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Exploring The Power Of Virtual Reality Technology And Image Processing In Tourism: The Architecture Of Quirino Laquatsa



Abstract: - Tourism industry have experienced major income losses and a spike in unemployment due to the pandemic. The need for technology have arisen to be able to help cope with challenges of the tourism industry of both cities and provinces. Technological advancements drive private and public sectors to adapt, with virtual reality gaining rapid popularity in tourist-oriented cities. Quirino province, the smallest in its region, requires recognition on social media and technology to advance its tourism industry. The province has to cope up with what the technology has to offer to its tourism management.

The study's main goal is to create a virtual tourism architecture as close as possible to a particular place or tourist destination in the province. This may be used in the development of the Quirino Laquatsa and give visitors a taste of what is expected of the place or tourist site has to offer. This study used the Design Thinking Methodology mixed with Feature Driven Development. The data collection was done through the empathy phase.

The proposed system architecture design promotes the development of a virtual tourism with the aid of virtual reality. It can help address the problems and issues in the tourism management of the province. This can eventually lead into the development of a web-based virtual tourism site to become a medium for sustainable tourism development.

Keywords: virtual tourism, virtual reality, tourism management.

I. BACKGROUND

Technology have revolutionized our way of life having a significant impact on the tourist industry, leading to the formation of new market sectors by ticking one button away may now take one person anywhere in the globe with the utilization of the internet, which has emerged as a major medium. In addition to the current changes of how we travel now, the recent worldwide epidemic brought on by the Covid-19 has also brought to light the crucial role that virtual tourism and gamified virtual experiences play. ^[11]

To enable users to fully immerse themselves in the environment and actualize the interaction between users and the environment, virtual reality technology creates a computer simulation environment and employs pertinent supporting facilities. ^[1] Virtual reality (VR) technology is a collection of multimedia, artificial intelligence (AI), network, computer graphics, and other technologies in the most recent technological advancements. ^[12] VR can make people accurately investigate or operate objects in the virtual world. This technology will significantly impact tourism growth.

The foundation of virtual tourism is actual tourism landscape and creating a virtual tourism environment by creating an artificial or surreal landscape, tourists can engage in virtual tourist activities as though they on the exact the same spot. ^[9]

Tourism invites visitors from outside a region or culture to go there and maybe experience it. This helps a province become more well-known outside of its borders, which is beneficial for the preservation of culture and legacy. When tourism is done well, it may give a culture a deep-seated visibility. It is true that tourism can help preserve a culture through the appreciation of others. A province's infrastructure is developed, its revenue is increased, and a sense of cultural interaction between locals and visitors because of tourism. ^[6]

The Quirino province was divided from Nueva Vizcaya in 1966 and has a population of 147,100, with a 2.50% yearly growth rate. It is in Region 02's southernmost province and is abundant in culture and natural resources. These natural resources are caves, falls, flower farms, rivers and virgin forests which assures venues in communicating with nature and sanctuary of nature lovers. There are few of the most observable problems in the tourism of the province and one is the limited numbers of tourist arrival. Another is lack of equipment for recreational activities in ecotourism sites and lack of parking areas. The lack of qualified tour guides were also included in the challenges as well as lack of equipment for search and rescue. ^[3]

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With the rich culture and natural resources that Quirino province has to offer, it requires the administration of tasks including researching the tour destination, organizing the trip, arranging transportation, and providing lodging. To entice tourists to visit specific locations, marketing initiatives are also required. With this, the architecture for virtual tourism was proposed.

The study aims to design an architecture to explore virtual reality in tourism to help preserve and promote tourism industry thus, the system architecture of Quirino Laquatsa is proposed. It specifically seeks to determine the challenges and issues involved in the tourism industry of Quirino Province in terms of preservation and promotion and design an architecture to address the challenges and issues in the promotion and preservation of the tourism industry of the province.

II. METHODOLOGY

This study employed both Design Thinking Methodology (DTM) and Feature Driven Development (FDD).

A. Design Thinking Methodology

DTM was used to identify the problems involved in the province's tourism industry. There are five steps in DTM but only four were used in this study considering the prototype stage as the connection with the FDD. Empathy is the first phase which involves stepping oneself into the users' shoe to build relationship, to understand the users and to study what exactly they need. Second phase is Define which describes the user's problems where the researchers formulated the problem statement called the Point of View. Third phase is Ideate which involves brainstorming to generate ideas and explore solutions to address the problems and issues defined. And fourth is Prototype connected in the FDD to design an architecture from the results of ideation.

B. Feature Driven Development

From the Prototype phase of DTM, the FDD started. The first phase as the fifth phase of the study, Develop the Overall Model, is where the outline of the domain model was done from the results of the Prototype phase of DTM. The second, Build features list, is where the significant features that are important to the target users are considered and are expressed as action, result and object. This study employed both Design Thinking Methodology (DTM) and Feature Driven Development (FDD) as shown in Figure 1.

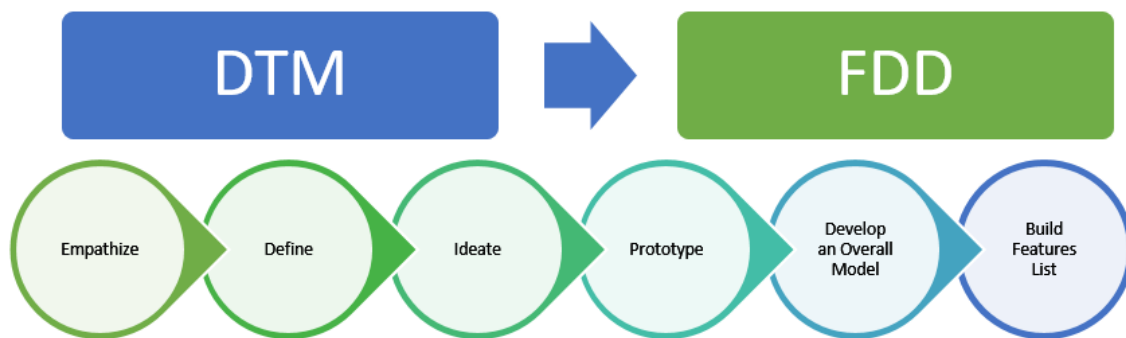


Figure 1. The Methodology of the Quirino Laquatsa Architecture

III. RESULTS AND DISCUSSIONS

A. Empathy

During the empathy phase, the researchers local tourists and asked to determine what the users really need in the tourism management of the province. It is during this phase that data collection was done. Figure 2 presents the empathy mapping and Figure 3 shows the needs and insights of a tourist.

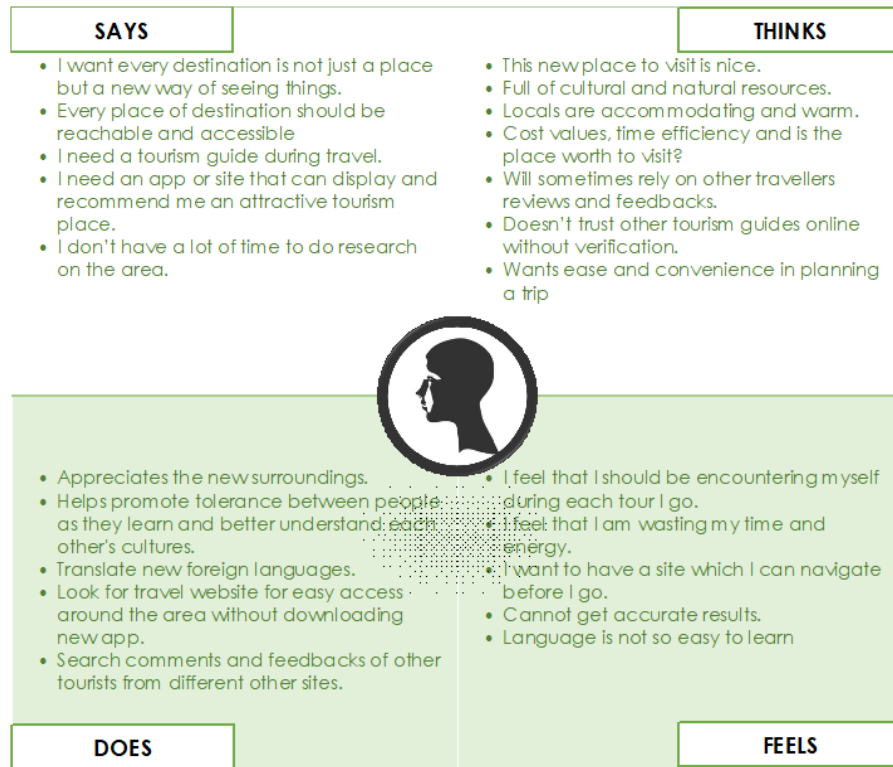


Figure 2. The Empathy Map of Tourists

Needs	Insights
<ul style="list-style-type: none"> A hassle-free and trustworthy information source. Must locate the most dependable choice without taking too much time. Desires to believe that the trip was worthwhile. Desires an online search experience that allows for simple navigation and region exploration. Information integrity is provided via the review feature. 	<ul style="list-style-type: none"> Useful data to make the user's life easier. Reduce the amount of time needed to plan a trip with more concise, relevant output that encourages consumer search and is jargon-free. Increase user trust by offering clear, succinct comments and reviews. Access to the app with any supported browser.

Figure 3. The Needs and Insights of a Tourist

B. Define

The design thinking process was the crucial step in defining the problem statement that the researchers have concentrated on addressing. From the empathy map and the needs and insights of the tourists, the problem statement derived was: **What are the specific needs to boost and preserve the tourism industry of Quirino Province and to preserve its culture?**

C. Ideate

During the ideate process, the problem statement was answered and has given ideas that might provide solutions to the problem. It was then realized that the province required a website with user registration and login options using usernames and passwords. Another requirement to draw in more tourists is a map showing all the province's many tourist attractions. Another need to make every location and destination accessible and attainable is a province-wide travel website. Another need is a website listing the main tourist destinations in the province. By doing so, it will be ensured that the suggested travel website provides accurate and trustworthy information.

D. System Architecture

Using ICT-based solutions, smart tourist destinations make it easier for travelers to access travel and hospitality-related goods, services, and experiences.

To provide a clearer picture of what is expected of the proposed research, Quirino Laquatsa's proposed architecture was developed. The suggested architecture has four basic characters: the modules, the primary functional interface, the website, and the users, who are typically tourists, either local or foreign.

The modules include virtual scenic locations, an electronic map of the entire province, a scenic plan, the URL of the upcoming website, and other details pertaining to virtual tourism. These are routed to the main functional interface as the panoramic picture interface after being processed and saved in the server. The website will then present this as the virtual reality tourist program, known in this study as Quirino Laquatsa. Then, users or visitors can browse the website on any internet-connected device, including smartphones, laptops, personal computers, etc.

With the help of the proposed architecture as shown in Figure 4, the researcher may be able to derive from there the design and development of the proposed Quirino Laquatsa. The proposed structure gives viewers a full immersion of a task, place, or destination through technology. To give people a sense of a location they can't obtain from merely looking at images or visiting websites, virtual tourism services frequently blend virtual reality, still photography, video, music, story, interactivity, and other multimedia components.

Although users can often see the content on an ordinary computer or even a mobile device, viewers can obtain virtual tourism information using a virtual reality headset for the most realistic experience.

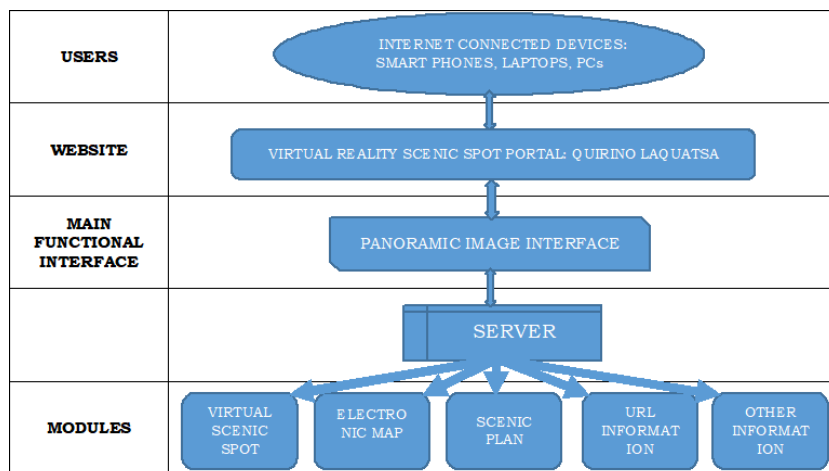


Figure 4. The Proposed Architecture of Quirino Laquatsa

a. Prototype

From the ideation phase, a sample prototype was designed based from the deliverables needed. Some of the required prototypes were designed below.

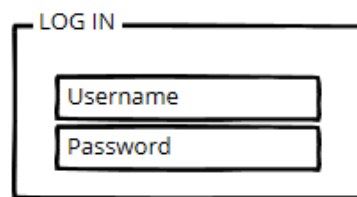


Figure 5. Log in form

Figure 5 is the Log in form which allows the user to log-in to his own account. This allows the users to create and manage their own account.

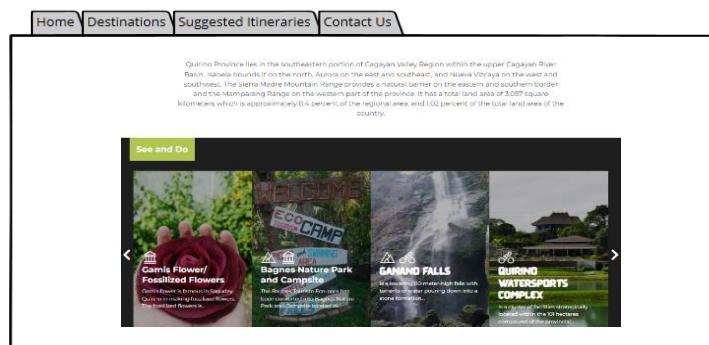


Figure 6. Home Page

Figure 6 is the home screen which presents a little bit of history and some of the tourists spots that can be found around the province.



Figure 7. Destination Page

The destination page as shown in Figure 7, shows the several destinations that can be found in the place. Selecting every picture shall direct you to the destinations it displays.

IV. CONCLUSION

Wherever and whenever the impacts are, virtual reality in tourism is a strong aid in the preservation and promotion of the tourism industry. By allowing people to view the location before making a reservation, the proposed project may contribute by drawing more tourists. It may provide high-resolution, realistic 360-degree images of any location. Travelers may be captivated with virtual reality because it enables them to independently explore locations from the comfort of their homes. By providing distinctive brand engagement, the project may enhance brand perception. By providing distinctive, unforgettable experiences, the province of Quirino is anticipated to obtain a competitive edge; aiding travelers from all over the world feel more at ease utilizing VR to discover tourist places.

Virtual tourism has extremely low environmental effect, which is one of the benefits of the proposed project. Travel life generates significant emissions, which are naturally reduced when tourists doesn't really travel. By traveling virtually using the proposed project, it may reduce CO2 emissions, waste, wear and tear on plants and animals, and damage of the environment's natural ecosystem and biodiversity.

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