iJRASET
International Journal For Research in Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 11 **Issue:** XI **Month of publication:** November 2023

DOI: https://doi.org/10.22214/ijraset.2023.56497

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International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.538
Volume 11 Issue XI Nov 2023- Available at www.ijraset.com

Tourist Guide with Augmented Reality

Prof. P. A Tamgave[1], Mr. Ajay Dhokale[2], Mr. Kirtikumar Birnale[3], Ms. Anuradha Lohar[4], Ms. Sakshi Kore[5]
Dept of Information Technology, Dr. J. J. Magdum College of Engineering

Abstract: ***This study aims to examine the use of the application in tourism field on the question of what augmented reality applications mean, which is one of the endpoints of technology for tourism. With the study of in-depth literature, firstly augmented reality has been determined, and the changes and developments it has undergone throughout the history have been examined. Then, its areas of use and the types have been examined. Today, it is thought that the augmented reality, being the newest dimension of technology and seems it is almost impossible not to use in the area of tourism will provide a huge amount of marketing convenience and competitive advantages. In this article, twelve case studies on the application used in many fields of tourism such as transportation, accommodation, food & beverage and museums, have been analysed.***
Keywords: Tourism; Tourist; Augmented reality.

I. INTRODUCTION

Augmented Reality is a complex field utilizing information technologies in diverse areas such as medicine, education, architecture, industry, tourism and others by augmenting the real-time real-world view with additional superimposed information in chosen formats. The aim of this paper is to present an overview of application aspects of using augmented reality technologies in tourism domain technology. This technology is revolutionizing the traveler's experience by making the journey more seamless, interactive, and simple. Thus, enhancing the tourist experience throughout the process. Augmented reality is an interactive experience of a real-world environment where the objects that reside in the real world are enhanced. The use of augmented reality technology within the travel industry is still a relatively recent development and, as a result, new uses are emerging all the time.

Augmented Reality focuses in enhancing physically-based reality perception through computer-generated sensory output. Augmented Realty: Is a visualization technique that superimposes computer generated data, such as text, video, graphics, GPS data and other multimedia formats, on top of the real- world view, as captured from the camera of a computer, a mobile phone or other devices. In an age where technology continues to reshape our world, augmented reality (AR) has emerged as a game-changer in the tourism industry. Augmented reality, a blend of digital information and the real world, is transforming the way we explore and experience new destinations. This innovative technology has opened up a realm of possibilities for tourists, enhancing their interactions with the places they visit. In this 21st-century tourist guide, we will delve into the fascinating world of augmented reality, exploring how it is revolutionizing the way we travel, discover, and immerse ourselves in diverse cultures and landscapes.

Augmented reality enriches the traditional travel experience by overlaying digital content onto the physical environment. It empowers tourists with information, context, and interactivity, thus bridging the gap between the unfamiliar and the known. Imagine strolling through a historic city, and through your AR-equipped smartphone or smart glasses, you instantly receive historical facts, restaurant recommendations, and even translations for local signs and menus. Augmented reality empowers tourists to be more informed and connected to their surroundings, creating a deeper and more meaningful travel experience.

II. RELEVANCE OF WORK

Augmented Reality (AR) tourist guides have gained significant relevance in the tourism industry due to their ability to enhance the overall travel experience for tourists. Here are some key points highlighting the relevance of AR tourist guides:

1) *Enhanced Engagement:* AR tourist guides provide an interactive and immersive way for tourists to engage with their surroundings. By overlaying digital information on the real world, tourists can access historical facts, cultural insights, and other relevant information, making their visit more engaging and memorable.
2) *Personalized Experiences:* AR tourist guides can be tailored to individual preferences, allowing tourists to explore destinations based on their interests. Whether it's history, art, cuisine, or adventure, AR can provide customized recommendations and content.
3) *Real-time Information:* AR tourist guides can offer real-time updates and information about local events, weather conditions, traffic, and emergency alerts. This real-time data ensures that tourists have the most up-to-date information to plan their activities.

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4) *Language Translation:* AR can provide instant language translation, breaking down language barriers for tourists who may not be fluent in the local language. This feature enhances communication and the overall travel experience.
5) *Navigation and Wayfinding:* AR can offer GPS-based navigation, guiding tourists to their chosen destinations while providing additional information about landmarks along the way. This feature is particularly useful for exploring unfamiliar cities or remote locations.
6) *Education and Learning:* AR tourist guides can serve as educational tools, providing tourists with educational content about the destination's geography, culture, and ecology. This makes tourism a more enriching experience.
7) *Accessibility:* AR can improve accessibility for tourists with disabilities. It can offer audio descriptions, tactile feedback, and other features to ensure that all tourists can enjoy their visit.
8) *Data Collection and Analytics:* For tourism businesses and local authorities, AR tourist guides offer valuable data collection opportunities. Analyzing user interactions can help destinations better understand tourist behavior and preferences, facilitating improved marketing and infrastructure development.
9) *Competitive Advantage:* Businesses in the tourism sector can gain a competitive edge by adopting AR technology. Offering an innovative and immersive AR tourist guide can attract tech-savvy travelers and differentiate a destination or service from competitors.
10) *Sustainability:* By providing tourists with digital guides, destinations can reduce the use of paper maps and brochures, contributing to sustainability efforts by minimizing waste.

III. LITERATURE REVIEW

Tay C, Dominic B, Ho H, Annuar N and Saferinor N. (2023). Gamified Augmented Reality Mobile Application for Tourism in Kuching. It is defined as an application that "supplements the real world with computer generated virtual objects that appear to coexist in the same space as the real world. Proceedings of the 9th International Conference on Computational Science and Technology. 10.1007/978-981-19-8406-8_27. (355-366).

Agudo D, Paredes C, Parra O and Granda M. (2022). A Methodology to Develop Extended Reality Applications for Exhibition Spaces in Museums 2022 XXVIII International Conference on Information, Communication and Automation Technologies (ICAT). The augmentation part is divided into a tracking module and a rendering module. As a principal one, the tracking module localizes the camera relative to target scenes using the planar-based visual tracking method that is simple and robust. In this subsection, we explain how the tracking works in detail. 10.1109/ICAT54566.2022.9811205. 978-1-6654-6692-9.

Barreto-Paredes C, Agudo D, Granda M and Parra O. (2022). Evaluating Extended Reality Application for a Virtual Museum. Case Study: Remigio Crespo Museum 2022 Third International Conference on Information Systems and Software Technologies (ICI2ST). AR applications were still not well known nor used by the general public. Thanks to the flash heat of 'Pokémon Go' AR game in 2016, awareness spread and the public was suddenly keen to use AR applications, triggering researchers to explore this unique and innovative technique 10.1109/ICI2ST57350.2022.00015.

IV. PROPOSE SYSTEM

Designing a proposed system for an Augmented Reality (AR) tourist guide involves several components and considerations. Below is an outline of a potential system:

A. Mobile Application

- Develop a mobile application compatible with smartphones or AR glasses (e.g., AR headsets).
- Ensure cross-platform support (iOS, Android) for wider accessibility.
- Optimize the application for performance and user experience.

B. GPS and Location Services

- Integrate GPS and location services to accurately track the user's position.
- Implement geofencing to trigger AR content when users approach specific landmarks or areas of interest.

C. Content Management System (CMS)

- Create a CMS to manage and update AR content, including text, images, videos, audio.
- Allow authorized administrators to add, edit, or delete content in real-time.

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D. Augmented Reality Technology
- Utilize AR frameworks and SDKs like ARKit, ARCore, or open-source solutions like AR.js.
- Develop marker-based and markerless AR experiences to recognize and augment objects and locations.

E. User Profile and Preferences
- Implement user profiles where tourists can set preferences and interests.
- Personalize AR content recommendations based on user profiles.
- Offer offline navigation capabilities for areas with limited connectivity.

F. Historical and Cultural Context
- Curate historical and cultural information about landmarks and tourist attractions.
- Overlay this information seamlessly when users point their device or gaze at a specific location.

G. Accessibility Features
- Ensure accessibility features such as screen readers, voice commands, and tactile feedback for users with disabilities.

H. Marketing and Promotion
- Develop a marketing strategy to promote the AR tourist guide application, partnering with tourism boards, travel agencies, and hotels.

I. Scalability
- Design the system architecture to accommodate scalability as the user base grows.

J. User Training and Support
- Provide user guides and customer support to assist tourists in using the AR guide effectively.

K. Sustainability Considerations
- Promote environmental sustainability by reducing the need for physical brochures and maps.

V. OBJECTIVE

1) Develop a user-friendly augmented reality app for tourists.
2) Incorporate geolocation services to enable real-time tracking of the user's position to offer location-based information.
3) Create an extensive library of augmented reality content, including 3D models, images, videos, and text overlays.
4) Offer multi-language support, voice-guided navigation and text-to-speech.

VI. PROPOSED METHODOLOGY

Developing an Augmented Reality (AR) tourist guide involves a structured methodology to ensure the successful creation and deployment of the system. Here is a typical methodology for creating an AR tourist guide:

1) Define Project Objectives
- Clearly outline the goals and objectives of the AR tourist guide project. What is the main purpose of the guide? Who is the target audience?

2) Market Research and Feasibility Study
- Conduct market research to understand the demand for AR tourist guides in the chosen destination(s).
- Assess the technological feasibility, considering the availability of AR hardware and software platforms.

3) Stakeholder Engagement
- Identify and engage relevant stakeholders, such as tourism boards, local businesses, and potential users, to gather input and support for the project.

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4) Concept Development

- Brainstorm and refine the concept for the AR tourist guide. Consider the type of content, user interactions, and unique features.

5) Content Creation

- Develop or curate the content for the tourist guide, including text, images, videos, 3D models, and audio recordings.
- Ensure that content is accurate, engaging, and culturally sensitive.

6) Technology Selection

- Choose the appropriate AR technology stack, including AR development platforms, hardware (smartphones, AR glasses), and software tools.

7) Prototype Development

- Create a functional prototype of the AR tourist guide to test its core features and functionality.
- Gather feedback from early testers and stakeholders for improvements.

8) User Experience (UX) Design

- Design the user interface (UI) for the AR application, focusing on ease of use, accessibility, and an intuitive AR experience.
- Consider user flow, navigation, and visual design.

9) Development and Integration

- Build the AR application using selected development tools and languages (e.g., Unity, ARKit, ARCore).
- Integrate GPS, location services, content management, and other necessary components.

A. System Architecture

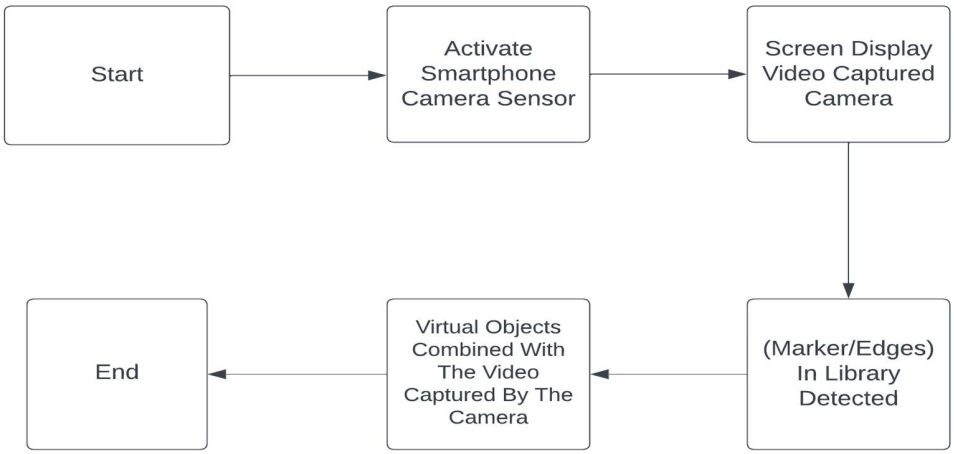

Fig. System Architecture of Tourist Guide Using Augmented Reality

B. Data Flow Diagram

Fig. DFD Level 0 for Tourist Guide Using Augmented Reality

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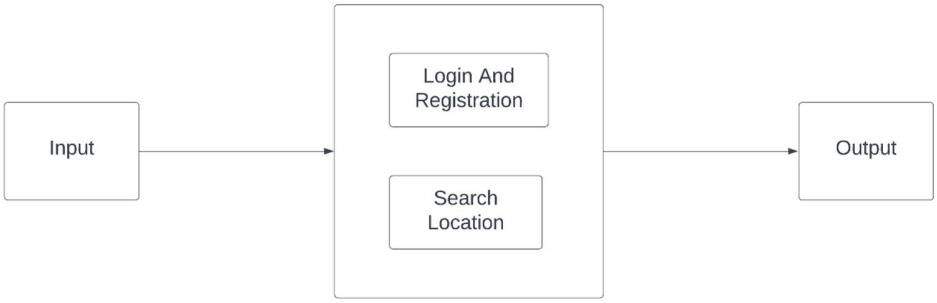

Fig. DFD Level 1 for Tourist Guide Using Augmented Reality

VII. CONCLUSION

In conclusion, the Tourist Guide Application with Augmented Reality represents a significant advancement in the tourism sector, offering tourists an immersive, informative, and interactive experience. Augmented Reality seamlessly integrates real-time information, precise navigation, language support, and gamified elements, enriching the traveler's journey. The application bridges language gaps, providing users with personalized explorations and enabling them to gain a deeper cultural understanding of their destinations. Continuous feedback and data analysis ensure ongoing improvement. Augmented Reality is poised to redefine how we experience and engage with the world, making this application a transformative tool for modern-day travelers.

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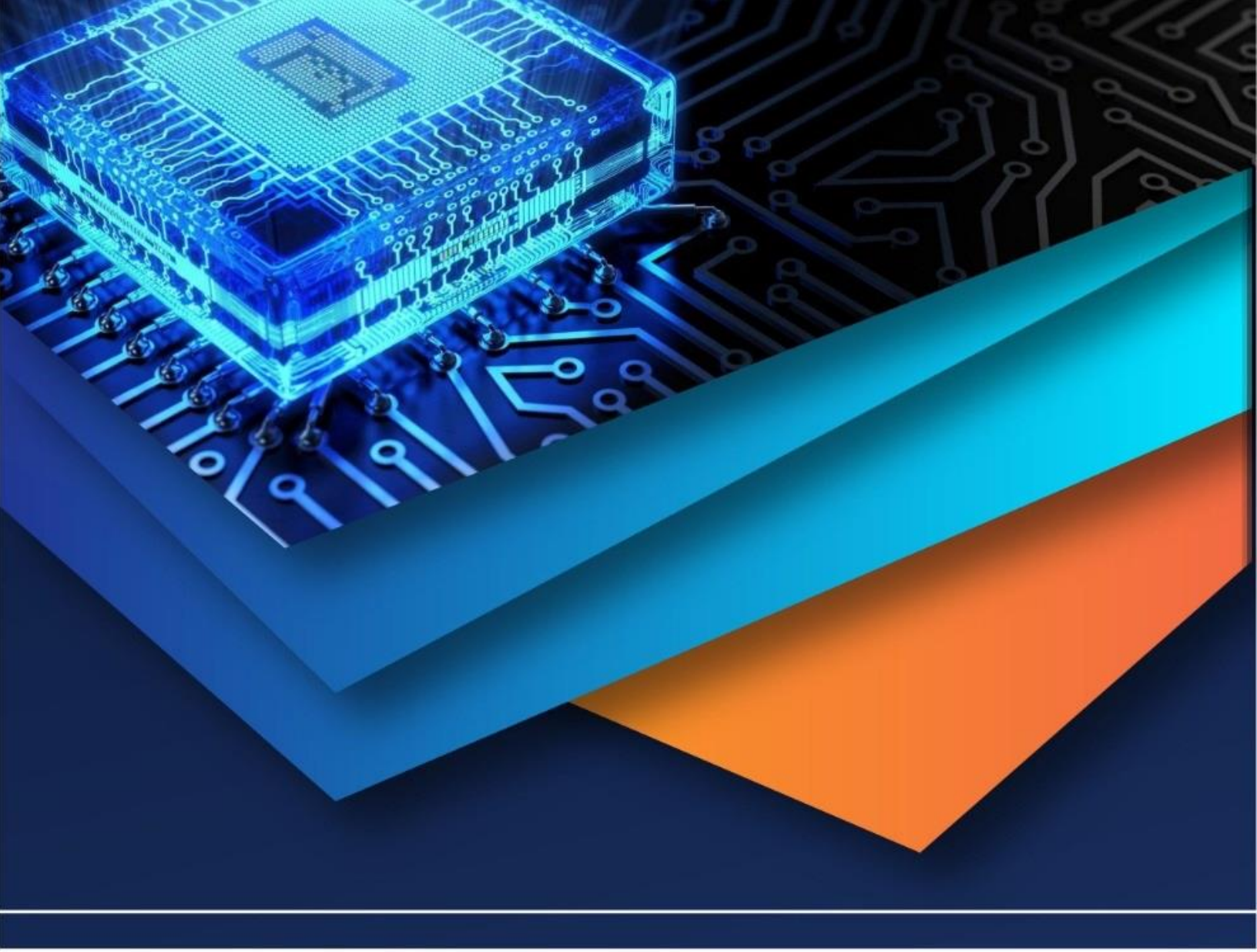

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