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Digital Exploration System of Ancient Monuments Using Virtual Historical Tour (VHT) Application for Physically Challenged Tourists

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Abstract: ***Ancient monuments represent an important part of human history, culture, and knowledge. However, many historical and heritage sites are difficult to access for physically challenged tourists due to uneven pathways, stairs, long walking distances, and strict conservation rules. In existing system, Traditional methods such as textbooks, photographs, and museum displays provide limited understanding and lack interactive experiences. Physical visits to heritage sites are often uncomfortable or impossible for individuals with mobility challenges In the proposed work," Digital Exploration System for Ancient Monuments Using Virtual Heritage Tour App for Physically Challenged Tourists" offers an effective solution by allowing users to explore historical monuments in a comfortable and accessible digital environment. The system integrates modern technologies such as Augmented Reality (AR), Virtual Reality (VR), 3D modeling, and audio narration to create an immersive learning environment. In the AR exploration module, users can view a 3D model of the monument and interact with different parts of the structure such as the dome, minarets, and entrance while listening to audio explanations. The VR exploration feature provides a virtual tour experience where users can explore monuments in a 360-degree immersive environment. In addition, the application includes guided narration that explains the historical background and architectural details of monuments, enabling users to gain a better understanding through audio guidance.***

Keywords:
ARCore – Augmented Reality Core
SDK – Software Development Kit
IDE – Integrated Development Environment
JSON – JavaScript Object Notation
URL – Uniform Resource Locator
HTTP – HyperText Transfer Protocol
HTTPS – HyperText Transfer Protocol Secure
CPU – Central Processing Unit

I. INTRODUCTION

The research domain of this project is Indian Knowledge Systems. Indian Knowledge Systems focus on the preservation, study, and dissemination of traditional knowledge, cultural heritage, and historical contributions of ancient civilizations. These systems aim to integrate traditional knowledge with modern technologies to promote cultural awareness and historical understanding. In the context of this project, digital technologies are used to present historical monuments in an interactive format that allows users to learn about cultural heritage through virtual experiences. By combining modern digital tools with historical knowledge, the system contributes to the digital preservation and accessibility of cultural heritage resources. The research area of this project is Historical and Civilizational Sciences. This field focuses on the study of ancient societies, their cultural practices, architectural achievements, and historical developments. Monuments are important sources of historical evidence, as they reflect the social, political, and artistic characteristics of the civilizations that built them. Through digital exploration technologies such as AR and VR, this project aims to create a virtual environment where users can explore historical monuments and gain knowledge about past civilizations. By presenting historical information through interactive digital experiences, the system enhances learning and promotes a deeper understanding of cultural heritage. The preservation and understanding of historical monuments play a vital role in maintaining cultural heritage and educating future generations. Ancient monuments represent the architectural, artistic, and cultural achievements of past civilizations.

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II. RELATED WORK

The development of digital systems for exploring historical monuments has gained significant attention in recent years due to the rapid advancement of technologies such as Augmented Reality (AR), Virtual Reality (VR), 3D modeling, and multimedia systems. Researchers and developers have focused on creating platforms that enhance the way users interact with cultural heritage by providing immersive and interactive experiences. Traditional heritage information systems primarily relied on text, images, and videos, but modern systems aim to provide a more engaging approach by allowing users to explore monuments virtually. These developments have laid the foundation for systems like the proposed Digital Exploration System for Ancient Monuments Using a Virtual Heritage Tour App for Physically Challenged Tourists.

Several early systems focused on the digital preservation of cultural heritage by storing monument-related data in digital repositories. These systems provided users with access to historical information, images, and documents through web-based platforms. While these systems were useful for educational purposes, they lacked interactive features and did not provide a realistic experience of visiting the monument. Users were limited to reading textual descriptions or viewing static images, which did not effectively convey the architectural complexity and spatial structure of monuments. As a result, researchers began exploring more advanced techniques to improve user engagement.

The introduction of Virtual Reality (VR) technology marked a significant advancement in the field of digital heritage exploration. VR-based systems enabled users to experience fully immersive environments where they could explore monuments in a 360-degree virtual space.

III. RESEARCH METHODOLOGY

The Research methodology for the project titled “Digital Exploration System for Ancient Monuments Using a Virtual Heritage Tour App for Physically Challenged Tourists” focuses on designing and developing an interactive, accessible, and technology-driven platform that enables users to explore historical monuments digitally. The methodology is based on integrating modern technologies such as Augmented Reality (AR), Virtual Reality (VR), 360-degree viewing, and audio narration to provide an immersive and user-friendly experience.

The system is designed to overcome the limitations of traditional methods and ensure that physically challenged tourists can explore monuments without physical constraints.

The development of the system begins with the identification and collection of relevant data related to ancient monuments After data collection; the next step involves designing the system architecture and user interface. The application is developed as a mobile-based platform to ensure accessibility and convenience. The user interface is designed to be simple, intuitive, and easy to navigate, especially for physically challenged users. The home screen provides options such as monument exploration, AR experience, VR tour, and audio narration. The design focuses on minimizing complexity and ensuring that users can access all features with minimal effort.

The monument exploration module allows users to browse and select monuments from a list. When a user selects a monument, the system retrieves relevant data from the database and displays detailed information, including historical background, construction details, and cultural significance. This module serves as the foundation for providing knowledge to users.

IV. IMPLEMENTATION

The implementation phase is a crucial stage in the software development life cycle where the designed system is transformed into a working application. In this project, titled “Digital Exploration System for Ancient Monuments Using a Virtual Heritage Tour App for Physically Challenged Tourists,” the implementation focuses on developing a mobile application that integrates advanced technologies such as Augmented Reality (AR), Virtual Reality (VR), Text-to-Speech (TTS), accessibility features, and cloud-based backend services.

The system is implemented using modern frameworks and tools that ensure scalability, flexibility, and ease of use. The application is designed to provide an immersive and accessible experience for users, especially those who are physically challenged, enabling them to explore monuments virtually.

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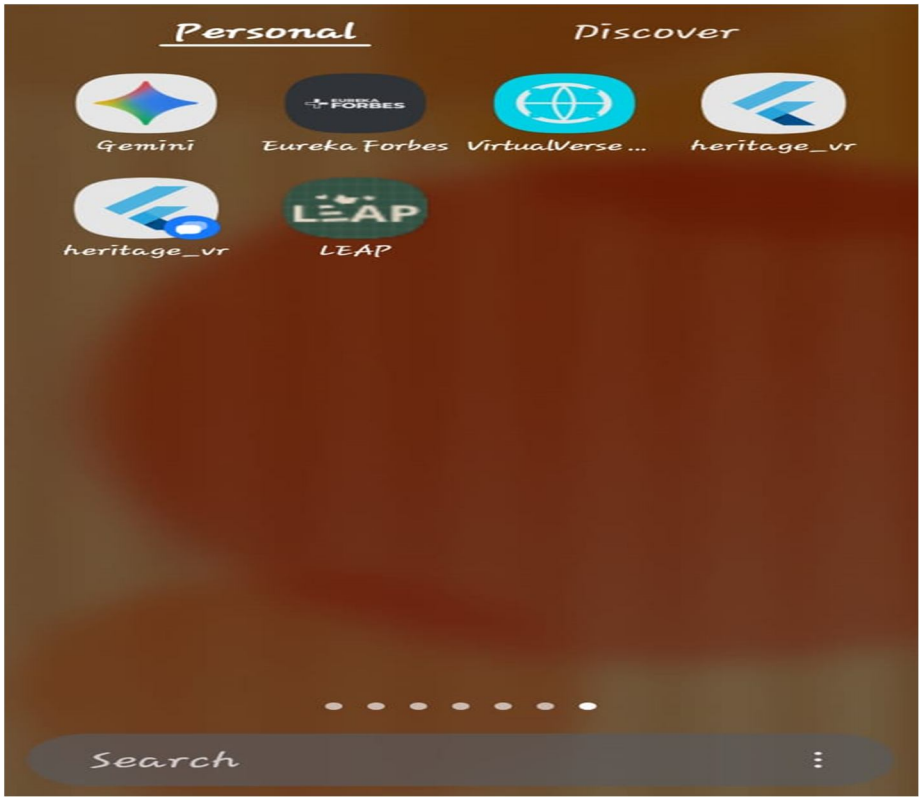
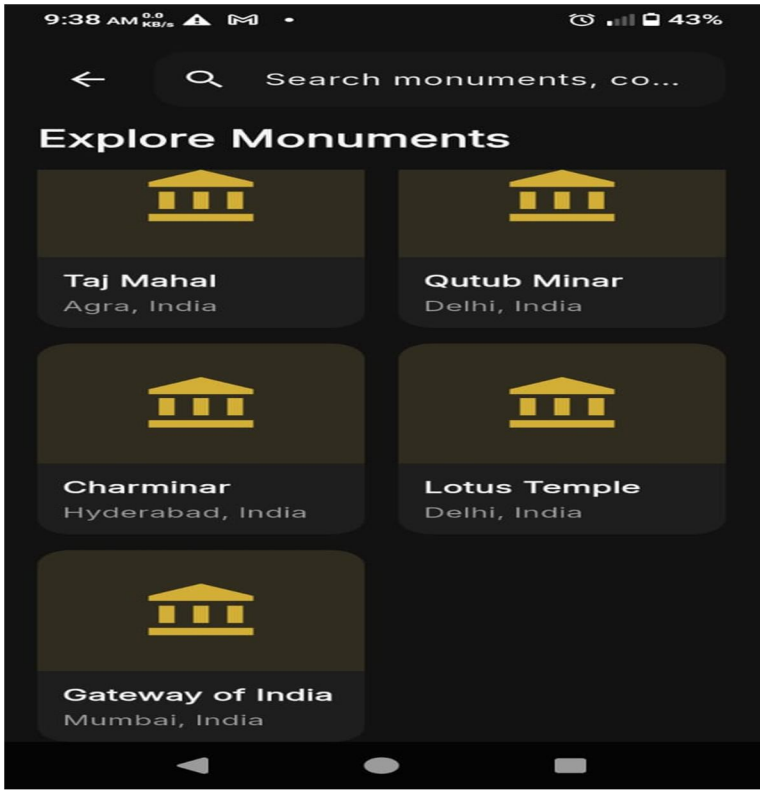


Screen1: digital VHT app

Displays the application logo and initializes resources before loading the main interface. It provides a smooth entry point for the user.

Screen2: splash screen of application

Screen3: home screen



Screen4: explore tab displaying list of monuments

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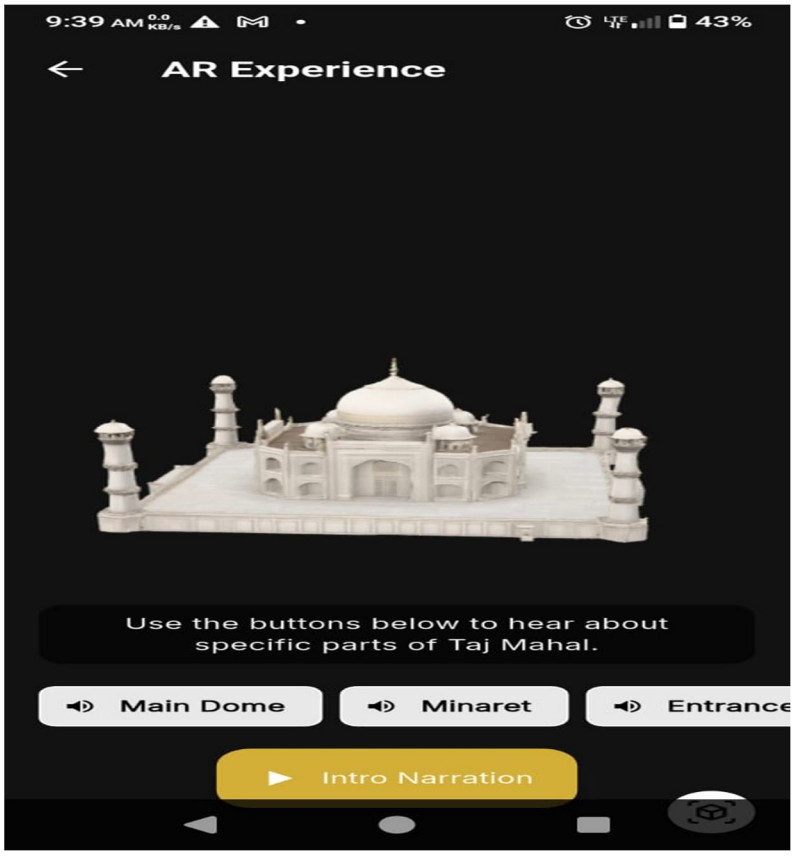
Screen5: ancient monument Taj mahal



Screen6: AR tour of tajmahal

V. CONCLUSION

The project titled “Digital Exploration System for Ancient Monuments Using a Virtual Heritage Tour App for Physically Challenged Tourists” successfully demonstrates how modern technologies can be utilized to create an inclusive and immersive platform for cultural exploration. conclusion, this project highlights the potential of combining emerging technologies to address real-world challenges. It provides a valuable solution for physically challenged individuals who may not be able to visit monuments physically. The system can also be extended to other domains such as education, tourism, and virtual learning. With further enhancements and improvements, this project has the potential to evolve into a comprehensive digital heritage platform.

VI. ACKNOWLEDGEMENT

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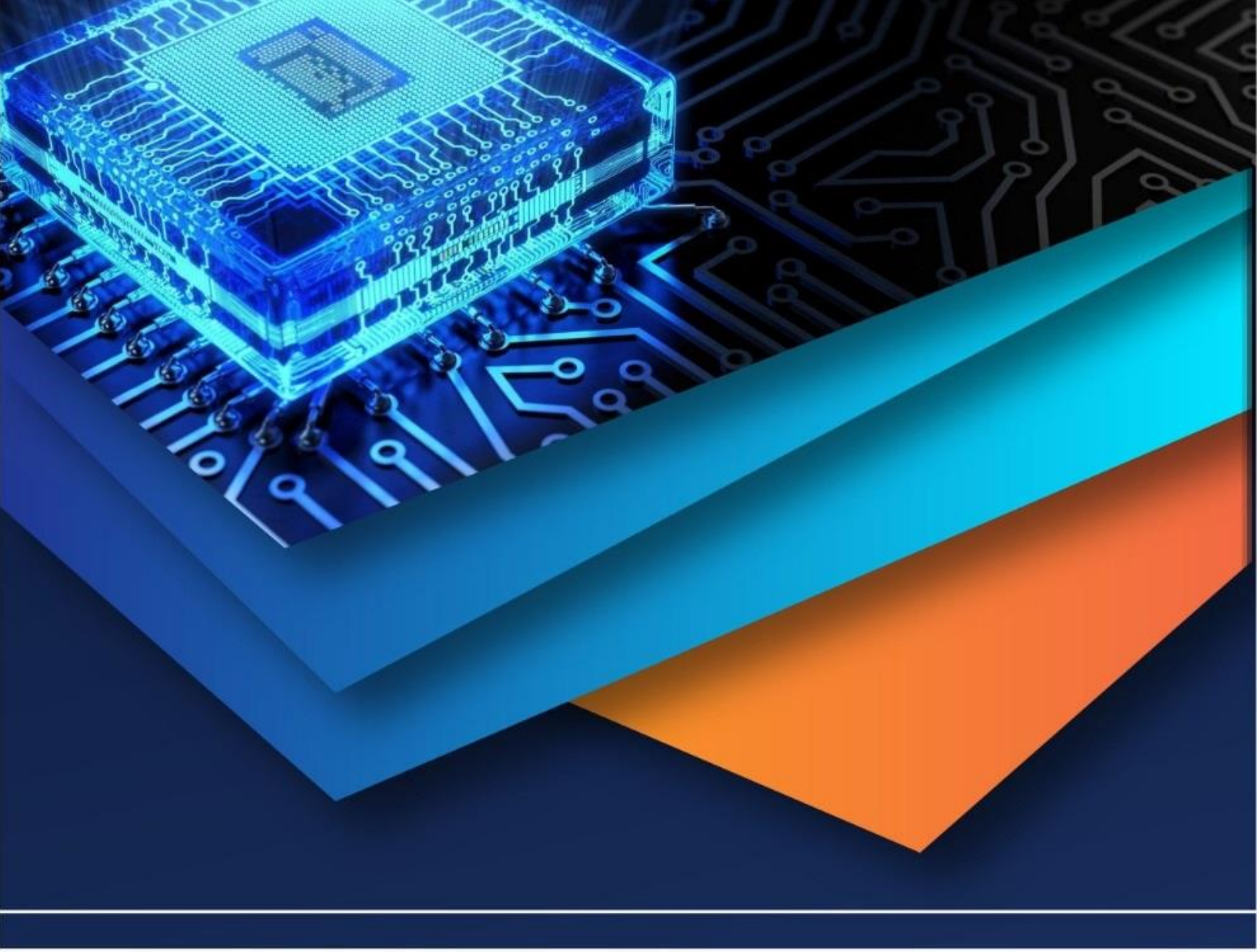

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