, 2025).

Although the Department of Tourism (DOT) initially launched the "More Fun Awaits" campaign website in 2021 to consolidate travel-related articles, videos, and infographics for both domestic and international audiences, the site is no longer active. For the most up-to-date information and ongoing tourism campaigns, visitors are now directed to the DOT's main web portal (PR Newswire, 2021; Department of Tourism, 2025).

1.2 Statement of the Problem

Caraga's tourism remains under-promoted because general mapping services excel at basic routing but lack the detailed information like history, activities, price ranges and immersive 360° content needed to bring its lesser-known sites to life.

Caraga's tourism marketing is currently hindered by several key issues:

1. **Lack of an Official Source of Tourism Information from the Department of Tourism (DOT):** When planning a trip, tourists often turn to various websites, blogs, social media posts, or third-party travel platforms to gather information about tourist destinations. However, these sources may be outdated, inaccurate, biased, or even misleading. This creates confusion and distrust, especially for tourists unfamiliar with the region. Without a verified official portal, tourists may struggle to distinguish between real, government-recognized attractions and unverified or unsafe locations.

2. **Need for a Specialized Platform:** To overcome these limitations, a dedicated Caraga Tourist Spots Interactive Map Portal is required. This platform would deliver tailored, immersive content that not only promotes lesser-known attractions but also facilitates balanced visitor distribution throughout the region.

1.3 Objectives of the Study

The goal of this project is to develop an interactive map portal that enhances the visibility and accessibility of Caraga's tourist attractions. Specifically, the study aims to:

1. Enable the DOT Caraga to manage and approve accounts and tourist spot submissions while providing a form for submitting tourist spot data.
2. Verify user and display approved tourist spots in a carousel that includes 360° virtual tours, brief histories, descriptions, entrance fees, activities, and accommodation price ranges, with embedded Google Maps for routing. Incorporate a search bar and allow filtering by province, city, and municipality.
3. Improve user experience by evaluating the portal's usability using User Acceptance Testing (UAT) and assessing its usability with the System Usability Scale (SUS).

1.4 Significance of the Study

The outcome of this development will have a positive impact on the following:

Tourists:

The portal will provide tourists with easy access and reliable information about Caraga's attractions, enabling them to better plan and experience their trips.

Local Communities:

By promoting lesser-known attractions, the portal will help distribute tourism traffic more evenly, benefiting local businesses and communities that rely on tourism for income.

Department of Tourism (DOT) Caraga Region:

By giving them the instrument to market Caraga as a must-visit location, the study's conclusions will directly help the Department of Tourism (DOT) Caraga Region. With the help of the interactive portal, DOT Caraga will be able to highlight the area's priceless natural and cultural assets, draw in a larger tourist base, and assist in promoting sustainable tourism development in the area more effectively.

The idea for this project emerged from the researchers' personal experiences, observations, and interactions with tourists and local stakeholders. The lack of a reliable and accessible resource for navigating Caraga's tourist spots was a recurring issue that the project aims to address. This problem is also highlighted in the Caraga Regional Development Plan 2023-2028, which emphasizes the need for improved tourism infrastructure and resources. This initiative aligns with the plan's goals of promoting tourism to boost local economies.

1.5 Scope and Limitation of the Study

The **Caraga Tourist Spot Interactive Map Portal** promotes tourism in the Caraga region by showcasing attractions through interactive maps, virtual tours, and user-submitted content. It allows admins to manage entries, users to promote their spots, and tourists to explore destinations easily. Below are the system's scope and limitations:

Scope

1. Features Tourist Spots attractions approved by DOT Caraga.
2. The admin can approve or reject places and LTO accounts. Users will then be notified by email.
3. To log in, an LTO account must first be approved by the admin after registration.
4. Supports three user roles: Admin (DOT Caraga), Local Tourism Officer, and Tourists.
5. Offers Carousel of Approved Tourist Spots, embedded Google Maps, virtual tours.
6. Includes carefully selected tourist spots, chosen based on comprehensive criteria including cultural significance, historical value, natural appeal, accessibility, and sustainable tourism potential.
7. Accessible on desktop and mobile web browsers.

Limitations

1. Requires internet access, limiting use in areas with poor connectivity.
2. Includes only attractions approved by DOT Caraga.
3. Relies on user submissions and admin approval.
4. Lacks offline access to maps and virtual tours.
5. The system relies solely on the embedded Google Maps for site location. As a result, potential issues related to false navigation are not addressed within this project. The accuracy of navigation is dependent on Google's mapping functionality.

This scope and limitations outline the system's objectives, features, and constraints to provide a clear understanding of its capabilities and potential challenges.

CHAPTER 2. REVIEW OF RELATED LITERATURE

This chapter reviews the concept of digital innovation in tourism considering theoretical background and empirical studies related with geospatial technologies, virtual tour platforms, and institutions that governing tourism development. It examines the legal basis of Local Tourism Officers (LTOs) in the Philippines, current tourism trends in the Caraga Region and the technology tools which could supplement the promotion of destination and the experiences by the tourists.

2.1 Theoretical Framework

2.1.1 Geographic Information Systems (GIS) in Tourism

The GIS theory helps gain insights into spatial data management, which is an essential elements for tourism planning and decision making. GIS can combine geographic data on attractions, infrastructure and physical environment to build interactive maps (Longley et al, 2015). It features route optimization, hazard mapping and resource management tools that answered the Caraga Region's call for environment-friendly tourism development.

2.1.2 Virtual Tour and 360° Views

Immersion in VR Immersive virtual tours are based on the principle of presence and interactivity that simulates the real world (Liu, et al., 2024). Companies like Marzipano and Webobook include 360° imagery to narrow the gap between what we expect and the real thing, enabling people to virtually visit destinations. It has been proved based on a high visual authenticity and a coherent narrative in these tours can increase intentions to travel, which contributes to Caraga's secondary destinations (Polishchuk et al., 2023). But the Webobook experience suffers from a couple of shortcomings: It can be slow to load, particularly on leisurely internet connections, and the image quality is sometimes uneven between devices. Additionally, users have reported intermittent login failures and session timeouts on Webobook's platform, which disrupt seamless access and negatively impact the overall experience.

2.2 Local Tourism Officer: Legal and Institutional Roles

2.2.1 Legal Basis Under Philippine Law

The Tourism Act of 2009 (Republic Act No. 9593) mandates that provinces, cities, and municipalities with significant tourism activity appoint a permanent Tourism Officer (Sec. 42). This role is further defined in the Act's Implementing Rules and Regulations (IRR), which require LTOs to hold a relevant bachelor's degree and at least five years of industry experience (Department of Tourism, 2020). The Local

Government Code (Republic Act No. 7160, 1991) reinforces this by assigning tourism development as a core LGU responsibility, including infrastructure planning and promotion.

2.2.2 Structure in DOT vs. LGUs

The Department of Tourism (DOT) employs Tourism Operations Officers (Salary Grades 11–24) to implement national programs, while LGUs appoint Municipal/City Tourism Officers under local budgets (Civil Service Commission, 2018). For example, the Municipality of Pulilan advertised a Municipal Tourism Officer position in 2023, requiring a bachelor's degree in tourism and compliance with DOT training standards (Municipality of Pulilan, 2023).

2.2.3 Duties and Responsibilities

Local Tourism Officers (LTOs) are primarily responsible for formulating and updating Local Tourism Development Plans. Their duties also include enforcing national standards for tourism enterprises and submitting essential visitor statistics and project reports to the Department of Tourism (DOT). Furthermore, LTOs are tasked with coordinating with national agencies, such as the DOT, on promotional campaigns (Department of Tourism, 2020). In the Caraga region, the practical application of these roles involves LTOs organizing festivals, managing heritage sites, as noted in DOT's 2024 regional reports.

2.2.4 Qualification Standards

LTO candidates must pass the Civil Service Professional Examination and complete DOT-approved training modules. Career progression follows CSC guidelines, with higher salary grades requiring additional years of experience (Civil Service Commission, 2018).

2.3 Tourism State in Caraga

2.3.1 Visitor Statistics and Economic Impact

Caraga recorded 1.67 million visitors in 2024, generating ₱20 billion in revenue (DOT-Caraga, 2024). Domestic travelers accounted for 93% of arrivals, driven by festivals and MICE events. Foreign visitors primarily originated from the U.S. and Europe, attracted to ecotourism sites like Enchanted River and Siargao's surf spots.

2.3.2 Development Challenges

Infrastructure gaps, particularly in rural access roads and digital connectivity, hinder destination accessibility. While the DOT's Philippine Experience Program has boosted cultural tourism in Agusan del Norte, smaller municipalities lack resources to market their assets effectively.

2.4 Geospatial Technology in Tourism

2.4.1 GIS Applications

Geographic Information Systems (GIS) significantly support Caraga's tourism through various applications. This includes contributing to risk management by mapping vulnerable areas such as landslide-prone zones in Surigao del Sur, and aiding in destination clustering to identify underdeveloped areas with potential for investments like agritourism. Furthermore, GIS is crucial for routing, enabling the planning and optimization of travel routes for tourists to enhance navigation and ease of access to the region's attractions.

2.4.2 Interactive Mapping Tools

Google Maps dominates navigation but lacks interior 360° views for many Caraga sites. OpenTripMap’s API integration offers a solution, though its reliance on open-source data leads to inconsistencies in rural areas (OpenTripMap, 2023).

2.5 Virtual Tour Technologies

2.5.1 Webobook and Marzipano

Webobook's 360° tours require initial investments in cameras and stitching software, posing challenges for LGUs with limited budgets. Marzipano offers a free alternative but has a steeper learning curve (Liu et al., 2024).

2.5.2 User Interface (UI) Design

User Interface (UI) design involves creating visually appealing interfaces for software or digital devices. Designers attempt to build user-friendly and delightful interfaces. The Interaction Design Foundation (2024) defines UI design as graphical user interfaces, including voice-controlled interfaces(What Is User Interface (UI) Design? — Updated 2024 | IxDF, n.d.). CareerFoundry's (2024) study emphasizes the importance of UI design in data-driven organizations. This means that the "Caraga Tourist Spots Interact

2.5.3 Accessibility Standards

Adherence to WCAG guidelines ensures virtual tours are usable by individuals with disabilities. Text descriptions and keyboard navigation are critical for inclusive design.

2.6 Research Gap and Justification

Despite rapid advancements in tourism technology, current digital platforms like Google Maps and social media provide only generic navigational assistance and idealized imagery, without the rich, localized content needed to fully showcase the Caraga region's diverse cultural, historical, and natural attractions. Literature emphasizes that immersive digital tools can enhance tourist engagement and drive sustainable tourism (Buhalis & Law, 2008; Gretzel et al., 2015); however, these benefits are not realized in existing solutions.

Namely, the absence of an official source of tourism information from the Department of Tourism (DOT) does not fulfill the outdated, inaccurate, biased, or even misleading sources that could create confusion and distrust. There is Caraga Tourist Spots Interactive Map Portal (CTSIMP). This platform would deliver tailored, immersive content that not only promotes lesser-known attractions but also facilitates balanced visitor distribution throughout the region.

2.6.1 Real-time Relevance and Accuracy

In recent years, there has been a notable shift in the tourism landscape towards the Tourism 2.0 paradigm, driven by enhanced travel experiences and the widespread availability of information through the Internet. This transition necessitates the development of intelligent tourism service tools aimed at achieving benefits such as

time efficiency and improved marketing effectiveness (Yoon et al., 2023). With the widespread availability of User Generated Content (UGC) on travel from social networks, it is increasingly important for tourism platforms to provide timely and accurate information to mitigate the impact of potentially biased and misleading UGC. The consumption of travel content in social community would help increase people's desire to visit places, and thus demand tourism platforms to meet these requirements, and also provide a credible reference for the decision making purpose for travel choices in terms of Both. PiazzaFrontPage. In order to correct for potential bias and distortion in UGC, travel websites or platforms need to take an initiative to supply true and updated information. This will contribute to a more consistent formation of perceptions and attitudes toward places by visitors. UGC can affect the perceived risk on travel decisions, can induce aspirational tourism consumption and can impact on travel behaviours, suggest the importance of being real-time pertinent and accurate on tourism platforms to mitigate such concerns by providing reliable information in a timely manner (Nguyen et al., 2023).

Real-time relevance and accuracy are also driving factors for tourists to make decisions and therefore they are essential aspects of tourism systems. All feederistes, or ramblers, want timely and accurate information in order to make informed decisions about their destination as their dependence upon user-generated content grows. Real-time relevancy empowers travelers to plan their journeys based on the latest and most relevant information. One the Machine's Accuracy: The perceptions as well as intentions of the travelers are significantly driven by the platform's accuracy;

this is critically important in fostering trust and confidence. Consequently, it is important to be relevant and accurate in real-time to fulfill the changing expectations of visitors and improve their entire visitor experience (Nguyen et al., 2023). The need for relevance in tourism destinations, was established in recent studies have, in the basis for the development of the "Caraga Tourist Spots Interactive Map Portal". Providing up-to-date and truthful information about the attractions of Caraga region, the website gives tourists a dependable reference resource to help them make travel decisions, correct possible biases from User Generated Content (UGC) and enhance their overall travel experience. The action is compatible with the increased quality of travel experiences driven by easy access to internet information and cooperate with the development of the so called Tourism 2.0.

2.7 User Acceptance Testing and SUS

User Acceptance Testing (UAT) is typically performed in the final stage of testing prior to deployment and it is the actual users or clients who test the software to ensure that it can handle required tasks in real-world scenarios. UAT is critical due to the definite purpose of verifying that the software implemented by an organization is in line with the requirements and expectations of the users, to facilitate successful deployment and user acceptance (Codecademy, 2022).

2.7.1 Benefits of Using the UAT

The primary advantages of UAT include early identification and resolution of issues, which can significantly reduce long-term maintenance costs. UAT also ensures that the application is intuitive and user-friendly, directly contributing to higher user satisfaction and acceptance. Furthermore, by validating system performance in realistic scenarios, UAT helps enhance the robustness and reliability of the software (TestMonitor, 2017).

2.7.2 System Usability Scale (SUS)

The System Usability Scale (SUS) is extensively used to quantify user perception of usability. SUS is an uniform scale rating from 0-100, composed by ten items which offers a reliable assessment of the usability as a whole system, being independent of the technology or domain of application (Brooke, 1996). Items are scored on a 5-point Likert scale, and the overall SUS score ranges from 0 to 100, with high scores being indicative of good usability.

SUS brings a great value especially in web applications in tourism, given that developers can compare user experience, identify usability problems and compare results among systems or iterations. It has been indicated in research that SUS scores of > 68 are interpreted as above average while scores lower reflect which areas are in need of improvement (Bangor et al, 2008).

UAT is incorporated with SUS testing and the development team of Caraga Tourist Spots Interactive Map Portal to ensure that not only it is functioning, but it is

also a very usable and user satisfactory. This two-pronged strategy contributes to incremental innovation and ensures that the platform is useful for tourists, local communities, and tourism officers in Caraga.

2.8 Summary of Related Literature and Studies

This chapter has reviewed the technological, theoretical, and institutional foundations relevant to the development of the Caraga Tourist Spots Interactive Map Portal. The discussion began with an analysis of existing tourism mapping platforms such as OpenTripMap and Google Maps, highlighting their strengths in accessibility and data integration, as well as their limitations in coverage, real-time accuracy, and immersive content for less-prominent destinations (OpenTripMap, 2023; Google, n.d.). The review emphasized the need for more comprehensive and locally relevant digital platforms, particularly for regional destinations like Caraga.

The chapter also examined the application of geospatial technologies, including Geographic Information Systems (GIS), in tourism planning and management. The technical foundation for accurate mapping of tourist interest points and optimal tour routing is offered by GIS, which can improve tourist experiences and facilitate strategic tourism development (Longley et al., 2015).

Two of these immersive applications (Webobook, Marzipano) were tested for generating 360 degree virtual tours that could enable potential tourists to have a more captivating and engaging glimpse of the tourist destinations. It was described that these devices may improve tourist interaction as well as satisfaction, though their use at the local government level may be limited by resources and training limitations (Liu et al, 2024; Polishchuk et al, 2023).

Design of user interface (UI) and the tourism digital transformation were also covered. The importance of good UI design in the creation of intuitive accessible and engaging digital experiences is paramount in order to attract and retain users (Interaction Design Foundation, 2024; Buhalis & Law, 2008).

One of the institutional elements considered was the presence of the Local Tourism Officers (LTO) in the Departments of Tourism (DOT) and municipalities. The mandate, functions, authority, and requirements for the appointment of LTOs were specified, highlighting the importance of the LTOs in enforcing tourism rules and guidelines, and encouraging local destination development including but not limited to sustainable tourism (RA 9593; Department of Tourism, 2020).

Last, the chapter discussed the significance of user evaluation in digital systems for tourism. It was observed that User Acceptance Testing (UAT) was considered important towards validating, that the system meets Users' expectations and real-world requirements, and hence it provided with timely bug identification and enhanced User satisfaction to the stakeholders (Codecademy, 2022; TestMonitor,

2017). Use of the System Usability Scale (SUS) standardizes the measurement of usability affording continual improvement and readiness for benchmarking against industry norms (Brooke, 1996; Bangor et al., 2008).

In conclusion, the literature reiterates the importance of integrating advanced geospatial and immersive technologies with solid user evaluation and institutional backing. These findings are used as the basis for the creation of the Caraga Tourist Spots Interactive Map Portal, a system that contributes to the specific tourism challenges and landscape in the Caraga region by providing accurate, accessible, and compelling digital travel information.

CHAPTER 3. METHODOLOGY

This section presents a detailed overview of the structured strategy and procedures that will be applied in this research. It expands on the research framework, the methods for gathering and preprocessing data, and the steps that will be taken during the development process. The methodology serves as a complete guide, ensuring the study's authenticity, consistency, and adherence to ethical principles.

3.1 Concept of the Study

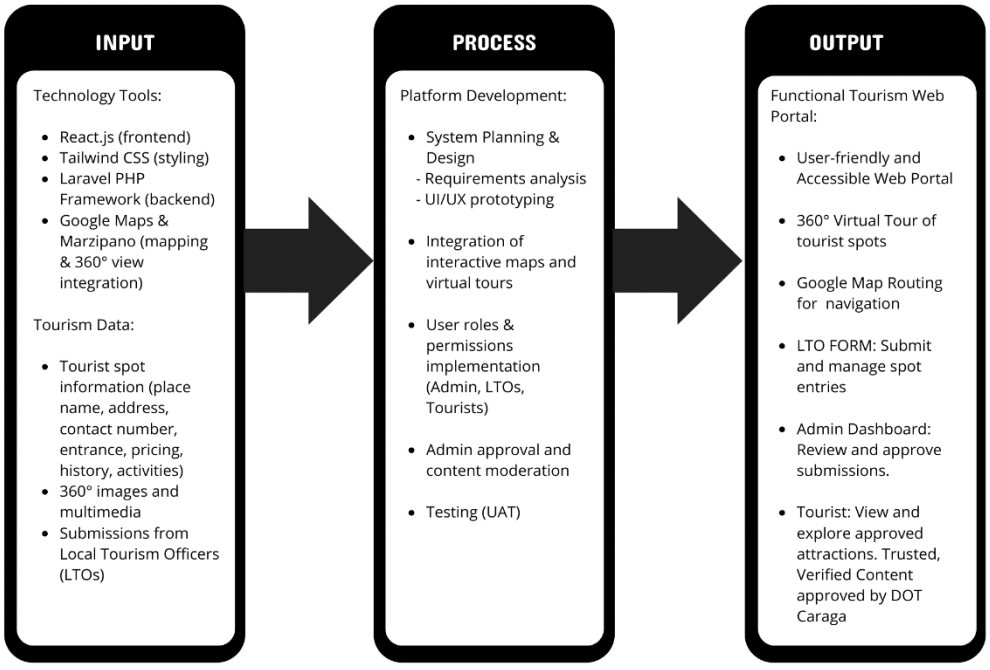


Figure 3-1. Conceptual Framework

This framework outlines the development of a functional tourism web portal using modern web technologies. The model starts with inputs such as technology tools (React.js, Tailwind CSS, Laravel, Google Maps, Marzipano) and tourism data (e.g., tourist spot details, 360° images, and submissions from Local Tourism Officers). The process involves platform development through system planning, map and virtual tour integration, role-based access implementation, content moderation, and user testing. The final output is a user-friendly portal offering interactive 360° virtual tours, navigation via Google Maps, and verified tourist information managed through an admin dashboard and LTO forms to ensure reliable content for users and tourists.

3.2. Agile Methodology

This figure highlights the cyclical and iterative nature of the Agile methodology used in developing the portal. It emphasizes the continuous cycle of planning, designing, implementing, testing, and deploying, with each cycle incorporating feedback and improvements.

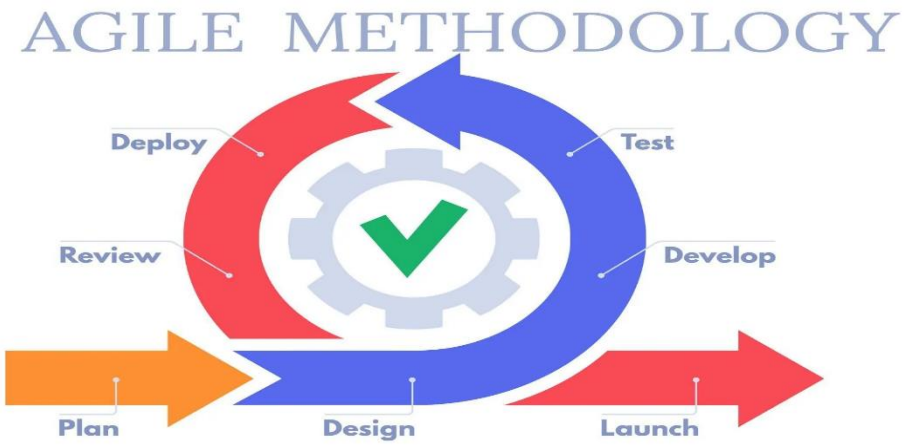


Figure 3-2. *Agile Development Methodology*

3.2.1 Data Gathering

The Caraga Tourist Spots Interactive Map Portal is designed to serve three primary user groups: Administrators (DOT Caraga), Local Tourism Officers (LTOs), and the General Public (Tourists). To gather qualitative insights on usability and system expectations, structured interviews were conducted. Below are the sets of interview questions and summarized feedback collected from each actor.

A. Department of Tourism (Admin)

Interview Questions:

1. What is the current process for including local tourist spots in your centralized system?
2. Who is responsible for inputting tourist spot information into the system?
3. Are local tourist spots in municipalities or cities adequately represented in your data?
4. What improvements would you suggest to better capture local tourist spots?
5. Who should be responsible for submitting and managing local tourist spot data?

Summary of Responses:

DOT representatives explained that local spots are often underrepresented because data entry is controlled at a higher level. They noted that municipalities prefer to manage their own entries to better promote their attractions. Their recommendation was to delegate full responsibility for submissions and management to Local Tourism Officers rather than relying on central data entry.

B. Local Tourism Officers (LTOs)

Interview Questions

1. Do you currently have a system for submitting and managing local tourist spot information?
2. Would a centralized portal for tourist spot submissions and approvals be beneficial to your work?
3. What challenges do you face when promoting attractions in your area?
4. If given administrative access, would you manage and update entries regularly?
5. Which features or tools in a portal would streamline your workflow?

Summary of Responses:

LTOs stated that they use informal or manual methods (paper forms, emails, or social media) to share spot information. They welcomed a centralized portal, citing potential benefits in transparency and coordination.

C. General Public (Tourists)

Interview Questions

1. How do you currently find information about tourist spots in Caraga?
2. What features do you expect from a tourism portal?
3. Would map-based browsing and search tools improve your planning process?
4. What difficulties have you encountered when planning visits?
5. How likely are you to use a platform that offers search, filtering, and virtual tours?

Summary of Responses:

Tourists largely rely on social media, word-of-mouth, or outdated websites, often encountering inconsistent or limited information. They cited a preference for map-based browsing, province and municipality filters, and integrated virtual tours. Most indicated they would use the portal if it provided reliable information in a visually engaging format.

3.2.2. Planning

The planning stage will be symbolized by a Gantt chart that consists of five phases (refer to Figure 2.3). This chart will be utilized to track advancement throughout the development phase.

Figure 3-3. *Gantt Chart of the Capstone Process*

The initial phase of week 1 – 5 will be focused on gathering data information. From conducting web search to personal approach.

The execution of the planning phase will be conducted, from week 2 - 9, will use these findings to create a clear path for the development of the portal. This includes outlining the portal's main features and technical requirements, structuring its overall design, crafting a comprehensive development schedule with key targets and resource distribution.

With a comprehensive strategy established, the project will advance to the design and analysis stage during the 9 - 17 weeks. In this phase, the user interface will be developed with a focus on user-friendliness.

During Phase 4, spanning weeks 15 - 40, the emphasis is on implementation. In this stage, the portal is constructed using an appropriate programming language, guided by the designs and functionalities determined previously. Subsequently, the testing phase, extending from weeks 41 to 52, entails thorough examination of the portal's functionality and usability, ensuring it operates as planned and delivers a satisfactory user experience. By adhering to these five phases delineated in the Gantt chart, our objective is to create and launch a user-friendly portal for the Caraga region that effectively guides tourists.

Table 3-1. Minimum System Requirements for Development

Operating System	Windows 11
CPU (Central Processing Unit)	Intel® Core™ i5-13420H
RAM (System Memory)	8GB RAM
Storage	128GB SSD
GPU (Graphics Processing Unit)	NVIDIA® GeForce® GTX 2050

Table 3-2. *Hardware Requirements*

PC/Laptop	Windows 10 or later
Android Version	Android 9 or later

3.2.3 Design

This part consists of the design components of the capstone project—a web portal showcasing tourist attractions in Caraga. The design phase is going to be critical in attaining a really good, friendly, user-friendly portal that is visually intriguing while able to serve the identified objectives of this project. It will have a user interface, technical requirements, and an overall development schedule.

3.2.4 System Architecture

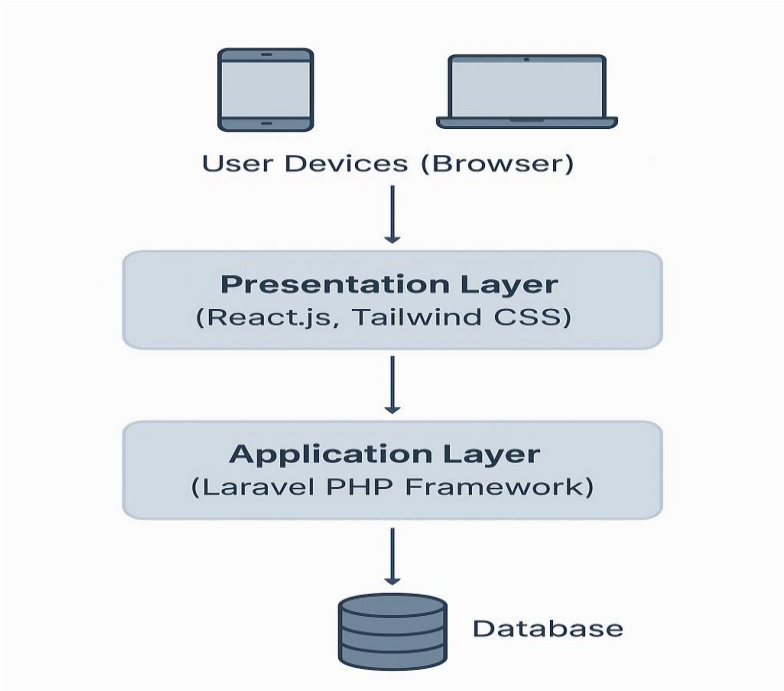


Figure 3-4. *System Architecture Diagram*

This system architecture uses a three-layer approach: a React.js and Tailwind CSS frontend, a Laravel PHP backend, and a database for data storage. It enables a clear separation of concerns between the user interface, business logic, and data management.

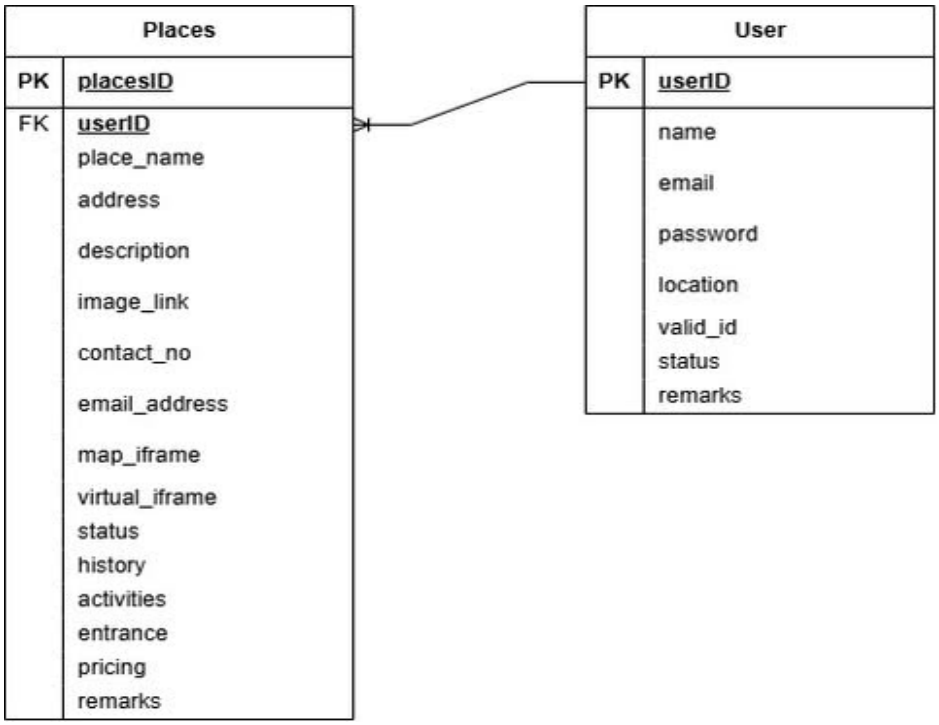


Figure 3-5. *Entity-Relationship Diagram*

This ERD illustrates a database structure with two main entities: User and Places. Each User can submit multiple Places, as shown by the one-to-many relationship via the userID foreign key. The Places entity stores detailed information about each location, including its name, address, description, images, contact details, map and virtual tour links, history, activities, entrance, pricing, and status, which controls its visibility in the system. The User entity captures essential user details such

as name, email, location, and account status, supporting effective management of submissions within the portal.

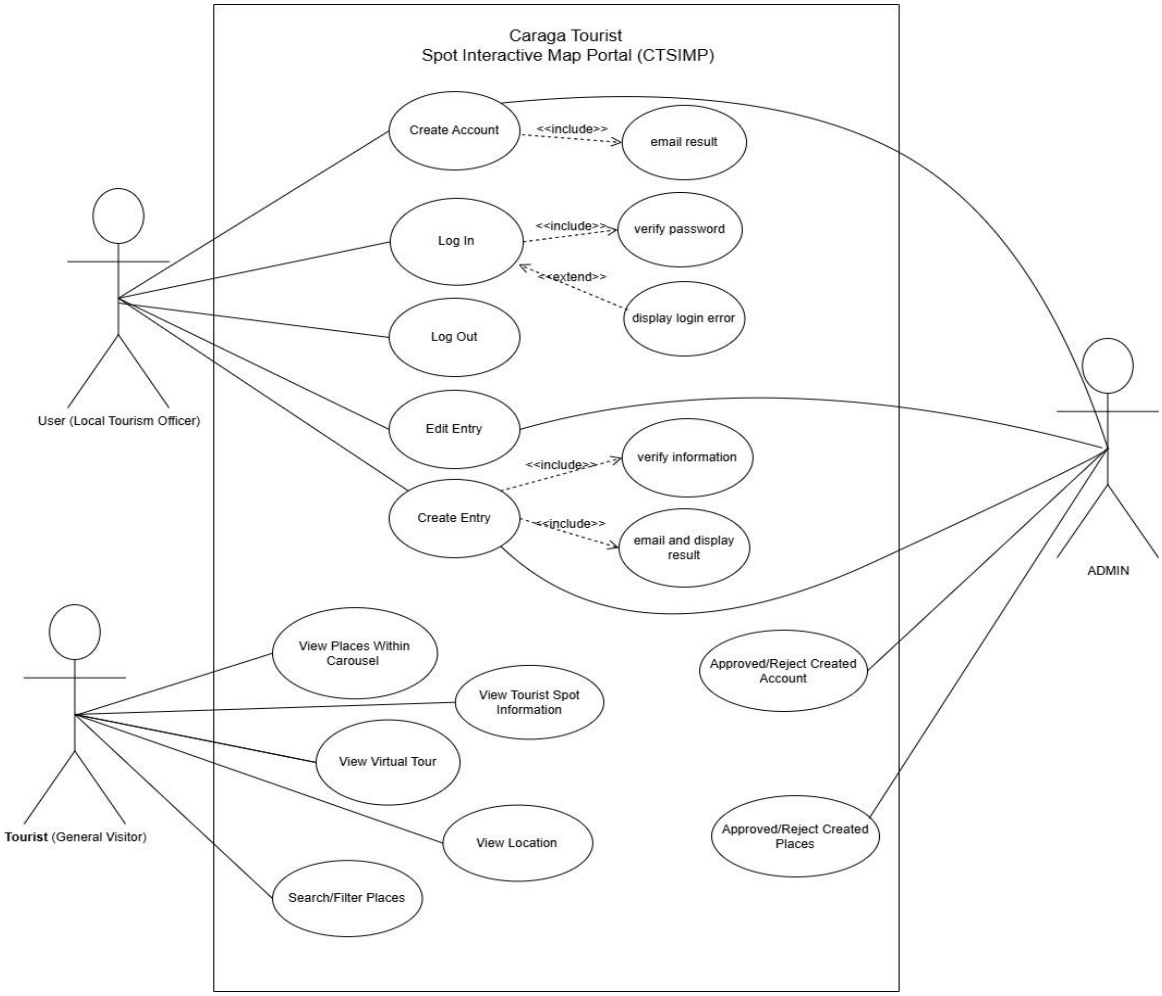


Figure 3-6. *Use-case Diagram*

The use-case diagram defines three actors Tourist (General Visitor), Local Tourism Officer, and System Administrator, and their interactions with the portal: Tourists can browse a carousel of approved spots, view detailed spot information, launch virtual tours, and explore locations on the map; Local Tourism Officers must log in, log out, and create or edit spot entries. Administrators review and approve or reject

both new officer accounts and submitted place entries to ensure content quality and access control.

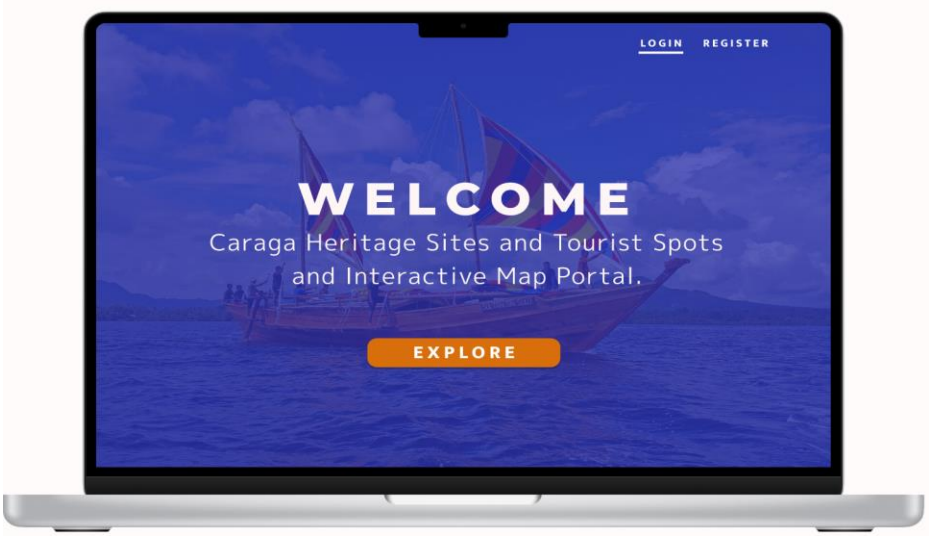


Figure 3-7. *Landing Page*

The figure above presents the landing page. This is what the unregistered users will see, a 'Login' and 'Register' option is available in the navigation bar for users to login and register.

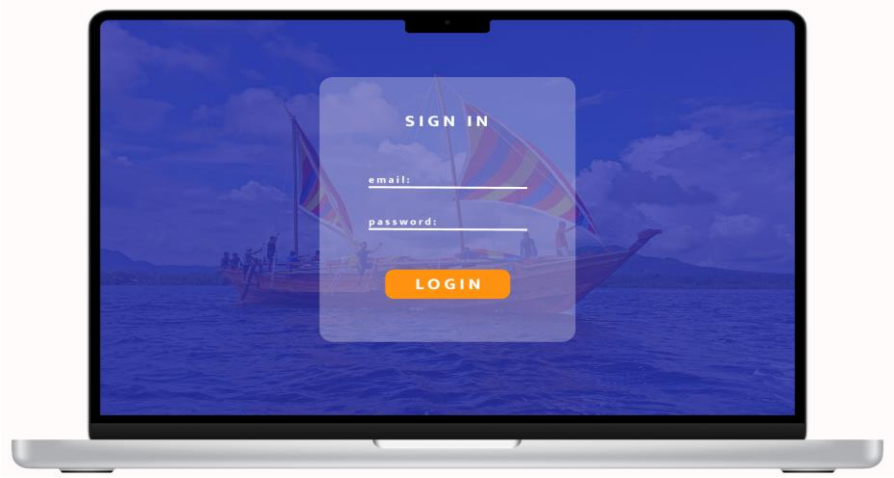


Figure 3-8. *Login Page*

The figure above presents the login page. Designed for returning users. It typically includes fields for entering a username or email and a password.

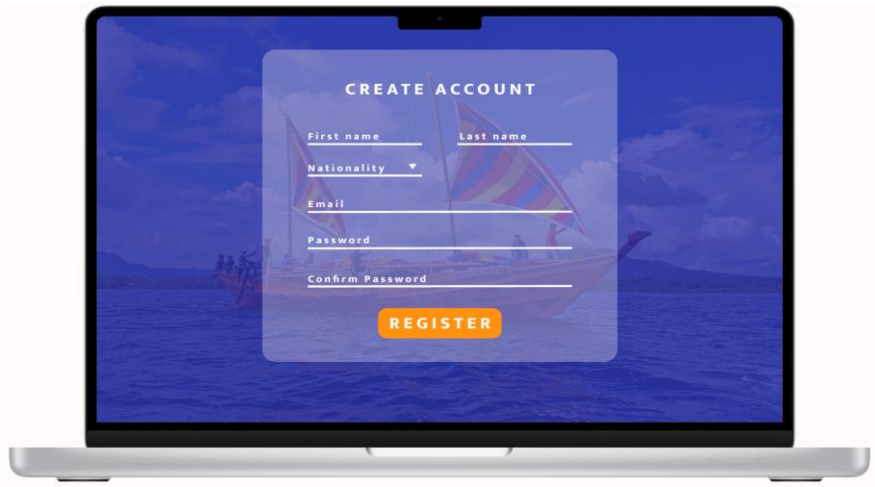


Figure 3-9. *Register Page*

The figure above presents the register page. Is for new users to create an account. The registration page requires users to enter personal information such as a

first name and last name, email, nationality, and password. The register page also asks for additional details like nationality which will be used for data analysis.

Figure 3-10. *Home Page*

The figure above presents the home page. A sliding carousel display showcasing various tourist spots in the Philippines. Each slide in the carousel represents a different location, complete with a high-quality image and a brief description. Users can manually navigate through the carousel to explore the featured locations at their own pace. This interactive format provides a visually engaging way to highlight the diverse attractions in the Philippines.

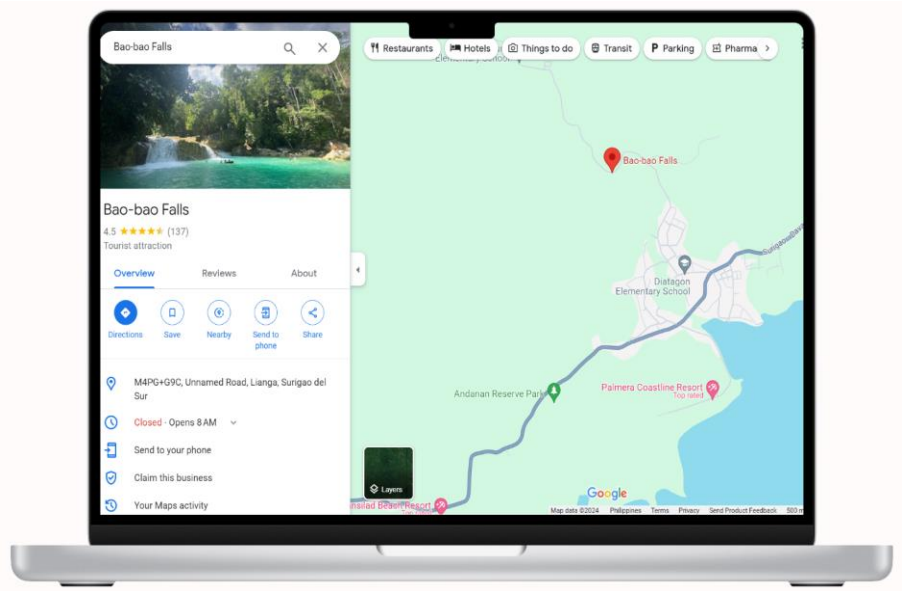


Figure 3-11. *Google Map Interface (without route)*

The figure above presents the google map interface where it provides a detailed map location of the selected tourist spot area. Users can explore the area, search for specific locations, and get directions. It offers various views including satellite and street maps. The interface is user-friendly and interactive.

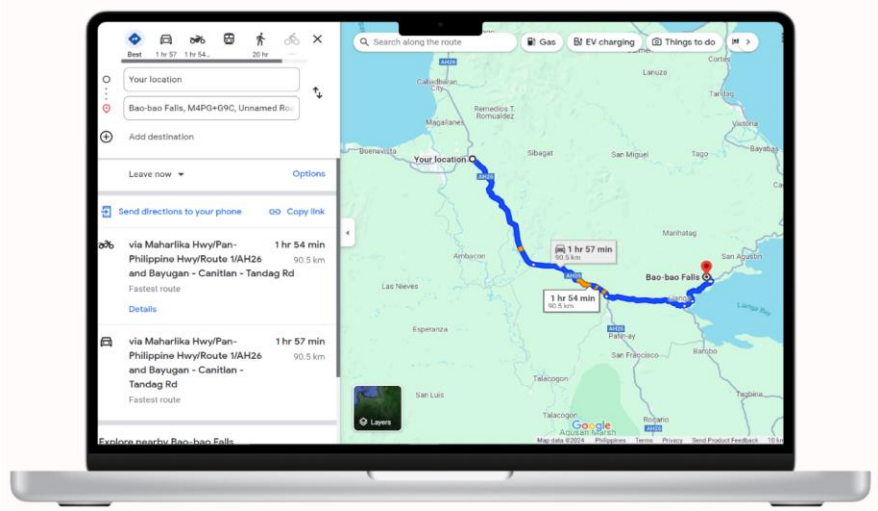


Figure 3-12. *Google Map Interface (with route)*

The figure above presents the google map interface (with route), it provides a guide route to the user's selected tourist spot area based on his/her current location.

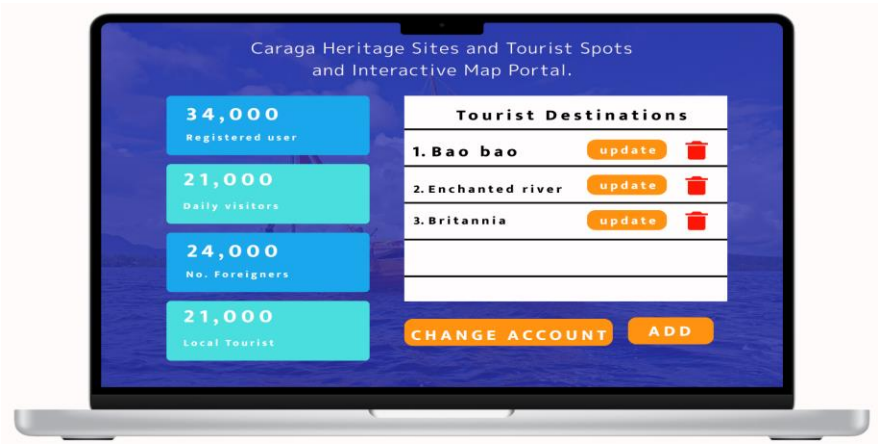


Figure 3-13. *Admin Page*

The figure above presents the admin page. Displaying *the list of most popular tourist spots.* designed for site administrators. It provides tools and features to manage the website's content, users, and settings. Access is typically restricted to

authorized personnel for security purposes. The exact features can vary, but may include user management, content moderation, and site analytics.

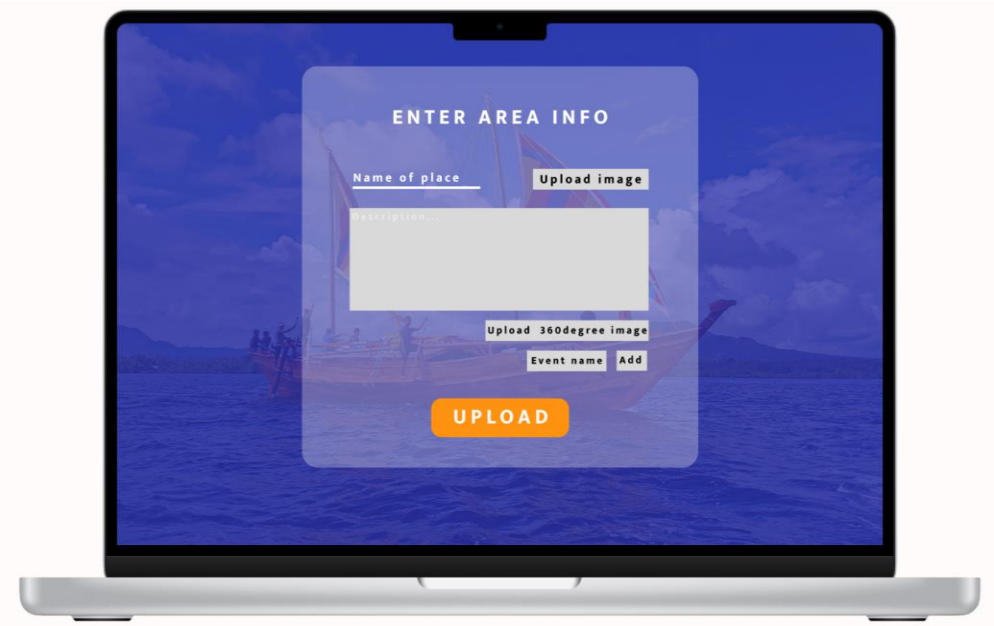


Figure 3-14. *Add Tourist Information Page*

The figure above presents the admin page, it shows how the admin will add area information in Caraga's tourist spot in the portal. The data entered will be displayed in the home page accordingly**.**

3.2.5 Implementation

This segment provides an overview of the technical components involved in the development of the Caraga Tourist Spots Interactive Map Portal. We will explore the various tools and systems that were used to bring the Caraga Tourist Spots Interactive Map Portal into existence.

3.2.5.1 Technology Stack

The Tourist Spot Interactive Map Portal System's features will be implemented using front-end and back-end technologies. The main technologies used are broken down as follows:

Web Development:

- **React.js:** is a coding language that allows you to design and organize the structure and appearance of web pages. It serves as the fundamental tool for presenting content on the internet.

- **Tailwind CSS:** is a language used to dictate how HTML elements should look and be presented on a web page. It enables developers to specify styles for fonts, colors, layouts, and other design elements, ensuring a clear distinction between content and appearance.

Backend:

- **LARAVEL:** is a popular PHP web framework for building web applications. It provides a structured and efficient approach to development, with features for routing, database management, authentication, and more. It promotes code reusability and has a supportive community.

3.2.5.2 Development Process

The Tourist Spot Interactive Map Portal system is built upon a set of steps, i.e.frontend development, back-end development, back-end and mapping technologies integration.

This system's front end aims at creating a user-friendly front end through which end-users can easily access cultural tourist spots. The design and prototyping of the user interface and user experience in the system, basically containing virtual tours, google map integration, and detailed information for each tourist spot, are part of the system. For the above, the front end will be created using react.js and tailwind CSS to ensure seamless and delightful experience across devices. The front end will have the interfaces for playing with a carousel to discover other attractions. The backend takes care of data management, information processing, and the provision of functionalities that are useful to the system.

Laravel is a PHP web application development framework that implements important features such as routing, database management, and authentication. In this way, it is capable of executing server-side JavaScript code in order to manage JavaScript packages and dependencies. This combination of technologies will certainly ensure the server provides effective handling of all server-side operations towards bolstering the performance and flexibility of the system.The system will integrate the Google Maps iframe source content to provide location-based information about cultural tourist spots. Upon user interaction, the iframe source content will retrieve the geographical coordinates and details of the selected sites. The front-end will render an interactive carousel within the system, displaying site locations on the map. Users can interact with carousels content to view additional information about each site, such as virtual tours, and other relevant details. This integration enhances the user experience by providing a visual representation of site locations, facilitating effective exploration and interaction with cultural tourist spots.

3.2.5.3 360° Image Acquisition

Figure 3-15. *360° Image Acquisition*

Using the "Go Street View" app, we first install and launch it on a tripod-mounted (or otherwise stabilized) smartphone, then capture 29 overlapping images from a fixed position to encompass the full 360° view. Next, we stitch these photos using the app's built-in panorama feature, carefully review the result for distortion or gaps, and retake any faulty segments. This ensures a seamless, high-quality 360° image.

3.2.6 User Acceptance Testing (UAT)

User Acceptance Testing was conducted with representatives embodying each of CTSIMPs three actor roles DOT Caraga as System Administrator, Local Tourism Officers (LTOs), and general public (Tourists) to verify that all workflows satisfy functional and usability requirements:

System Administrator (DOT Caraga):

- Log In/Out — authenticate and terminate sessions.
- Approve/Reject Accounts — approve or reject LTO registrations; applicants receive an automated email notification upon approval or rejection.
- Approve/Reject Place Submissions — review and approve or reject new spot entries; submitters receive an email notification indicating approval status.

Local Tourism Officers (LTOs):

- Register & Await Approval — create an account and receive notification to await admin approval before first login; once approved or rejected, they receive an email with remarks.
- Log In/Out — authenticate post-approval, then securely end their session.
- Submit & Edit Place Form — enter or update spot details; upon admin review of both user registration and place submissions, receive an email with approval status and any remarks.

General Public (Tourists):

- Browse Features — navigate the carousel, view spot details, view virtual tours, and explore maps and routes.

- Search & Filter — search for specific tourist spots and refine results by province and municipality/city.

During a live presentation, we walked through each scenario demonstrating expected vs. actual behavior and gathered immediate feedback. All actor-specific test cases executed successfully, confirming that registration workflows, content management, and interactive features meet performance and usability thresholds. Detailed results appear in Chapter 4.

3.2.7 System Usability Scale (SUS)

System Usability Scale is a 10-item Likert Scale Questionnaire that provides an at-a-glance look at the ease of use of websites, software, hardware, mobile applications and other technological applications. It is applied to measure how easy or difficult they are to use in order to improve. The researchers target participants are Lto's,Admin,and Tourists and will have a sample size of 20 to obtain reliable results.

The participants are asked to score the following 10 items with one of five responses that range from 5 (Strongly Agree) to 1 (Strongly Disagree).

SUS Score	Grade	Rating
>80	A	Excellent
68-80	B	Good
68	C	Okay
51-68	D	Poor
<51	F	Awful

Figure 3-16. *Range of System Usability Result*

Table 3-3. System Usability Scale Instrument (Sauro, J. n.d)

Questions	**1 (Strongly Disagree)**	**2**	**3**	**4**	**5 (Strongly Agree)**
1. I think I would like to use this system frequently.					
2. I found the system unnecessarily complex.					
3. I thought the system was easy to use.					
4. I think I would need support to use this system.					
5. I found the various functions in this system were well integrated.					
6. I thought there was too much inconsistency in this system.					
7. I would imagine most people would learn to use this system very quickly.					
8. I found the system very cumbersome to use.					
9. I felt very confident using the system.					
10. I needed to learn a lot of things before I could get going with this system.					
Comments:					

The SUS is typically used after respondents have had the opportunity to use the system being evaluated, but before any debriefing or discussion takes place,

respondents should be encouraged to express their instant response to each item rather than thinking about it for an extended period of time. All things should be checked, and if a respondent believes they are unable to give an answer to a certain item, they should mark the center of the scale.

The formula is represented in this:

$$SUS = 2.5 * ((\Sigma Item\_i)-10) \qquad \text{Equation (1)}$$

Where:

- Item_i represents the score contribution of each item, calculated as follows:
    - For items 1, 3, 5, 7, and 9: Item_i = Scale Position_i-1
    - For items 2, 4, 6, 8, and 10: Item_i = 5 - Scale Position_i
- ∑ Item i represents the sum of the score contributions from each item.
- Finally, multiply the sum by 2.5 to obtain the overall SUS score.

Remember that SUS scores range from 0 to 100, however they are not percentages and should be understood as percentile rankings.

The results will assist in identifying the system's usability strengths and shortcomings, as well as guiding future enhancements to improve the user experience and overall system performance.

CHAPTER 4 RESULTS AND DISCUSSIONS

This section discusses the results and discussion of the study made in the development of the Caraga tourist spot interactive map portal. It also analyzes to interpret how the system, decision can be measured to evaluate effectiveness to help the local tourism officer, tourist, and the Department of Tourism in promoting and development for tourism in the Caraga Region. It is consistent with the research aim to discuss the efficiency of the system, experiences of user, and the influence towards regional tourism.

4.1 Caraga Tourist Spot Interactive Map Portal

This objective focuses on developing an online portal system that showcases the diverse attractions of the Caraga region. By creating a centralized platform, local tourism officers can promote their destinations, and tourists can explore these attractions via virtual tours and interactive maps.

4.1.1 Application for Promoting Tourist Spot Process

This section details the step-by-step process for creating an account and applying to promote a tourist spot through the portal. The process includes:

1. Account Creation: New users (Local Tourism Officers) create an account.
2. User Management: The administrators inspect new user registrations and verify submitted valid IDs before granting access.
3. Sign In: Returning users sign in using their approved registered credentials.
4. Data Entry: Users fill in all required information (e.g., place name, address, contact details, history, price range, activities, map iframe, image, virtual tour iframe and description).
5. Submission: The completed application for the created account and place is submitted for review.

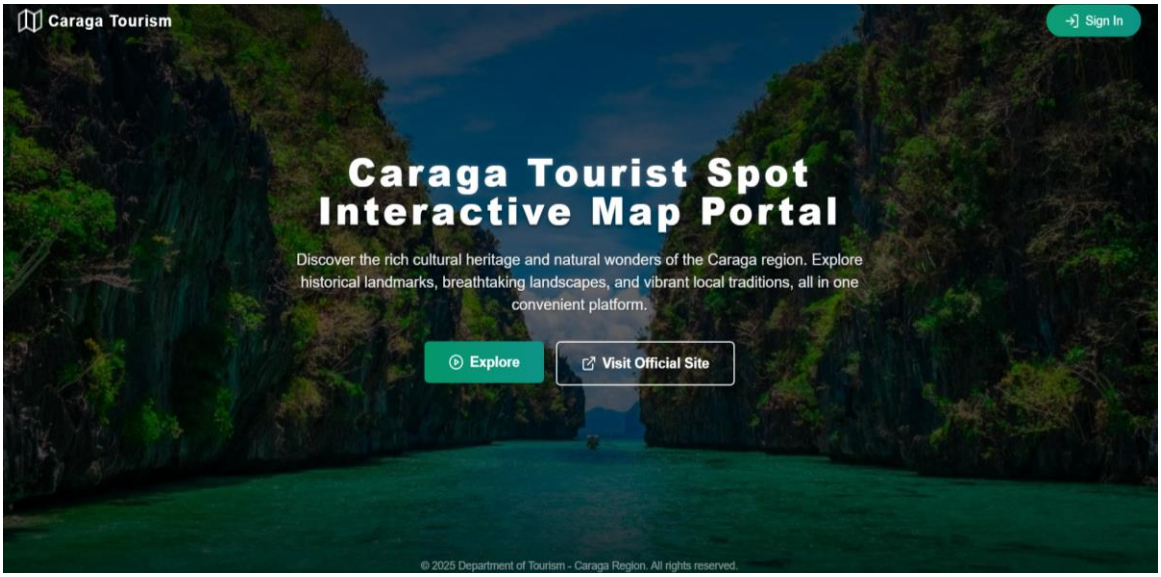


Figure 4-1. *Landing Page*

The figure above presents the landing page. This is what unregistered and tourist users will see. A 'Sign In' option is available in the navigation bar for Local

Tourism Officers to login and register, allowing them to create an entry to promote their place. Additionally, users can visit the official site of the Department of Tourism through a link in the UI.

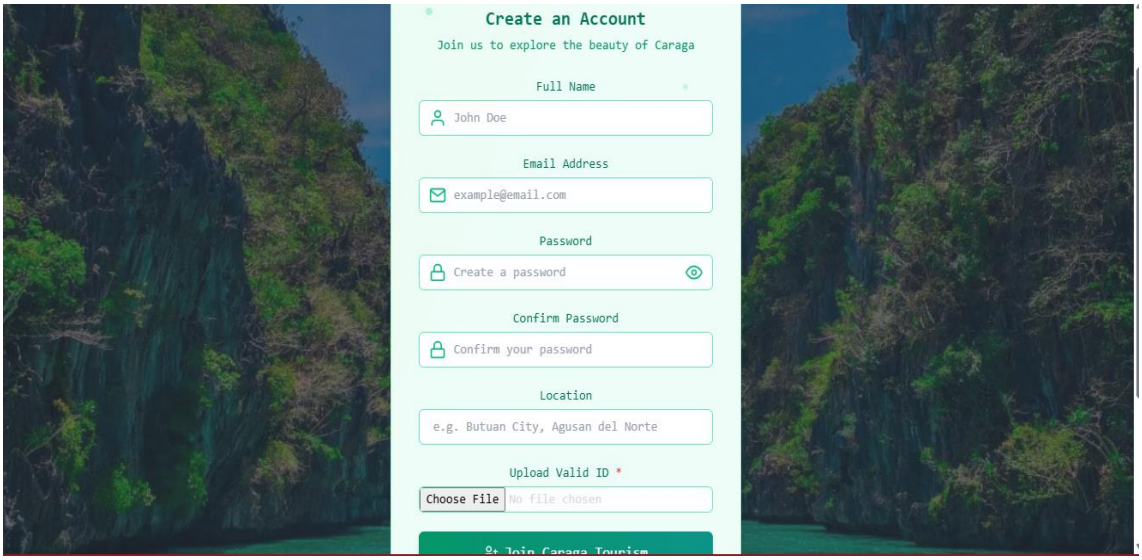


Figure 4-2. *Register Page*

The figure above presents the register page. For new Local Tourism Officer users to create an account, they need to enter personal information such as a full name, email, password, address, and a valid ID.

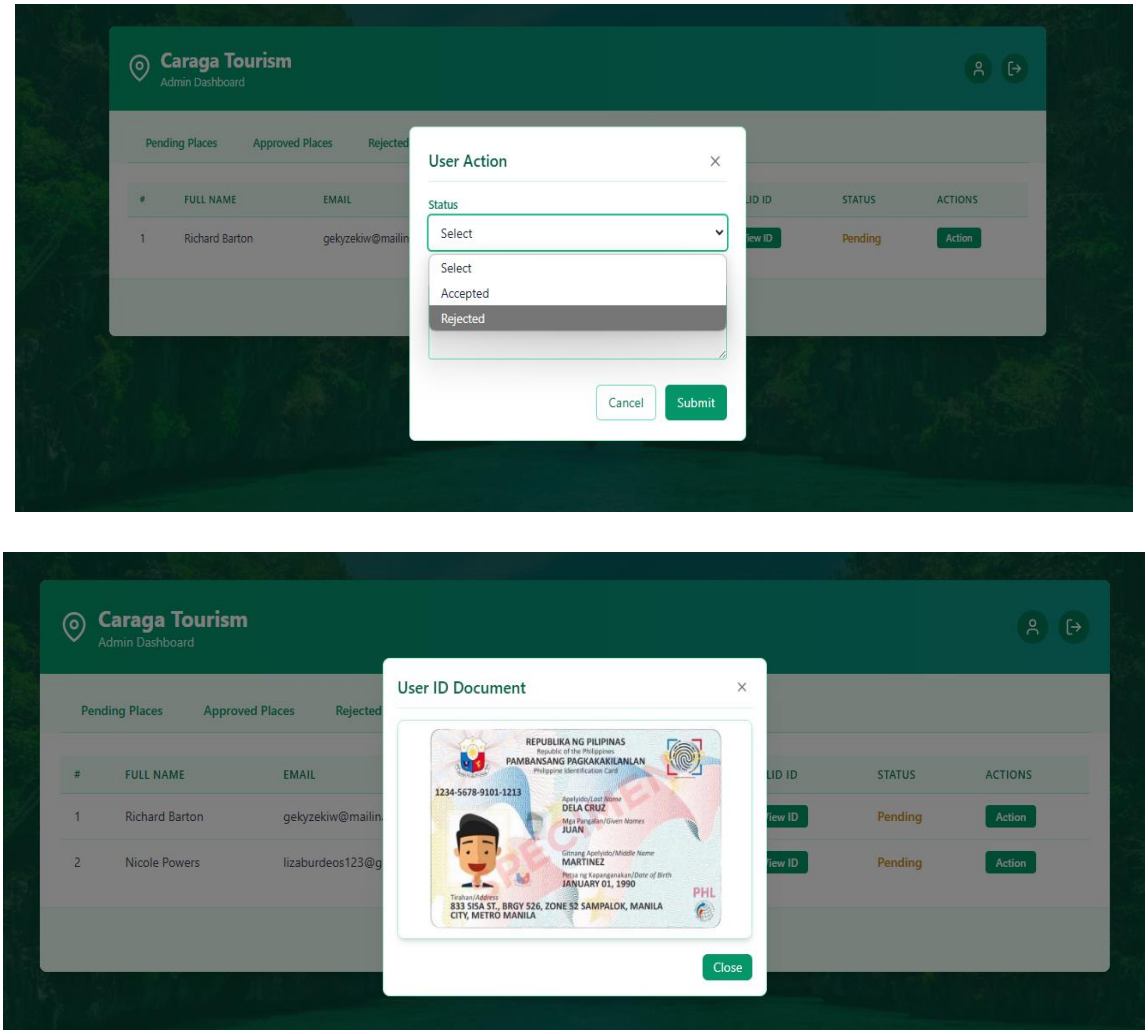


Figure 4-3. *Admin Dashboard (User Management)*

The user management shown in the figure above allows administrators to inspect new user registrations and verify submitted valid IDs before granting access. Each application can be examined individually, allowing the admin to approve or reject it based on the provided information. Applicants will receive an email notification informing them whether their registration has been approved or rejected. Only authorized users can log in afterwards.

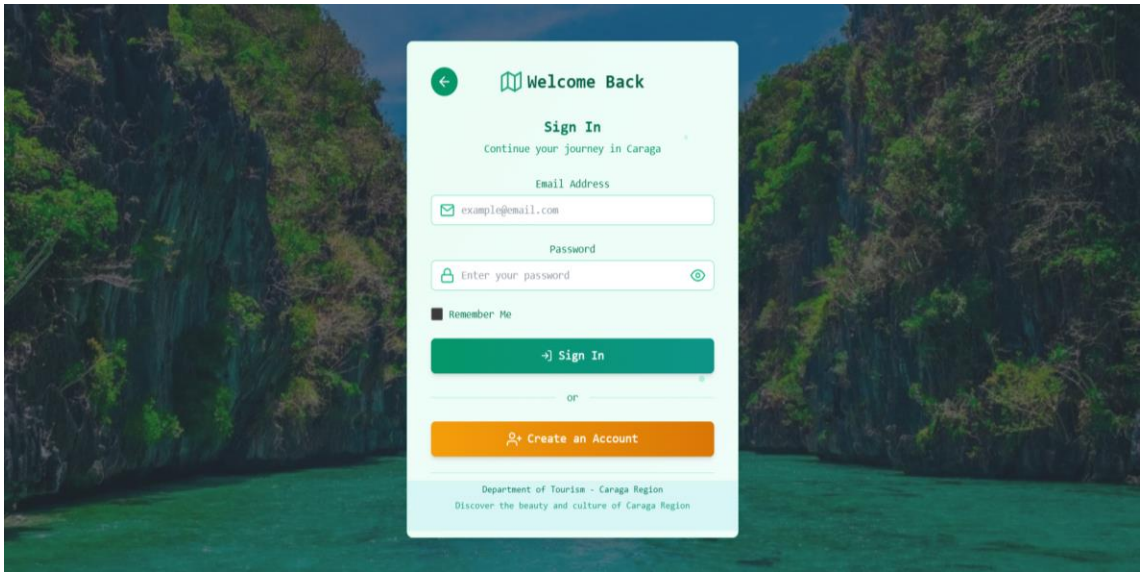


Figure 4-4. *Sign In Page*

The figure above presents the Sign In page, designed for returning users. It includes fields for entering an email and password, along with a "Remember Me" option for convenience. Users can sign in or create a new account if they don’t have one.

4.1.2 Admin Reviewing Entries Process

This objective outlines the procedures followed by the admin reviewing entries submitted by Local Tourism Officers. The key steps include:

1. Reviewing Submission Details: The admin views all information entered by the user.
2. Approval: The admin approves entries that meet the required criteria, making them visible to tourists.
3. Rejection: Entries that do not meet the standards are denied.

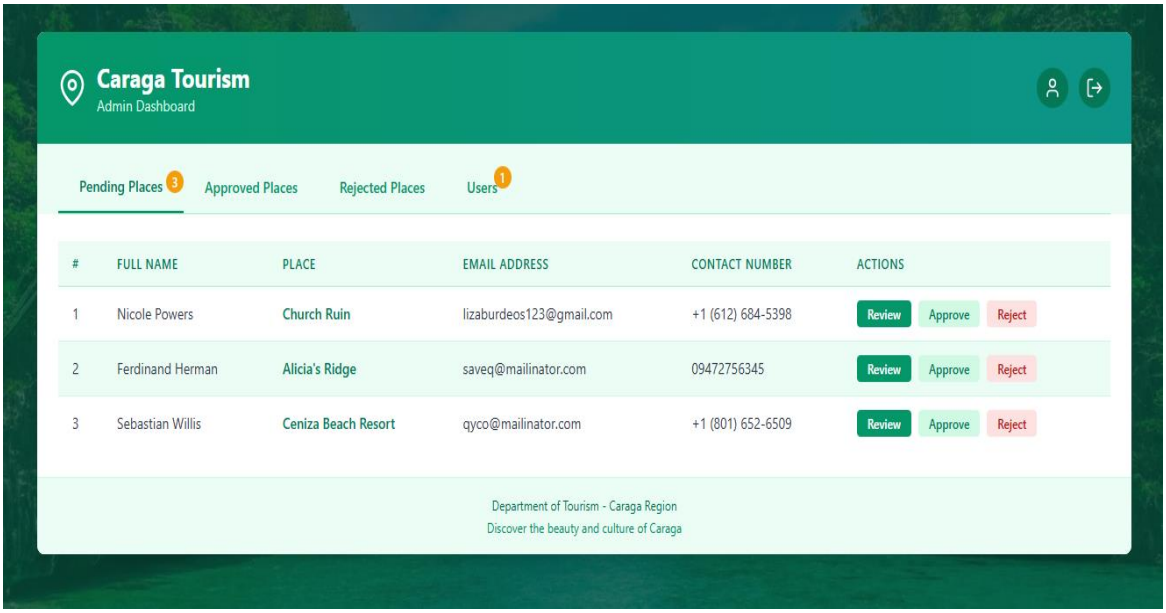


Figure 4-5. *Admin Dashboard*

The Admin Dashboard is restricted to authorized personnel for managing tourist spot submissions. Admins can review, approve, or reject entries and user registration from LTO's. The dashboard displays pending and approved places,

showing details like LTO's name, email, contact, and tourist spot with action buttons for efficient decision-making.

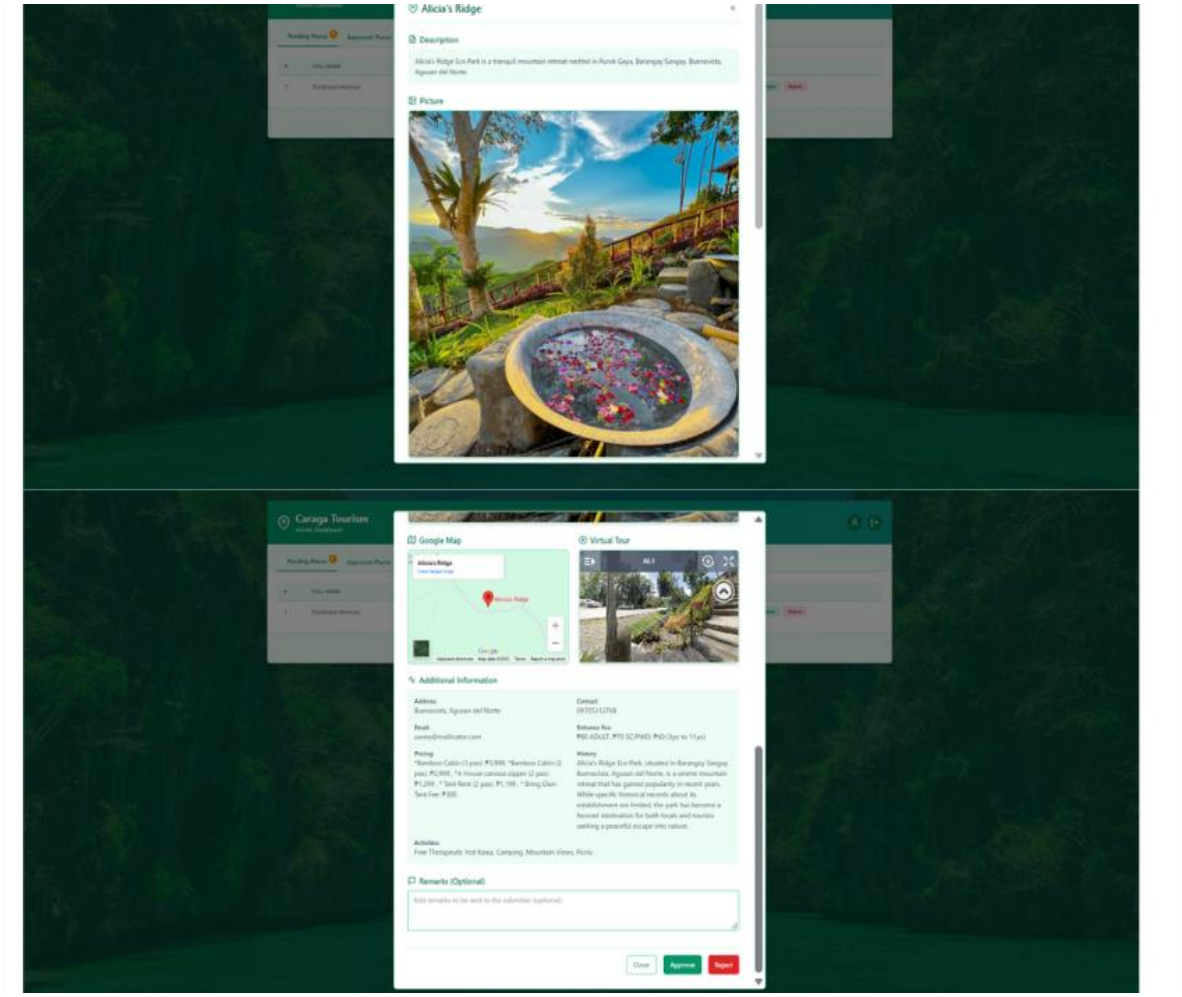


Figure 4-6. *Admin Dashboard (Review Clicked)*

The figure shown above presents the admin dashboard when the review button is clicked. This view includes key submission details such as the place name, address, description, entrance details, pricing, google map iframe, virtual tour, activities and history.

4.1.3 Local Tourism Officer Form Entry

This objective outlines the procedures for how a user manages submitted entries. The key steps include:

1. Dashboard Overview: Displays submitted tourist spot entries, their statuses (Pending, Approved, Rejected), and options to edit or resubmit.
2. Tourist Spot Management: Allows officers to add data or update entries based on admin feedback.
3. Notifications & Updates: Notifies officers about approval status and required revisions.

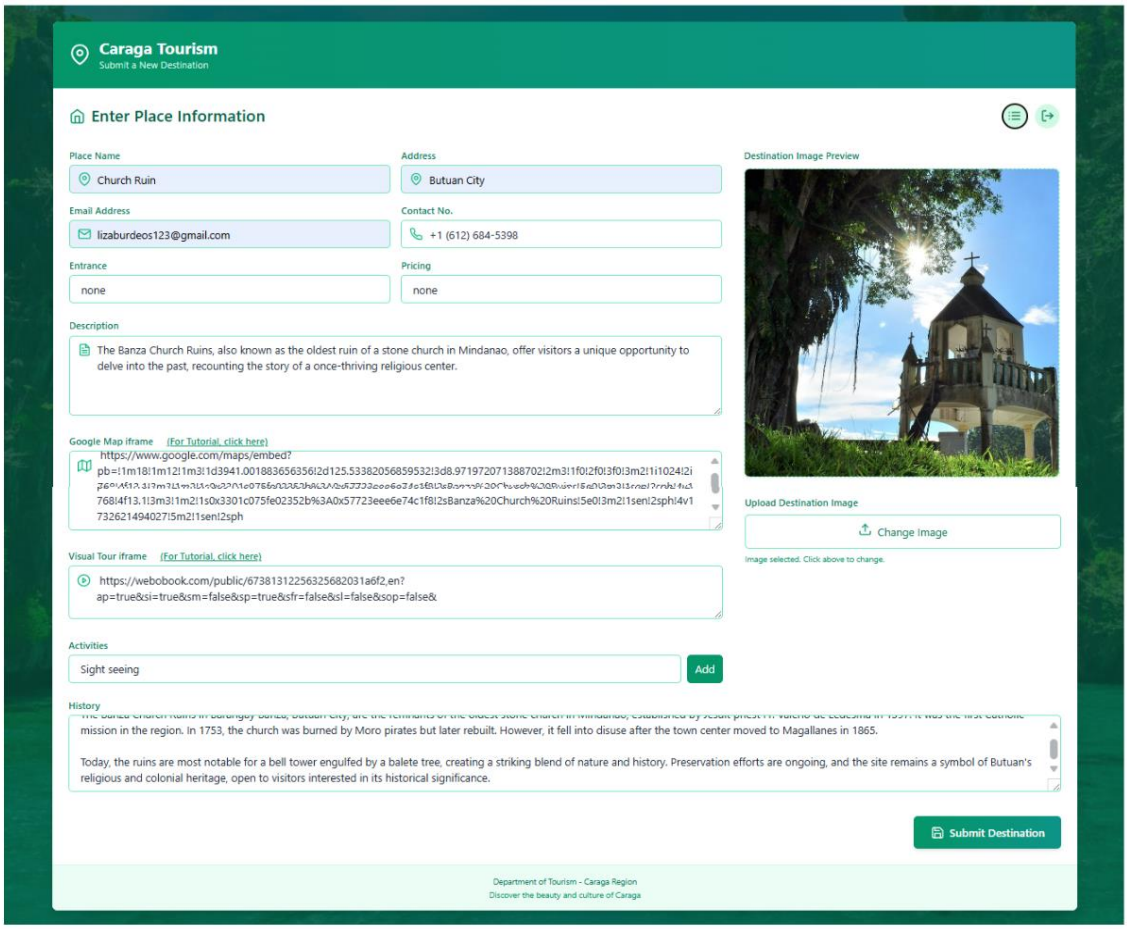


Figure 4-7. *Local Tourism Officer Form*

The form shown in the figure above allows Caraga tourism officers to input tourism destination details. The form requires information such as place name, address, contact number, entrance, pricing, description, Google Maps iframe embed, Visual Tour iframe, activities, history, and relevant image.

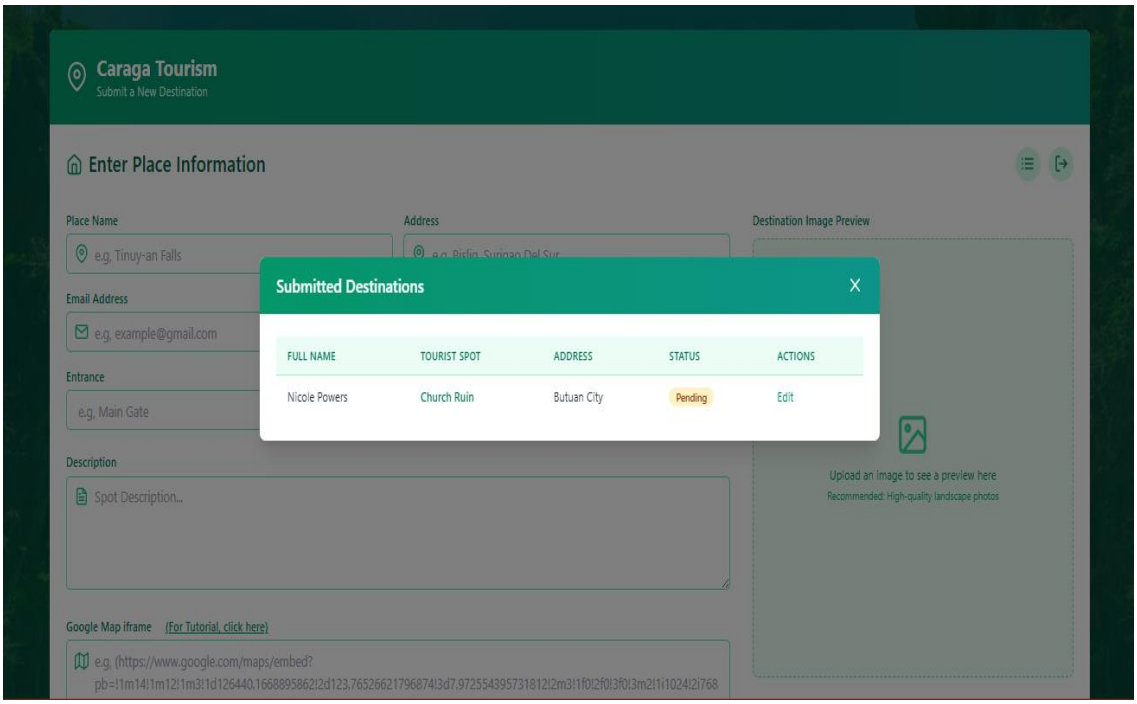


Figure 4-8. *Submission & Status Tracking*

The image shown above illustrates the submission and status tracking. It allows users to monitor the progress of their submitted tourist destinations. This feature ensures transparency and helps users stay updated on the approval process of their submissions.

4.2 Tourist Experience and Interface Evaluation

This objective evaluates the user interface and overall experience of the portal as experienced by tourists. It covers features such as the interactive carousel, Google Maps integration, and virtual tours. Key aspects include:

1. Carousel Functionality: Showcasing approved tourist spots with high-quality images and brief descriptions.
2. Map Integration: Providing detailed maps with routing capabilities to guide users.
3. Virtual Tours: Offering immersive 360° views to help users preview destinations before visiting

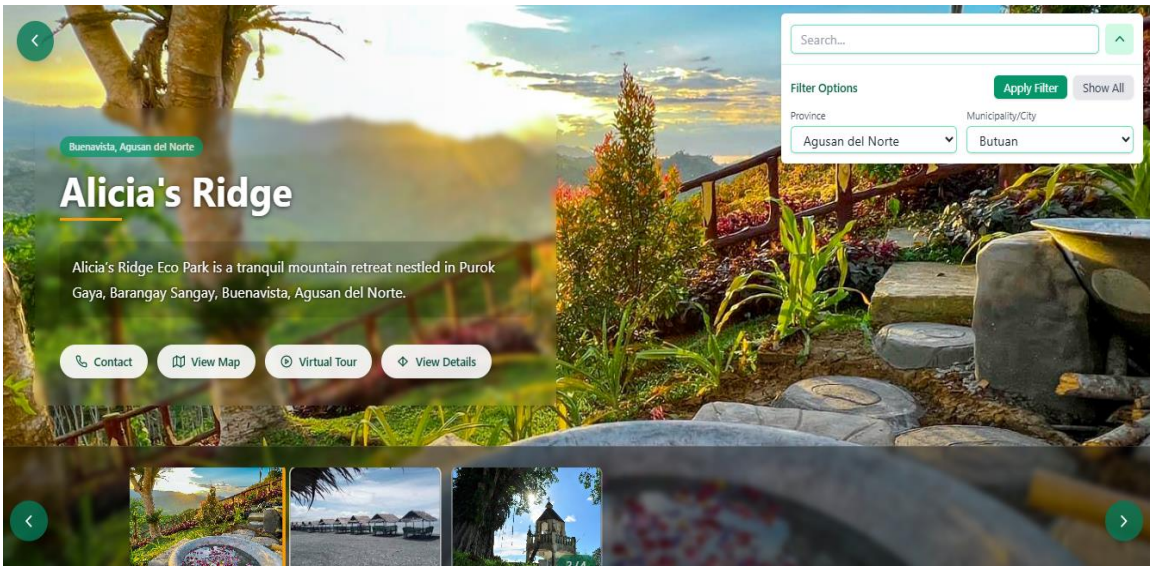


Figure 4-9. *Carousel*

The figure above displays the tourist view of the platform, accessible to unregistered users. It showcases approved tourist spots with a brief description and

its image. A sliding carousel, search bar and filter allow users to explore destinations across Caraga. Each slide includes a "View Details" button, allowing users to access more comprehensive information and every spot highlights a different location with high-quality visuals, providing an immersive browsing experience.

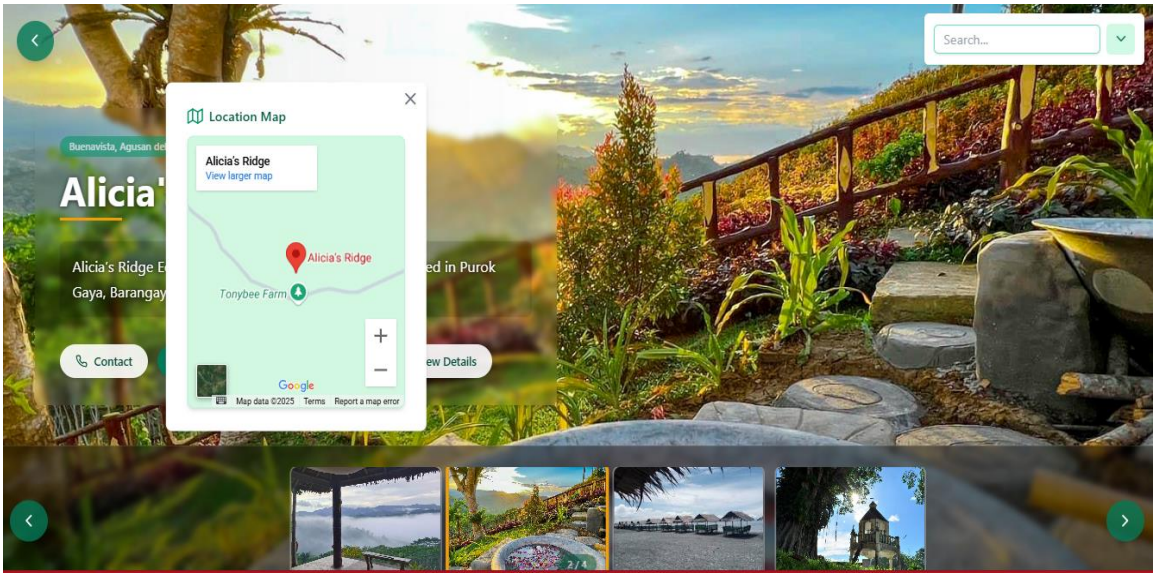


Figure 4-10. *Carousel (View Map clicked)*

The image shown above is the Location Map of the selected tourist destination, when the view map button is clicked. This map provides a visual reference to help users to locate the exact position of the destination. The embedded Google Map offers interactive features, including zoom controls and a link to view the map in larger format.

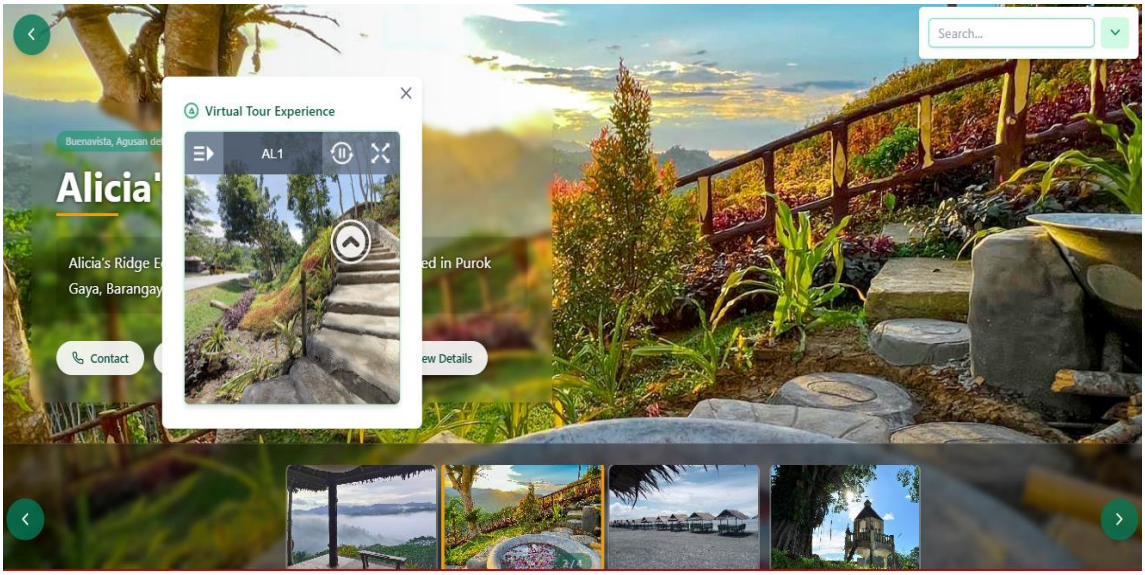


Figure 4-11. *Carousel (Explore Virtual Tour Map clicked)*

The Virtual Tour Map shown in the figure above showcasing an immersive, panoramic preview of the tourist destination. This feature allows users to virtually explore key areas of the site. It provides an engaging, realistic experience that helps visitors visualize the place before an actual visit. The virtual tour interface includes navigation controls, allowing users to move through various spots and get a feel of destination from different angles.

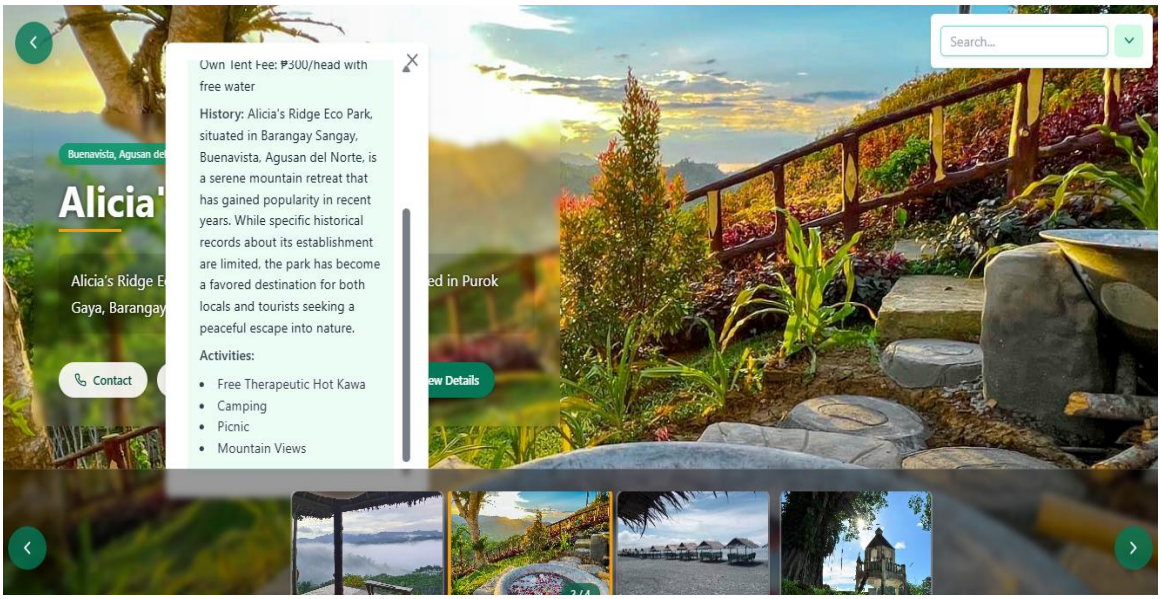


Figure 4-12. *Carouse l(View Details clicked)*

The Details shown in the figure above displaying comprehensive information about the selected tourist destination. This functionality ensures that users have all the essential information they need to plan their visit and make informed travel decisions.

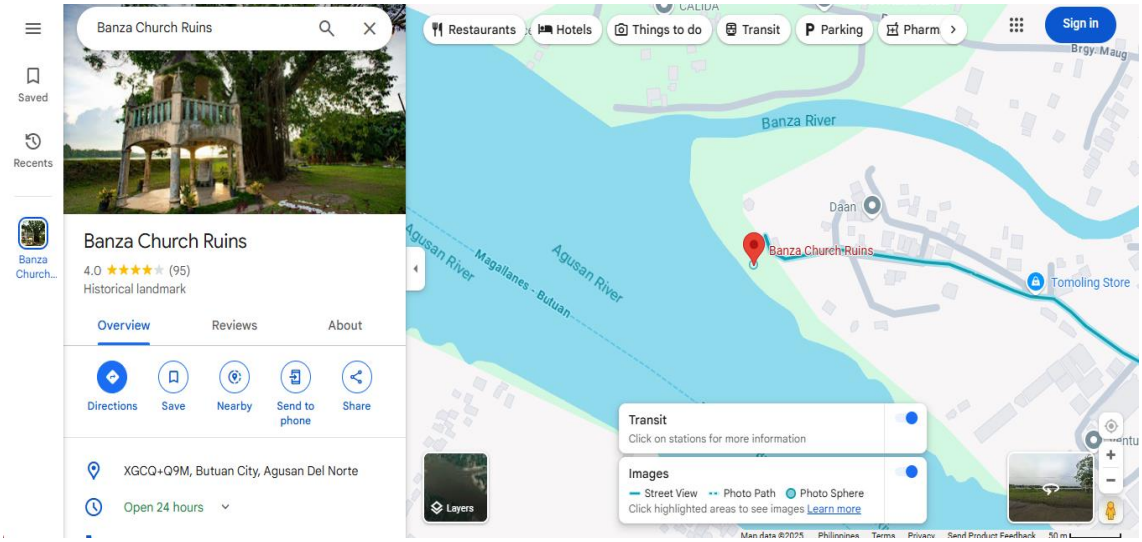


Figure 4-13. *Google Map Interface (without route)*

The figure above presents the google map interface where it provides a detailed map location of the selected tourist spot area. Users can explore the area, search for specific locations, and get directions. It offers various views including satellite and street maps.

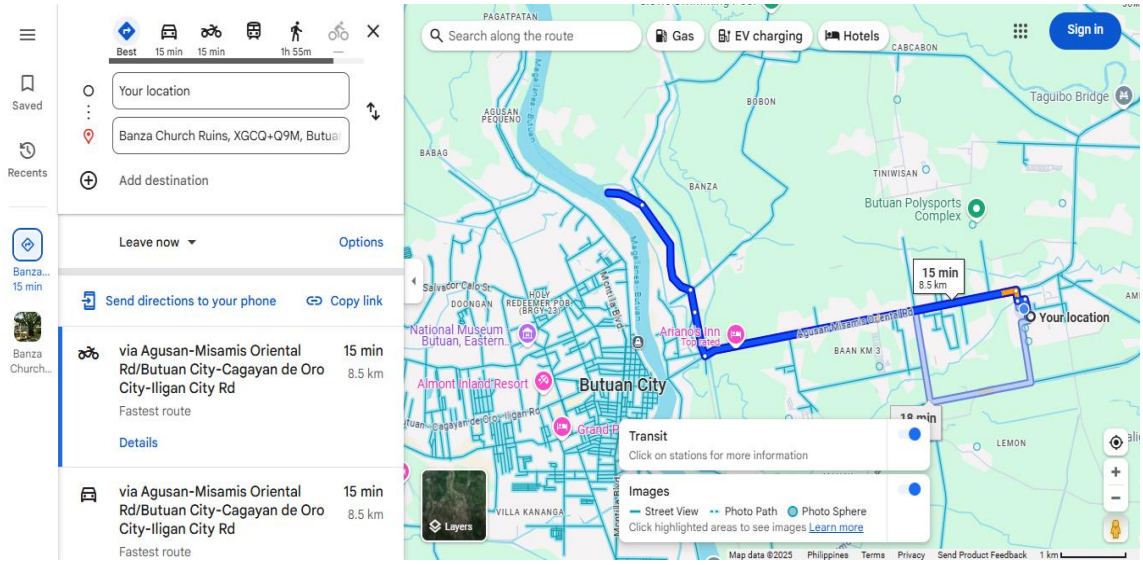


Figure 4-14. *Google Map Interface (with route)*

The figure above presents the google map interface (with route), it provides a guide route to the user's selected tourist spot area based on his/her current location.

4.3 User Acceptance Testing (UAT) and SUS

This section presents the outcomes of the UAT, detailing how the Caraga Tourist Spots Interactive Map Portal performed against predefined test scenarios for all three actor groups (DOT Caraga administrators, Local Tourism Officers, and general public tourists) and summarizes the System Usability Scale (SUS) results.

Table 4-1. DOT Caraga (Administrator)

Test Case ID	Test Scenario	Expected Outcome	Status
TC-001	Log In/Out	Secure authentication and session termination	Pass
TC-002	Review New Accounts	View pending LTO and Tourist registrations; approval or rejection sends email notification	Pass
TC-003	Review Submitted Destinations	View "Pending Review" list; approval or rejection sends email notification	Pass
TC-004	Approved Entries Appear in Carousel	Newly approved spots immediately appear in the public carousel	Pass

Admins can securely log in/out, review and approve or reject user and place submissions, and immediately publish approved spots to the public carousel with automated email notifications.

Table 4-2. Local Tourism Officers (LTO)

Test Case ID	Test Scenario	Expected Outcome	Status
TC-005	Registration & Approval Workflow	Account created; notification to await admin approval; receives email with remarks upon decision	Pass
TC-006	Log In/Out	Authenticate post-approval; login/logout	Pass
TC-007	Submit New Place Entry	Entry appears in Admin's "Pending Review" queue	Pass
TC-008	Edit Existing Place Entry	Updates saved; entry returns to "Pending Review"	Pass

LTO's register (and await admin approval), then log in to submit new place entries or edit existing ones, all of which are routed to the admin's pending queue with updates.

Table 4-3. General Public (Tourists)

Test Case ID	Test Scenario	Expected Outcome	Status
TC-009	Browse Approved Spots	Carousel displays each approved spot with its image, description, entrance fee, accommodation price range, integrated 360° virtual tour and routing map	Pass
TC-0010	Search & Filter	Search by spot name and filter by province/municipality; correct results displayed	Pass
TC-0011	View 360° Virtual Tour	Launches seamless panoramic viewer	Pass
TC-0012	View Map & Routing	Opens map markers and generates accurate route directions	Pass

Tourists browse approved spots complete with image, description, entrance fee, accommodation range, virtual tour, and map routing and use search and filter tools to find destinations.

4.3.1 User Acceptance Testing (UAT) and SUS

Respondent	Question1	Question2	Question3	Question4	Question5	Question6	Question7	Question8	Question9	Question10
Respondent #1	3	3	4	4	3	1	3	1	3	2
Respondent #2	5	3	4	1	4	4	4	3	3	3
Respondent #3	5	1	3	3	2	4	4	3	4	1
Respondent #4	5	5	5	1	5	3	5	1	3	1
Respondent #5	4	4	3	3	5	3	4	4	4	4
Respondent #6	4	4	3	2	4	2	4	2	3	4
Respondent #7	4	2	5	5	4	3	5	2	5	4
Respondent #8	3	3	3	5	4	3	3	3	3	5
Respondent #9	4	5	5	4	4	5	5	4	5	4
Respondent #10	5	3	4	2	5	2	5	2	5	2
Respondent #11	5	4	5	2	4	3	5	1	5	1
Respondent #12	5	1	5	5	5	1	5	1	5	1
Respondent #13	5	4	4	3	4	1	5	1	4	2
Respondent #14	5	5	5	1	5	1	5	2	5	2
Respondent #15	5	5	5	2	5	1	5	2	5	1
Respondent #16	5	5	5	2	5	2	5	1	5	2
Respondent #17	4	3	4	5	5	2	3	3	3	4
Respondent #18	4	4	3	4	4	3	3	2	3	4
Respondent #19	4	4	5	2	4	2	5	3	5	2
Respondent #20	4	4	3	2	4	2	4	2	3	4
AVERAGE	5	4	5	2	4	3	5	2	5	4

Figure 4-15. Datasets of System Usability Scale

Immediately after completing their respective UAT scenarios, 20 participants (5 DOT admins, 5 LTOs, 10 tourists) completed the 10-item SUS questionnaire on a 5-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). Individual item scores were adjusted and summed, then multiplied by 2.5 to yield a composite usability rating out of 100.

Respondents	SUM OF ODD	FINAL ODD	SUM OF EVEN	FINAL EVEN	FINAL	SUM OF FINAL	SUS SCORE
Respondent #1	16	27.5	11	35	62.5	1355	68.5
Respondent #2	20	37.5	14	27.5	65		
Respondent #3	18	32.5	12	32.5	65		
Respondent #4	23	45	11	35	80		
Respondent #5	20	37.5	19	15	52.5		
Respondent #6	18	32.5	14	27.5	60		
Respondent #7	23	45	16	22.5	67.5		
Respondent #8	16	27.5	17	20	47.5		
Respondent #9	23	45	22	7.5	52.5		
Respondent #10	24	47.5	12	32.5	80		
Respondent #11	24	47.5	11	35	82.5		
Respondent #12	25	50	9	40	90		
Respondent #13	21	40	11	35	75		
Respondent #14	25	50	11	35	85		
Respondent #15	25	50	11	35	85		
Respondent #16	25	50	11	35	85		
Respondent #17	19	30	19	15	45		
Respondent #18	17	30	17	20	50		
Respondent #19	23	45	15	25	70		
Respondent #20	18	32.5	16	22.5	55		

Figure 4-16. Computation of System Usability Scale Result

Figure above shows the scores computed by the researchers using the standard System Usability Scale formula. **Sum of Odd** represents the total of all odd-numbered question scores per respondent. **Sum of Even** represents the total of all even-numbered question scores per respondent. **Final Odd** is calculated by subtracting five from Sum of Odd and multiplying by 2.5. **Final Even** is calculated by subtracting Sum of Even from twenty-five and multiplying by 2.5. **Final** represents the sum of Final Odd and Final Even. **Sum of Final** is the total of all Final scores across the 20 respondents.

Lastly, **SUS Score** is obtained by dividing the Sum of Final by 20, yielding the average usability score on a 0–100 scale.

CHAPTER 5. SUMMARY, CONCLUSION, and RECOMMENDATIONS

5.1 Summary

This research developed and tested the Caraga Tourist Spots Interactive Map Portal to resolve the issues in tourism promotion in the Caraga region. It aimed to determine the systemic development of a digital platform in promoting discoverability of Caraga's attractions and assessed its impact on tourists, local communities, the Department of Tourism (DOT), and the Caraga Region. The process of data collection included developing the interactive map portal and conducting user acceptance testing to measure the portal's ease of use and overall functionality.

Key findings reveal that the Caraga Tourist Spots Interactive Map Portal is a visually-compelling tool which is able to address the problem of lack of awareness of people on the tourist attractions of the region. The findings indicate that by allowing visitors to interact with the portal and observe 360 views of selected tourist spots may improve the tourists' experience and local economy.

The development and evaluation of the Caraga Tourist Spots Interactive Map Portal demonstrates a significant step towards leveraging technology to support the region's tourism sector. The portal offers a modern solution to the challenges of promoting Caraga's unique offerings, aligning with regional development goals focused on ecotourism and sustainable economic growth. By providing

comprehensive information and user-friendly tools, the portal has the potential to attract more tourists, benefit local communities, and support the DOT Caraga Region's promotional efforts.

5.2 Conclusion

Based on the findings, it can be concluded that the Caraga Tourist Spots Interactive Map Portal represents a successful digital solution for showcasing the region's tourist spots and addressing existing promotion challenges. The study confirms that interactive map technology can be effectively applied in a regional tourism context to enhance information accessibility and improve the overall tourist experience. The research provides valuable insights into the development and evaluation of such a system, demonstrating its potential to positively influence tourists, local communities, and tourism authorities in Caraga. In addition, this research emphasizes the need for user-centered design and evaluation in the development of effective digital tourism products. The research provides valuable insights into the development and evaluation of such a system, highlighting its potential to positively impact tourists, local communities, and tourism authorities in Caraga. Furthermore, the study highlights the importance of user-centered design and evaluation in creating effective digital tourism tools.

The results also highlight the portal's capacity to boost tourist visits and generate economic advantages for the Caraga region, in line with the goals of DOT Caraga. Although the study effectively met its aims, it is important to acknowledge

certain limitations, such as potential challenges posed by inadequate internet connectivity in specific areas. These factors should be taken into account when analyzing the findings and making plans for future growth. Continuous efforts to improve accessibility and ensure data accuracy will be vital for ensuring the portal's sustained success.

To sum up, the Caraga Tourist Spots Interactive Map Portal offers strong possibilities to develop tourism across the region. User Acceptance Testing proved the map's usability, relevance, and effectiveness in presenting the cultural and natural attractions of Caraga. The User Acceptance Testing supported the foundations of the project and emphasized the growing notion that digital tools can assist in promoting tourism. The ability to improve and strategize a long-term maintenance plan will be fundamental for the number of visitors to continue to grow.

5.3 Recommendations

The Caraga Tourist Spots Interactive Map Portal has laid a solid foundation for showcasing the region’s diverse attractions, but there are several recommendations that can further enhance its reach, usability, and impact. Future development could focus on:

1. Adoption by Authorities:

   The Department of Tourism (DOT) Caraga Region and local government units should formally integrate the portal into their tourism development plans and promotional campaigns to ensure sustained visibility and support.

2. Further Research:

   Researchers should examine the portal's long-term effects on tourist arrivals, local economies, and sustainable practices. Studies might also explore the use of emerging technologies such as augmented reality or machine learning—to elevate user engagement and platform functionality.

3. Technology Integration:

   Expand current features (real-time navigation via embedded Google Maps and 360° previews powered by Marzipano or Webobook) by incorporating an AI-driven virtual assistant that can answer visitor inquiries, offer personalized recommendations, and guide users through their trip planning.

4. User Experience Improvements:

   Address existing limitations by adding robust filtering, search, and categorization particularly for province-level browsing to streamline navigation and eliminate excessive horizontal scrolling.

5. Infrastructure and Community Engagement:

   Invest in local internet upgrades and digital-literacy initiatives to broaden access. Encourage tourism businesses and community stakeholders to keep their listings current and to actively respond to user feedback, ensuring content remains accurate and engaging.

6. Tourist Participation:

   Motivate visitors to plan their journeys and share firsthand experiences through the portal. User-generated content and reviews will not only enrich the platform but also drive continual system enhancements and raise the profile of lesser-known destinations.

This study contributes to the growing body of work on interactive, map-based tourism tools and demonstrates the potential for digital platforms to promote regional development. By implementing these recommendations, the Caraga Tourist Spots Interactive Map Portal can continue to evolve leveraging the latest technological advances to foster inclusive economic growth, sustainable tourism practices, and wider recognition of Caraga as a vibrant travel destination.

REFERENCES

Bangor, A., Kortum, P. T., & Miller, J. T. (2008). An empirical evaluation of the system usability scale. International Journal of Human–Computer Interaction, 24(6), 574–594. https://doi.org/10.1080/10447310802205776

Backpacking With A Book. (n.d.). Cloud 9 Siargao: Everything You Need to Know. Retrieved from https://backpackingwithabook.com/cloud-9-siargao-everything-you-need-to-know/

Buhalis, D., & Law, R. (2008). Progress in information technology and tourism management: 20 years on and 10 years after the Internet—The state of eTourism research. Tourism Management, 29(4), 609–623. https://doi.org/10.1016/j.tourman.2008.01.008

Butuan's Golden Glory. (n.d.). SunStar. Retrieved from https://www.sunstar.com.ph/more-articles/butuans-golden-glory

Codecademy. (2022). What is User Acceptance Testing (UAT)? Retrieved from https://www.codecademy.com/

Department of Tourism. (n.d.). The Philippines Ultimate Travel Guide for Tourist. Retrieved from http://www.visitmyphilippines.com/index_title_AllabouttheRegion_func_all_pid_2469_tbl_0.html

Department of Tourism. (2025). DOT main portal. https://beta.tourism.gov.ph

Department of Tourism Caraga. (2022). Annual Tourism Report 2021. Department of Tourism Caraga. Retrieved from https://dotr.gov.ph

Deshmukh, A. M., & Chalmeta, R. (2024). Validation of system usability scale as a usability metric to evaluate voice user interfaces. PeerJ Computer Science, 10. https://doi.org/10.7717/PEERJ-CS.1918/SUPP-1

Do you feel like social media has made travel less special in a way? (2024, August). [Online forum post]. Reddit. Retrieved from https://www.reddit.com/r/travel/comments/1f0ggqe/do_you_feel_like_social_media_has_made_travel/

Explore Street View and add your own 360 images to Google Maps. (n.d.). Retrieved May 12, 2024, from https://www.google.com/streetview/

Fabian, N., & Haenlein, M. (2021). Digital transformation: A multidisciplinary reflection and research agenda. Journal of Business Research, 122, 889. https://doi.org/10.1016/j.jbusres.2019.09.022

Filipino Cave Divers. (2013, May 10). A Dive From The Sea and Out To The Lake (Exploring Lake Bababu). Retrieved from https://filipinocavedivers.com/2013/05/10/a-dive-from-the-sea-and-out-to-the-lake/

Get recognized - Local Guides Help. (n.d.). Retrieved May 12, 2024, from https://support.google.com/local-guides/answer/6281793?hl=en

Google Maps' biggest moments over the past 15 years. (n.d.). Retrieved May 12, 2024, from https://blog.google/products/maps/look-back-15-years-mapping-world/

Guide to the Philippines. (n.d.). Information about Britania Group of Islands. Retrieved from https://guidetothephilippines.ph/destinations-and-attractions/britania-group-of-islands

Hinatuan Enchanted River - Wikipedia. (n.d.). Retrieved from https://en.wikipedia.org/wiki/Hinatuan_Enchanted_River

I planned my holidays through TikTok for two years and it was a disaster. (2025, January 16). The Sun. Retrieved from https://www.thesun.co.uk/travel/32830169/planned-holiday-tiktok-attractions-social-media-overrated/

Journey Era. (n.d.). Magpupungko Rock Pools: Siargao's Natural Infinity Pools. Retrieved from https://www.journeyera.com/magpupungko-rock-pools-on-siargao-island/

Journey Era. (n.d.). Sohoton Cove National Park Tour: Caves, Lagoons, Snorkeling. Retrieved from https://www.journeyera.com/sohoton-cove-national-park-lagoon-cave/

Journey Era. (n.d.). Sugba Lagoon in Siargao: The Original Guide. Retrieved from https://www.journeyera.com/sugba-lagoon-siargao/

K.O. the Explorer. (2022, September 29). Exploring PROSPERIDAD: Home of Agusan del Sur's Beautiful Waterfalls. Retrieved from https://kotheexplorer.net/2022/09/29/exploring-prosperidad-home-of-agusan-del-surs-beautiful-waterfalls/

Kling, K. G., & Ioannides, D. (n.d.). Enhancing accessibility in tourism & outdoor recreation: A review of major research themes and a glance at best practice.

Lake Mainit - Wikipedia. (n.d.). Retrieved from https://en.wikipedia.org/wiki/Lake_Mainit

Lewis, J. R. (2018). The system usability scale: Past, present, and future. International Journal of Human–Computer Interaction, 34(7), 577–590. https://doi.org/10.1080/10447318.2018.1455307

Liu, B., Kralj, A., Moyle, B., & Li, Y. (2024). Developing 360-degree stimuli for virtual tourism research: A five-step mixed measures procedure. Information Technology and Tourism, 1–35. https://doi.org/10.1007/S40558-024-00287-Y/METRICS

Lopez, A. (2020). Challenges in Philippine tourism. Journal of Tourism & Hospitality Management, 8(1), 1–12. https://doi.org/10.1234/jthm.2020.001

OpenTripMap - Map service for sightseeing and travel planning. (n.d.). Retrieved May 13, 2024, from https://opentripmap.com/en/#15/14.5954/120.9721

Panoee. (2024). Enhancing user experience with 360° view. Retrieved from https://panoee.com/

Peres, S. C., Pham, T., & Phillips, R. (2013). Validation of the system usability scale (SUS): SUS in the wild. In Proceedings of the Human Factors and Ergonomics Society (pp. 192–196). https://doi.org/10.1177/1541931213571043

Philippines Travel. (2021). Tourism trends in the Philippines: A regional analysis. Retrieved from https://www.philippines.travel

Polishchuk, E., Bujdosó, Z., El Archi, Y., Benbba, B., Zhu, K., & Dávid, L. D. (2023). The theoretical background of virtual reality and its implications for the tourism industry. Sustainability, 15(13), 10534. https://doi.org/10.3390/SU151310534

Province of Agusan del Sur. (n.d.). The Province. Retrieved from https://agusandelsur.gov.ph/the-province-of-agusan-del-sur/

Regional Development Plan. (2023). Caraga Regional Development Plan 2023–2028. Retrieved from https://nro13.neda.gov.ph/wp-content/uploads/2023/08/Caraga-RDP-2023-2028-Communication-Plan.pdf

rtradn.gov.ph. (n.d.). Tourism Activites - RTR. Retrieved from https://rtradn.gov.ph/tourism-activities/

Shoestring Diary. (2019, July 11). Pangabangan Island's Blue Lagoon. Retrieved from https://shoestringdiary.wordpress.com/2019/07/11/pangabangan-islands-blue-lagoon/

Springer. (2024). Exploring the impact of social media on tourists' travel behavior: A. Retrieved from https://link.springer.com/chapter/10.1007/978-3-031-54338-8_20

Stack Overflow. (2017, February 3). 360° degree camera in Webobook. Retrieved from https://stmcomputers.stmjournals.com/index.php/RTPL/article/view/610

TestMonitor. (2017). What is user acceptance testing (UAT) and why do we need it? Retrieved from https://www.testmonitor.com/

Tinuy-an Falls - Wikipedia. (n.d.). Retrieved from https://en.wikipedia.org/wiki/Tinuy-an_Falls

Tourism Journal. (2024). The role of social media in promoting sustainable tourism: Strategies. Retrieved from https://www.tourismjournal.net/article/view/75/5-2-9

Traveloka. (n.d.). A Deep Dive into the Dinagat Island's Hidden Treasure. Retrieved from https://www.traveloka.com/en-ph/explore/destination/a-deep-dive-into-the-dinagat-islands-hidden-treasure/300929

Trip.com. (n.d.). Mount Redondo Natural Bonsai Forest Tickets [2025] - Promos, Prices, Reviews & Opening Hours. Retrieved from https://us.trip.com/travel-guide/attraction/dinagat-islands/mount-redondo-natural-bonsai-forest-61887103/

UNESCO. (2021). Puerto Princesa Subterranean River National Park. Retrieved from https://whc.unesco.org/en/list/652

UNESCO World Heritage Centre. (n.d.). Agusan Marsh Wildlife Sanctuary. Retrieved from https://whc.unesco.org/en/tentativelists/6716/

Ursavaş, Ö. F. (2022). Technology acceptance model: History, theory, and application (pp. 57–91). https://doi.org/10.1007/978-3-031-10846-4_4

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. MIS Quarterly, 27(3), 425–478. https://doi.org/10.2307/30036540

What is User Interface (UI) Design? — updated 2024 | IxDF. (n.d.). Retrieved May 12, 2024, from https://www.interaction-design.org/literature/topics/ui-design

Wikipedia. (n.d.). Agusan image. Retrieved from https://en.wikipedia.org/wiki/Agusan_image

Yoon, J. H., & Choi, C. (2023). Real-time context-aware recommendation system for tourism. Sensors, 23(7), 3679. https://doi.org/10.3390/S23073679

Zhang, Y., Sotiriadis, M., & Shen, S. (2022). Investigating the impact of smart tourism technologies on tourists' experiences. Sustainability, 14(5), 3048. https://doi.org/10.3390/SU14053048/S1

APPENDICES

Appendix A : *UAT Test Cases and Scenarios (DOT Caraga (Administrator)*

Test Case ID	Test Scenario	Expected Outcome	Status
TC-001	Log In/Out	Secure authentication and session termination	Pass
TC-002	Review New Accounts	View pending LTO and Tourist registrations; approval or rejection sends email notification	Pass
TC-003	Review Submitted Destinations	View "Pending Review" list; approval or rejection sends email notification	Pass
TC-004	Approved Entries Appear in Carousel	Newly approved spots immediately appear in the public carousel	Pass

Appendix B : *UAT Test Cases and Scenarios Local Tourism Officers (LTO)*

Test Case ID	Test Scenario	Expected Outcome	Status
TC-005	Registration & Approval Workflow	Account created; notification to await admin approval; receives email with remarks upon decision	Pass
TC-006	Log In/Out	Authenticate post-approval; login/logout	Pass
TC-007	Submit New Place Entry	Entry appears in Admin's "Pending Review" queue	Pass
TC-008	Edit Existing Place Entry	Updates saved; entry returns to "Pending Review"	Pass

Appendix C : *UAT Test Cases and Scenarios General Public (Tourists)*

TC-009	Browse Approved Spots	Carousel displays each approved spot with its image, description, entrance fee, accommodation price range, integrated 360° virtual tour and routing map	Pass
TC-0010	Search & Filter	Search by spot name and filter by province/municipality; correct results displayed	Pass
TC-0011	View 360° Virtual Tour	Launches seamless panoramic viewer	Pass
TC-0012	View Map & Routing	Opens map markers and generates accurate route directions	Pass

Appendix D : *Tourist Attractions in the Caraga Region (Region XIII)*

Agusan del Norte

- Mount Hilong-hilong: The highest peak in the province and habitat to the Philippine EagleDENR, 2018).
- Lake Mainit: The fourth largest lake in the Philippines shared with Surigao del Norte (LMDA, 2020).
- Kalinawan River: A historically significant and culturally rich river system (NEDA, 2022).
- Magellan Landing Marker: Memorial site in Magallanes marking the arrival of Magellan's expedition (NHCP, 2021).
- Bitaog (Bilang) Tree: Declared a Centennial Tree, over 500 years old (DENR, 2019).
- Bood Promontory Eco-Park: Commemorates the first Mass on Philippine soil (NHCP, 2021).
- Pagatpatan Miracle Spring: A methane-rich spring believed to have healing properties (Agusan del Norte Tourism Office, 2021).
- Ancestral Houses & Community Museum: Spanish-era architecture preserved in Cabadbaran (Cabadbaran LGU, 2020).
- Mt. Carmel Viewing Deck: Panoramic views dubbed as the "Show Window of Caraga" (Agusan del Norte Tourism Office, 2021).
- Manlangit Viewing Park: Overlooks Buenavista and Butuan City (Agusan del Norte Tourism Office, 2021).

- Caasinan Beach: Noted for its shoreline and the "Gentle Island" islet (Cabadbaran LGU, 2020).
- Tinago Beach: Coastal resort area with white sand in Buenavista (Agusan del Norte Tourism Office, 2021).
- Vinapor Beach and Turtle Nesting Site: Known for its endangered turtle hatchlings (DENR-Caraga, 2020).
- Tacub Falls: Multi-tier cascade accessible via a 9km upland trail (Agusan del Norte Tourism Office, 2021).
- Sak-a Falls: Three-tiered waterfall in Remedios T. Romualdez (Agusan del Norte Tourism Office, 2021).
- Humilog Cave 1: A deep vertical cave system with unique limestone formations (DENR Mines and Geosciences Bureau \[MGB], 2021).

Agusan del Sur

- Agusan Marsh Wildlife Sanctuary: Ramsar-listed wetland and ASEAN Heritage Park (DENR, 2018).
- Golden Tara (Agusan Image): 21-karat gold artifact dated to the 9th century (National Museum of the Philippines, 2019).
- Bega Falls: Multi-tiered waterfall known for its beauty and ecopark amenities (Agusan del Sur Tourism Office, 2020).
- Tugonan Falls: Features a broad curtain of water with a deep plunge pool (Agusan del Sur Tourism Office, 2020).

- Tiger Falls: A newer scenic waterfall attraction in Prosperidad (Agusan del Sur Tourism Office, 2020).
- Agusan River: Third-longest river in the Philippines (DENR, 2018).

Surigao del Norte

- Cloud 9 Surfing Area: Internationally recognized surf break in Siargao (Department of Tourism \[DOT], 2020).
- Magpupungko Rock Pools: Natural tidal pools visible only during low tide (Siargao Tourism Office, 2021).
- Sugba Lagoon: Known for paddle-boarding, cliff diving, and emerald waters (Del Carmen LGU, 2021).
- Sohoton Cove National Park: Protected area with caves, lagoons, and jellyfish sanctuaries (Protected Area Management Board \[PAMB], 2020).

Surigao del Sur

- Tinuy-an Falls: Often called the "Little Niagara of the Philippines" (Surigao del Sur Tourism Office, 2020).
- Hinatuan Enchanted River: A deep spring-fed river known for its mystic color and legends (Hinatuan LGU, 2020).
- Britania Group of Islands: Cluster of white-sand islets ideal for island hopping (San Agustin LGU, 2020).

Dinagat Islands

- Mount Redondo Natural Bonsai Forest: Stunted forest ecosystem on the island's highest peak (DENR-Caraga, 2019).
- Lake Bababu Underwater Cave: The longest fully submerged cave system in the Philippines (DENR-MGB, 2021).
- Blue Lagoon: Tidal pool on Pangabangan Islet (Dinagat Islands Tourism Office, 2020).
- Pangabangan Island: Popular for snorkeling and vibrant coral reefs (Dinagat Islands Tourism Office, 2020).

Appendix E : *AI Writing Similarity Indicator Result*

turnitin Page 2 of 77 - AI Writing Overview Submission ID trn:oid:::3618:97848157

*% detected as AI

AI detection includes the possibility of false positives. Although some text in this submission is likely AI generated, scores below the 20% threshold are not surfaced because they have a higher likelihood of false positives.

Caution: Review required.

It is essential to understand the limitations of AI detection before making decisions about a student's work. We encourage you to learn more about Turnitin's AI detection capabilities before using the tool.

Disclaimer

Our AI writing assessment is designed to help educators identify text that might be prepared by a generative AI tool. Our AI writing assessment may not always be accurate (it may misidentify writing that is likely AI generated as AI generated and AI paraphrased or likely AI generated and AI paraphrased writing as only AI generated) so it should not be used as the sole basis for adverse actions against a student. It takes further scrutiny and human judgment in conjunction with an organization's application of its specific academic policies to determine whether any academic misconduct has occurred.

Frequently Asked Questions

How should I interpret Turnitin's AI writing percentage and false positives?

The percentage shown in the AI writing report is the amount of qualifying text within the submission that Turnitin's AI writing detection model determines was either likely AI-generated text from a large-language model or likely AI-generated text that was likely revised using an AI-paraphrase tool or word spinner.

False positives (incorrectly flagging human-written text as AI-generated) are a possibility in AI models.

AI detection scores under 20%, which we do not surface in new reports, have a higher likelihood of false positives. To reduce the likelihood of misinterpretation, no score or highlights are attributed and are indicated with an asterisk in the report (*%).

The AI writing percentage should not be the sole basis to determine whether misconduct has occurred. The reviewer/instructor should use the percentage as a means to start a formative conversation with their student and/or use it to examine the submitted assignment in accordance with their school's policies.

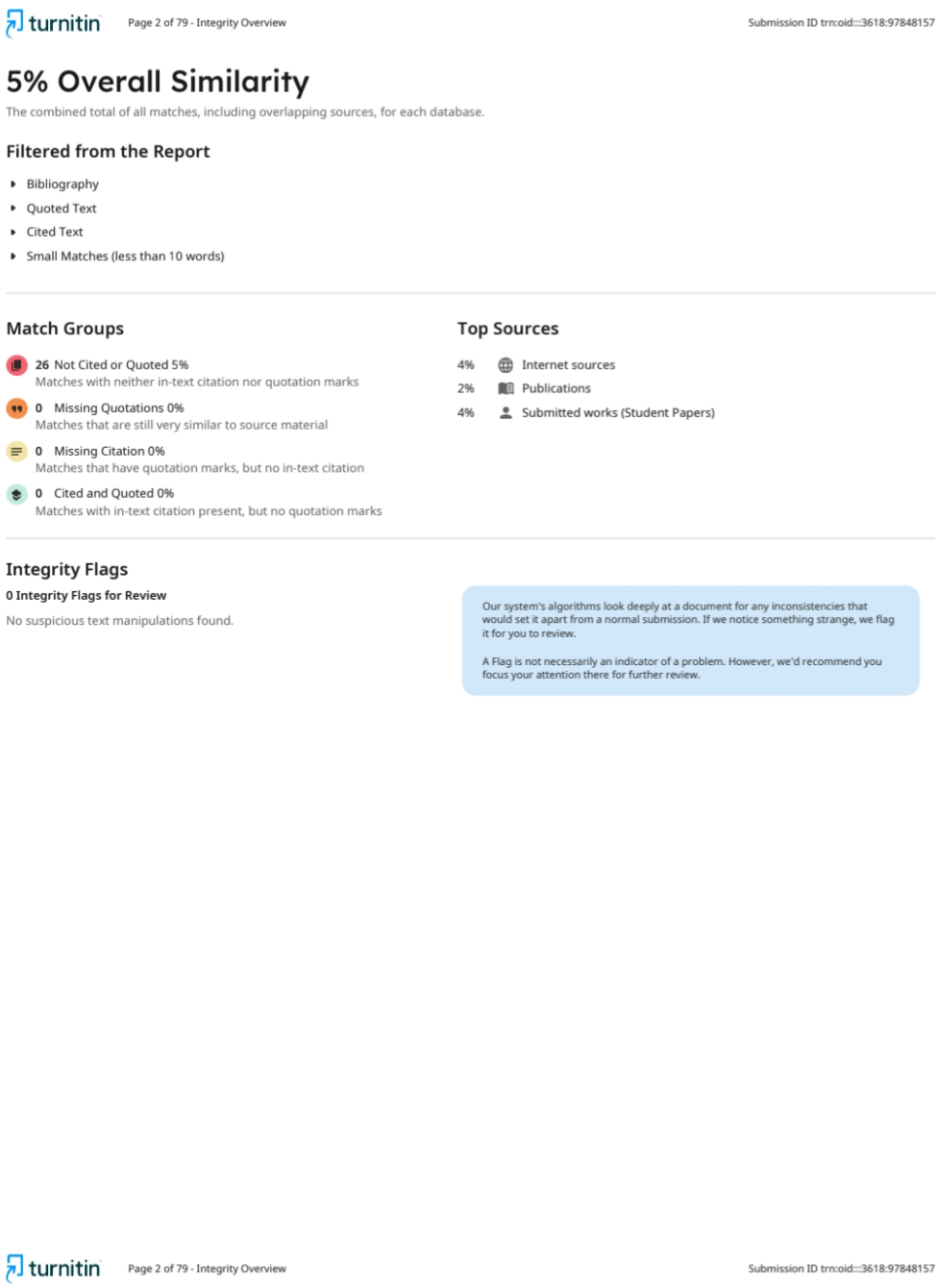
What does 'qualifying text' mean?

Our model only processes qualifying text in the form of long-form writing. Long-form writing means individual sentences contained in paragraphs that make up a longer piece of written work, such as an essay, a dissertation, or an article, etc. Qualifying text that has been determined to be likely AI-generated will be highlighted in cyan in the submission, and likely AI-generated and then likely AI-paraphrased will be highlighted purple.

Non-qualifying text, such as bullet points, annotated bibliographies, etc., will not be processed and can create disparity between the submission highlights and the percentage shown.

turnitin Page 2 of 77 - AI Writing Overview Submission ID trn:oid:::3618:97848157

Appendix F : *Similarity Result*



turnitin Page 2 of 79 - Integrity Overview Submission ID trn:oid:::3618:97848157

5% Overall Similarity

The combined total of all matches, including overlapping sources, for each database.

Filtered from the Report

- Bibliography
- Quoted Text
- Cited Text
- Small Matches (less than 10 words)

Match Groups

26 Not Cited or Quoted 5%
Matches with neither in-text citation nor quotation marks

0 Missing Quotations 0%
Matches that are still very similar to source material

0 Missing Citation 0%
Matches that have quotation marks, but no in-text citation

0 Cited and Quoted 0%
Matches with in-text citation present, but no quotation marks

Top Sources

4% Internet sources
2% Publications
4% Submitted works (Student Papers)

Integrity Flags

0 Integrity Flags for Review

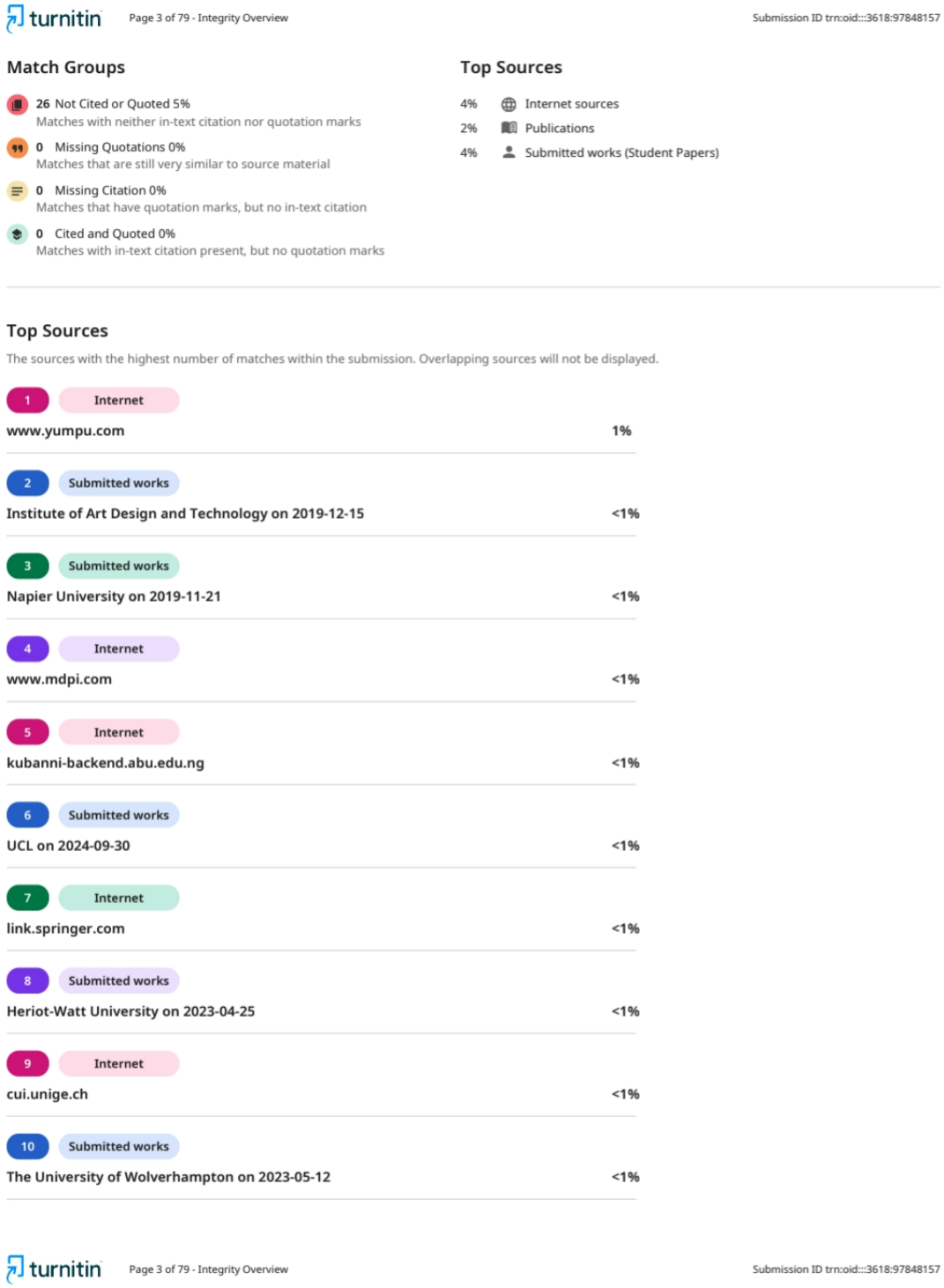
No suspicious text manipulations found.

Our system's algorithms look deeply at a document for any inconsistencies that would set it apart from a normal submission. If we notice something strange, we flag it for you to review.

A Flag is not necessarily an indicator of a problem. However, we'd recommend you focus your attention there for further review.

turnitin Page 2 of 79 - Integrity Overview Submission ID trn:oid:::3618:97848157

Appendix F : *Similarity Result (Cont..)*



turnitin Page 3 of 79 - Integrity Overview Submission ID trn:oid:::3618:97848157

Match Groups

- 26 Not Cited or Quoted 5%
  Matches with neither in-text citation nor quotation marks
- 0 Missing Quotations 0%
  Matches that are still very similar to source material
- 0 Missing Citation 0%
  Matches that have quotation marks, but no in-text citation
- 0 Cited and Quoted 0%
  Matches with in-text citation present, but no quotation marks

Top Sources

- 4% Internet sources
- 2% Publications
- 4% Submitted works (Student Papers)

Top Sources

The sources with the highest number of matches within the submission. Overlapping sources will not be displayed.

1	Internet	
www.yumpu.com		1%
2	Submitted works	
Institute of Art Design and Technology on 2019-12-15		<1%
3	Submitted works	
Napier University on 2019-11-21		<1%
4	Internet	
www.mdpi.com		<1%
5	Internet	
kubanni-backend.abu.edu.ng		<1%
6	Submitted works	
UCL on 2024-09-30		<1%
7	Internet	
link.springer.com		<1%
8	Submitted works	
Heriot-Watt University on 2023-04-25		<1%
9	Internet	
cui.unige.ch		<1%
10	Submitted works	
The University of Wolverhampton on 2023-05-12		<1%

turnitin Page 3 of 79 - Integrity Overview Submission ID trn:oid:::3618:97848157

Appendix F : *Similarity Result (Cont..)*

11	Internet	
www.yellowbrick.co		<1%
12	Internet	
etd.astu.edu.et		<1%
13	Internet	
testsigma.com		<1%
14	Submitted works	
Notre Dame of Marbel University on 2024-05-14		<1%
15	Submitted works	
Swinburne University of Technology on 2022-11-30		<1%
16	Internet	
www.coursehero.com		<1%
17	Internet	
www.cws-i.com		<1%
18	Internet	
www.nuigalway.ie		<1%
19	Submitted works	
De Montfort University on 2024-01-15		<1%
20	Publication	
Jannik Schaaf, Martin Sedlmayr, Brita Sedlmayr, Hans-Ulrich Prokosch, Holger Sto...		<1%
21	Internet	
cdn.inst-fs-dub-prod.inscloudgate.net		<1%
22	Internet	
repository.up.ac.za:8080		<1%
23	Internet	
www.ncbi.nlm.nih.gov		<1%
24	Internet	
www.zhb.uni-luebeck.de		<1%

BIONOTE

CRISTIAN JAY T. BUQUIS, a 22-year-old student currently pursuing a Bachelor of Science in Information Systems at Caraga State University - Main Campus. Born and a resident of Buenavista, Agusan del Norte, Cristian is deeply committed to his academic journey, focusing on the dynamic and evolving field of information systems. His pursuit of this degree reflects a keen interest in leveraging technology to solve real-world problems and improve organizational efficiency.

Throughout his studies, Cristian has actively developed a foundation in various aspects of information systems, including database management, network administration, and systems analysis. As an aspiring Full-Stack Developer, he possesses hands-on experience in modern web technologies such as Vue.js, React, Node.js, Strapi, and Laravel. This blend of technical depth, business understanding, and applied practice equips him for a dynamic career at the intersection of technology and management.

For further inquiries or collaboration opportunities, the author of this research paper can be reached through his email at cristianjay.buquis@carsu.edu.ph

RODELIZA O. BURDEOS a 24 years old and a resident of Ong Yiu, Butuan City. She is a 4th-year college student pursuing a Bachelor of Science in Information Systems at Caraga State University – Ampayon Main Campus. She has foundational knowledge in front-end technologies such as HTML, CSS, and Vue.js, as well as experience with the Laravel and Strapi back-end framework. As the youngest child in her family, she is driven by a strong sense of responsibility and a desire to support and uplift her loved ones.

Recently, she completed her On-the-Job Training (OJT) at the General Services Office of Caraga State University, rendering 486 hours over the course of 61 days. During her internship, she contributed to the development of a system for managing weekly reports and monitoring projects, applying her technical skills in a real-world setting and gaining meaningful hands-on experience. For further inquiries regarding this research, she can be reached at rodeliza.burdeos@carsu.edu.ph

LOWIE VINCENT A. CANONIGO is 24 years old and a resident of Barangay Maug, Agusan Del Sur. He is a 4th year college pursuing Bachelor of Science in Information Systems here at Caraga State University Ampayon Main Campus. His academic interests include frontend development and backend development. He is the youngest child of Freda and Erlocel Canonigo. Persevering through the hardships of life, determined in achieving goals to help his family. As part of his academic journey, he recently completed his On-the-Job Training (OJT)at the General Services Office of Caraga State University, where he rendered 486 hours over a span of 61 days. During his internship, he significantly contributed to the development of a Project Monitoring System within the office. This hands-on experience allowed him to apply his technical skills in a real-world environment and gain valuable insights into system development. For Further inquiries for this research or collaboration opportunities, he can be reached through his email address lowievincent.canonigo@carsu.edu.ph