Design of a web platform for registering tourist locations in San Martín Texmelucan using augmented reality

Diseño de plataforma web para el registro de lugares turísticos de San Martín Texmelucan utilizando realidad aumentada

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Abstract

This project aims to create an online tool that allows users to register, explore, and promote tourist destinations in San Martín Texmelucan using augmented reality technology, enabling visitors to fall in love with and appreciate the greatness of each place. The web platform seeks to boost tourism in the area, enhance the tourist experience, and promote the local economy by attracting more tourists and highlighting local tourist destinations. Additionally, the platform aims to provide detailed and enriched information about registered tourist spots, including photos, videos, descriptions, and user reviews, so that visitors can make informed decisions and have a more enriching experience. With this initiative, the goal is to promote tourism in San Martín Texmelucan and provide a useful and engaging tool for tourists, as well as for entrepreneurs and businesses in the local tourism sector.

Platform, Tourist, Texmelucan

Resumen

Este proyecto tiene como objetivo crear una herramienta en línea que permita a los usuarios registrar, explorar y promover los lugares turísticos de San Martín Texmelucan mediante el uso de tecnología de realidad aumentada, que permitan que el visitante pueda enamorarse y ver lo grandioso que es cada lugar. La plataforma web busca fomentar el turismo en la zona, mejorar la experiencia turística de los visitantes y promover la economía local al atraer a más turistas y promover los lugares turísticos locales. Además, la plataforma tiene como objetivo proporcionar información detallada y enriquecida sobre los lugares turísticos registrados, incluyendo fotos, videos, descripciones y comentarios de otros usuarios, para que los visitantes puedan tomar decisiones informadas y tener una experiencia más enriquecedora. Con esta iniciativa, se busca promover el turismo en San Martín Texmelucan y brindar una herramienta útil y atractiva para los turistas, así como para los empresarios y las empresas relacionadas con el sector turístico en la región.

Plataforma, Turísticos, Texmelucan

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Introduction

The web platform for the registration of tourist sites in San Martin Texmelucan using augmented reality addresses several issues. Some of them are the following:

Lack of visibility of tourist sites: many tourist sites in San Martin Texmelucan may be unknown to tourists due to lack of advertising and promotion. A web platform that includes an augmented reality feature could make these sites more visible and accessible to tourists, which would increase the number of visitors and tourism in the area.

Incomplete or inaccurate information: In many cases, tourists may have difficulty finding accurate and complete information about tourist sites in San Martin Texmelucan. A web platform that allows users to upload detailed and accurate information about tourist sites, including images and augmented reality videos, could help solve this problem.

Lack of interaction: Tourists often seek interactive and memorable experiences. A web platform that allows users to interact with tourist sites in San Martin Texmelucan through augmented reality could provide a more enriching and engaging experience for visitors.
The web platform for the registration of tourist sites in San Martin Texmelucan using augmented reality is based on several relevant theoretical aspects, including:

User experience: user experience is a key aspect in tourism and technology. According to Zhang *et al.* (2019), user experience refers to an individual's subjective perception of a product or service. In the context of tourism, user experience refers to the quality of the tourism experience offered to visitors. Augmented reality can enhance the user experience by providing interactive and enriching information about tourist sites.

Augmented reality technology: Augmented reality technology allows virtual elements to be superimposed on the real world, which can enhance the user experience and provide detailed and enriching information about tourist sites. According to Azuma (1997), augmented reality has three key characteristics: it combines virtual elements with the real world, it is interactive in real time, and it is recorded in 3D.

Web platforms: Web platforms can be used to provide detailed and accurate information about tourist sites, facilitate travel planning and booking, and collect information about tourists and their preferences. According to Buhalis and Law (2008), web platforms can be used to improve customer satisfaction, efficiency and service quality, and reduce costs.

Methodology to be developed

Analysis of the current situation

Before starting the development of the web platform, it is necessary to analyze the current situation of tourism in San Martin Texmelucan, identifying the main tourist attractions of the region, the strengths and weaknesses of the current tourist offer, and the opportunities and threats of the environment.

Definition of requirements

The functional and non-functional requirements of the web platform should be defined, including the functionality of the augmented reality application, the database of tourist sites, the web interface, security and privacy measures, and other relevant aspects.

Prototype design

In this phase, low-fidelity interfaces are designed in order to make the idea known to the user so that he/she can provide feedback on the proposal.

Architectural design

The architecture of the web platform must be designed, defining the components and modules necessary for the operation of the augmented reality application and the web interface, and establishing the interactions between them.

Prototype development

Prototypes of the augmented reality application and web interface can be developed to evaluate their functionality and usability, and adjustments and improvements can be made if necessary.

Implementation and testing

Once the requirements have been defined, the architecture has been designed and the prototypes have been developed, the web platform can be implemented and tested to ensure that it meets the defined requirements and functions correctly.

Evaluation of results

Finally, an evaluation of the results obtained should be carried out, including the usability of the web platform, user satisfaction, impact on local tourism, and other relevant aspects. Based on this evaluation, adjustments and improvements can be made to the web platform to optimize its performance and improve its results.

For this article, the first three phases will be presented: Analysis of the current situation, Definition of the requirements, and Design of the prototype.

Step 1: Analysis of the current situation

Main Tourist Attractions of the Region:

–   *Colonial Architecture:* San Martin Texmelucan has a rich colonial architectural heritage that includes churches, old houses and historic buildings that attract history and architecture lovers.

–   *Gastronomy:* The region is known for its delicious food, with traditional Mexican dishes and local specialties that attract food lovers.

–   *Festivals and Traditions:* San Martin Texmelucan celebrates several festivities and traditions throughout the year, such as the Sphere Fair, which attracts visitors interested in local culture.

–   *Nature and Landscapes:* The surrounding area offers beautiful rural landscapes, including agricultural fields and mountains, which are ideal for ecotourism and outdoor activities.

Strengths of the Current Tourism Offering:

–   *Cultural Heritage:* The preservation of the region's cultural and architectural heritage is a strength that attracts those interested in history and culture.

–   *Gastronomy*: Local food is an attraction in itself and can serve as a focal point for gastronomic tourism.

–   *Diversity of Offer:* San Martin Texmelucan offers a wide range of activities, from cultural tourism to nature tourism.

Weaknesses of the Current Tourism Supply:

–   *Limited Infrastructure*: There may be limitations in tourism infrastructure, including lodging and transportation.

–   *Insufficient Promotion*: The region may not be adequately promoting itself nationally and internationally to attract a greater number of tourists.

–   *Regional Competition*: San Martin Texmelucan competes with other cities and tourist regions in Mexico, which may make it difficult to attract visitors.

Step 2 Definition of requirements

Functional requirements are presented in Table 1.

Key	Name	Description
RF001	Registry of Tourist Places:	Users should be able to register new tourist sites on the platform, providing detailed information about the site, such as name, location, description, photos and videos.
RF002	Site Exploration	Visitors should be able to explore registered tourist sites using augmented reality technology. This may include overlaying relevant information in real time, such as names and descriptions, when using the camera of a mobile device.

RF003	Search and Filters	Users should be able to search for tourist sites by name, location, or category, and apply filters to refine results.
RF004	Comments and Qualifications	Users should be able to leave comments and ratings for the tourist sites they have visited, providing useful feedback for other travelers.
RF005	User Profile	Each user should have a profile where they can manage their registered tourist sites, save their favorite places and view their past activities.
RF005	Map Integration	The platform should integrate interactive maps that allow users to easily locate tourist sites.

Table 1 functional requirements

The pseudo requirements are shown in Table 2.

Key	Name	Description
SP001	Performance	The platform must be fast and efficient, ensuring minimal loading times and a smooth user experience.
SP002	Security	Security measures must be implemented to protect user information and ensure data integrity.
SP003	Scalability	The platform must be able to handle an increase in the number of registered users and tourist sites as its popularity grows.
SP004	Usability	The user interface should be intuitive and easy to use, even for people unfamiliar with augmented reality.
SP005	Compatibility	The platform must be compatible with a variety of devices and web browsers, including smartphones, tablets, and desktop computers.
SP006	Availability:	The platform must be available 24 hours a day, 7 days a week, with a minimum planned downtime for maintenance.

Table 2 non-functional requirements

Step 3: Prototype design

For this phase the balsamiq software was used for the first proposal presented below, in figure 1 the initial screen of the system, where the visitor can see in a carousel of images the tourist sites presented randomly, as well as the menu to be able to search for places.

Figure 1 Main screen

To register tourist sites, access will only be possible through an e-mail account and a password, where only the administrator will allow access, and will be limited to the cultural councilors of each locality and the owners of the tourist centers (see figure 2).

Figure 2 login

When registering a tourist site, you must add its name, complete address, attach it to a category, register contact information, opening hours, if discounts are applied and what type of discounts, costs, days of service. (See figure 3).
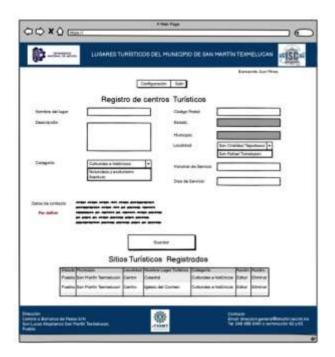
Figure 3 Tourist site registration

Once the places have been registered, visitors can search by municipality and category, as shown in Figure 4 below.

Figure 4 Site filtering

Once the filter has been made, two photographs of the place, its general data, a map with the location, and a qr code will be displayed, which can be scanned to visualize the place using augmented reality (see figure 5).

Figure 5 Search results

In addition, with the option to leave comments and rate the place once visited, which will provide a better user experience.

Results

So far, significant progress has been made in the development of the web platform project for the registration of tourist sites in San Martín Texmelucan using augmented reality. The first design of the interfaces has been completed, and these designs have been shared with the cultural councillors of the municipality to receive their valuable feedback and suggestions. This collaboration with local stakeholders is essential to ensure that the platform is relevant and beneficial to the community.

In addition, work is currently underway on the implementation of augmented reality with the creation of the first prototype, which covers two prominent tourist sites: the Parish of San Martin Texmelucan and the Hacienda de San Cristobal Polaxtla. These prototypes provide a practical demonstration of how augmented reality technology can enhance the tourist experience at these iconic sites.

The next important step is to present the proposal to the owners and managers of various tourist sites in the municipality of San Martin Texmelucan. This will not only provide an opportunity to explain the benefits and potential of the platform, but also to establish important collaborations with the owners of these sites, thus enriching the tourism offer of the region.

Conclusions

The project is moving forward in a solid and collaborative manner, with a focus on technological innovation and local community participation. The impact is positive for tourism in San Martin Texmelucan and continues towards its successful implementation.

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