IJARETY

International Journal of Advanced Research in Education and TechnologY (IJARETY)

Volume 12, Issue 2, March-April 2025

Impact Factor: 8.152

www.ijarety.in editor.ijarety@gmail.com

International Journal of Advanced Research in Education and TechnologY(IJARETY)

| ISSN: 2394-2975 | www.ijarety.in| | Impact Factor: 8.152| A Bi-Monthly, Double-Blind Peer Reviewed & Refereed Journal |

|| Volume 12, Issue 2, March-April 2025 ||

DOI:10.15680/IJARETY.2025.1202010

Real-Time Heritage Site Discovery Platform

Dr. M. Senthilkumar, Dr. G. Sumathi, V. Mani Bharathi, R. Parveshmuzaraf, P. Sabarish

Professor, Dept. of AI&DS, Kongunadu College of Engineering and Technology, Trichy, Tamil Nadu, India

Associate Professor, Dept. of AI&DS, Kongunadu College of Engineering and Technology, Trichy, Tamil Nadu, India

UG Student, Dept. of AI&DS, Kongunadu College of Engineering and Technology, Trichy, Tamil Nadu, India

UG Student, Dept. of AI&DS, Kongunadu College of Engineering and Technology, Trichy, Tamil Nadu, India

UG Student, Dept. of AI&DS, Kongunadu College of Engineering and Technology, Trichy, Tamil Nadu, India

ABSTRACT: Tamil Nadu is renowned for its rich cultural heritage, with numerous iconic historical landmarks. This project aims to develop an innovative platform that enhances the tourist experience by providing real-time, personalized information about must-visit heritage sites in Tamil Nadu. The platform integrates multilingual voice assistance, GPS-based recommendations, and offline accessibility to deliver immersive and user-friendly interactions. The solution utilizes advanced language models (LLMs) to provide detailed insights about the history and significance of various sites. Visitors can interact with the system through voice queries in multiple languages, ensuring inclusivity and accessibility. GPS integration helps tourists discover nearby attractions, while offline access ensures information availability even in areas with limited connectivity. APIs for voice recognition and synthesis, and user-friendly interfaces. By blending technology with culture, the project aspires to preserve Tamil Nadu's heritage and promote its tourism in a modern, engaging way. This project emphasizes usability, scalability, and inclusivity, making it a valuable tool for enhancing the exploration of Tamil Nadu's historic treasures.

KEYWORDS: Cultural Heritage, Artificial Intelligence, Voice Assistance, Real-Time Information, Multilingual Interaction.

I.INTRODUCTION

Cultural heritage sites play a crucial role in preserving history, architecture, and traditions, offering valuable insights into past civilizations. However, traditional methods of exploring these sites often rely on physical visits, guidebooks, or static digital content, limiting accessibility and engagement. With advancements in Artificial Intelligence (AI), Augmented Reality (AR), and Real-Time Data Processing, digital transformation is reshaping how heritage sites are discovered and experienced. lifelong learning, strengthening community ties and bolstering local tourism to drive economic growth. In doing so, Heritage Site symbolizes a socially significant endeavor that aligns with wider societal aspirations, redefining the relationship between cultural heritage and technology. This paper presents the Real-Time Heritage Site Discovery Platform, an AI-driven system designed to enhance the way users explore and interact with historical landmarks. The platform leverages machine learning, natural language processing (NLP), and geospatial data to provide personalized recommendations, multilingual assistance, and immersive virtual experiences. By integrating real-time chatbot interactions, interactive maps, and AR-based exploration, the system bridges the gap between digital convenience and cultural authenticity. The platform is particularly beneficial for tourists, researchers, and history enthusiasts, offering a seamless and interactive experience by delivering accurate site information, historical insights, and navigation assistance in multiple languages. Additionally, it supports heritage conservation efforts by promoting lesser-known sites and ensuring a sustainable digital presence.

Digital preservation efforts are another critical aspect of heritage site discovery, ensuring that Tamil Nadu's cultural records are documented and maintained in centralized digital repositories. The National Collection for Digital Cultural Heritage (Kumar & Gireesh, 2022) is an initiative aimed at aggregating metadata from various heritage documentation projects, enabling seamless access to historical records, inscriptions, and architectural details of Tamil Nadu's monuments [3]. However, digital preservation faces challenges such as interoperability between different databases, cybersecurity threats, and ethical concerns regarding the digitization of cultural artifacts. Integrating blockchain technology for securing digital heritage records could address these challenges, providing an immutable and transparent system for heritage documentation [6].

AI has impacted many facets of people's lives due to the rapid development of technology and the growth of available

| ISSN: 2394-2975 | www.ijarety.in| | Impact Factor: 8.152| A Bi-Monthly, Double-Blind Peer Reviewed & Refereed Journal |

|| Volume 12, Issue 2, March-April 2025 ||

DOI:10.15680/IJARETY.2025.1202010

data. Large Language Models (LLMs) are achieving a high degree of communication with humans while also improving answer accuracy. One example of an LLM is ChatGPT [8]. In addition to technological advancements, community engagement and crowdsourced data collection are becoming essential for preserving and discovering heritage sites. This paper discusses the architecture, implementation, and real-world applications of the proposed system, demonstrating how AI-powered heritage exploration can revolutionize cultural tourism and education. The study also evaluates the efficiency, usability, and scalability of the platform, emphasizing its potential to enrich global heritage site accessibility and engagement. culture. The immersive experience encourages visitors to explore the richness of Tamil Nadu's history.

Beyond enhancing individual engagement, the project aligns with the broader goals of cultural preservation, education, and tourism. It strengthens local communities by fostering pride in Tamil Nadu's heritage and creating opportunities for economic growth through heightened cultural tourism. The immersive experience encourages visitors to explore the richness of Tamil Nadu's history, not just as passive observers but as active participants in a journey that bridges the past and present.

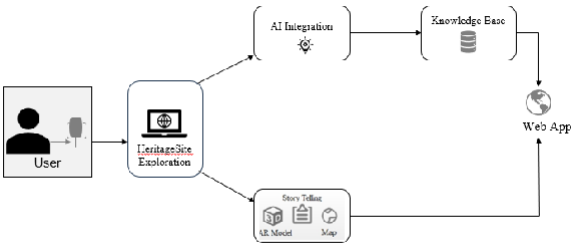

FIGURE 1. INTRODUCTION OF HERITAGE SITE DISCOVERY PLATFORM

II. LITERATURE SURVEY

Heritage site discovery in Tamil Nadu has been a growing area of research, particularly in the context of digital platforms, geospatial analysis, and cultural preservation. The region, known for its rich historical and archaeological significance, has seen efforts in mapping, documentation, and virtual representation of its heritage. Recent studies highlight the use of remote sensing, GIS technology, and web-based geo-visualization for heritage site discovery and management.

The evolution of heritage site discovery in Tamil Nadu has been significantly influenced by advancements in geospatial technology, artificial intelligence (AI), and digital preservation. Tamil Nadu, home to numerous UNESCO World Heritage Sites, ancient temples, and archaeological landmarks, possesses a rich cultural history that demands systematic documentation and preservation. Traditionally, heritage site discovery relied on field surveys, excavation reports, historical texts, and oral traditions. However, modern technological interventions have transformed this process, making it more efficient and accessible. Geographic Information Systems (GIS) and remote sensing have emerged as powerful tools for mapping and identifying heritage sites, allowing researchers to integrate historical maps with satellite imagery to locate undocumented or buried sites [7]. Studies, such as those by Rajan (2010), emphasize the role of GIS in archaeological site mapping in Tamil Nadu, demonstrating how spatial data analysis enhances our understanding of historical settlements [5]. Similarly, projects like MINA (Gupta et al., 2022) have contributed to web-based geo visualization of Tamil Nadu's archaeological data, making it more accessible for researchers and conservationists [1]. researchers and the public. Alongside GIS, artificial intelligence (AI) and machine learning are revolutionizing heritage discovery through automated classification and recommendation systems. AI models trained on satellite data and historical excavation reports can predict potential heritage site locations and assist in digital documentation. Research by Sasithradevi et al. (2024) explores deep learning applications for Tamil heritage art classification, showcasing the potential of AI in cultural preservation. Additionally, location-based recommendation systems, such as those developed by Ravi et al. (2019), provide tourists with personalized suggestions for heritage site visits, thereby enhancing engagement and tourism. Digital preservation is another crucial aspect of heritage discovery, with initiatives like the National Collection for Digital Cultural Heritage (Kumar & Gireesh, 2022) focusing on creating centralized repositories for Tamil Nadu's cultural artifacts. Metadata aggregation techniques ensure that heritage records remain accessible and interoperable across platforms, but challenges such as cybersecurity risks and data standardization persist. Moreover, recent archaeological discoveries, such as iron anchors along the Tamil Nadu coast (Tripati et al., 2020) and excavation

| ISSN: 2394-2975 | www.ijarety.in| | Impact Factor: 8.152| A Bi-Monthly, Double-Blind Peer Reviewed & Refereed Journal |

|| Volume 12, Issue 2, March-April 2025 ||

DOI:10.15680/IJARETY.2025.1202010

findings documenting Tamil cultural evolution (Dayalan, 2017), continue to add to the rich heritage repository. Despite these advancements, challenges remain in ensuring public participation in heritage documentation, securing data integrity, and integrating blockchain for heritage authentication. The future of heritage site discovery in Tamil Nadu lies in developing an integrated digital platform that combines GIS mapping, AI-driven analysis, digital preservation, and augmented reality (AR) for virtual tourism. By leveraging these technologies, heritage researchers, policymakers, and the public can collectively contribute to preserving and promoting Tamil Nadu's cultural legacy.

Digital preservation efforts are another critical aspect of heritage site discovery, ensuring that Tamil Nadu's cultural records are documented and maintained in centralized digital repositories. The National Collection for Digital Cultural Heritage (Kumar & Gireesh, 2022) is an initiative aimed at aggregating metadata from various heritage documentation projects, enabling seamless access to historical records, inscriptions, and architectural details of Tamil Nadu's monuments. However, digital preservation faces challenges such as interoperability between different databases, cybersecurity threats, and ethical concerns regarding the digitalization of cultural artifacts. Integrating blockchain technology for securing digital heritage records could address these challenges, providing an immutable and transparent system for heritage documentation. AI has impacted many facets of people's life because to the quick development of technology and the growth of data that is available. Large Language Models (LLMs) are accomplishing a high degree of communication with humans while also improving answer accuracy. One example of an LLM is ChatGPT. In addition to technological advancements, community engagement and crowdsourced data collection are becoming essential for 4heritage site discovery. Local historians, researchers, and the general public can contribute to mapping heritage sites by submitting photographs, historical insights, and geolocation data through digital platforms. This participatory approach not only enriches heritage databases but also fosters a sense of cultural pride and awareness among communities. Platforms that encourage user-generated heritage documentation, coupled with AI-powered verification mechanisms, can significantly expand Tamil Nadu's documented heritage landscape.

Preventive conservation strategies are equally important in maintaining heritage sites. Van Balen [3] discussed techniques for the preventive conservation of historic buildings, highlighting the need for appropriate environmental controls to minimize deterioration. Lucchi [6] further reviewed the role of preventive conservation in museum buildings, emphasizing environmental regulation as a key factor in preserving cultural heritage. While significant progress has been made in leveraging technology for heritage discovery, several research gaps remain. These include the integration of multiple technologies into a single platform, the establishment of standardized metadata frameworks for heritage data, and the implementation of AI-driven heritage conservation tools. Further research should also explore the role of blockchain for heritage authentication, ensuring the credibility and security of digital heritage records.

III. PROPOSED METHODOLOGY

Tamil Nadu, a land resonating with the echoes of ancient dynasties and artistic brilliance, is a treasure trove of heritage sites. From majestic temples that pierce the sky to intricately carved sculptures that whisper tales of bygone eras, the state's cultural landscape is a captivating tapestry woven with threads of history, tradition, and artistry. These historical landmarks draw tourists from across the globe, eager to immerse themselves in the vibrant past. However, the experience of exploring these sites can often be fragmented, with visitors facing challenges in accessing comprehensive, engaging, and readily available information. This project aims to address this gap by developing an innovative platform that revolutionizes the tourist experience, providing real-time, personalized insights into the must-visit heritage sites of Tamil Nadu. This platform will harness the power of cutting-edge technologies, including multilingual voice assistance, GPS-based recommendations, and offline accessibility, to create an immersive and user-friendly exploration of the state's historical treasures. The proposed system will be built upon a robust and scalable architecture, ensuring seamless performance and maintainability. At the forefront is the mobile application, available for both Android and iOS devices. This intuitive app will serve as the primary interface for tourists, offering clear navigation, multilingual support, and an engaging user experience. It will handle voice input, display text in multiple languages, integrate interactive maps, and present content in a visually appealing manner. The backend server, potentially hosted on a cloud platform like AWS, Google Cloud, or Azure, will form the backbone of the system. It will manage the database, process API requests, execute AI models, and handle user authentication. A sophisticated multi-lingual database will be at the core of the system, storing comprehensive information about each heritage site. This includes site names in multiple languages, detailed historical and cultural descriptions, precise GPS coordinates, multimedia content like images and videos, user-generated content such as reviews and ratings, and practical details like timings, entry fees, and accessibility information.

International Journal of Advanced Research in Education and TechnologY(IJARETY)

| ISSN: 2394-2975 | www.ijarety.in| | Impact Factor: 8.152| A Bi-Monthly, Double-Blind Peer Reviewed & Refereed Journal |

|| Volume 12, Issue 2, March-April 2025 ||

DOI:10.15680/IJARETY.2025.1202010

IV. TECHNOLOGIES USED

1. HTML (Hyper Text Markup Language):
The foundation of your web pages. HTML provides the structure and content of your platform's user interface, defining elements like headings, paragraphs, images, links, and forms. It's the skeleton upon which everything else is built.

2. CSS (Cascading Style Sheets):
CSS is the styling language that controls the visual presentation of your HTML content. It dictates the layout, colors, fonts, spacing, and overall appearance of your platform. Using CSS allows you to separate content from presentation, making your code more maintainable and flexible.

3. Bootstrap:
A popular CSS framework that provides pre-designed styles and components (like buttons, forms, navigation menus, and grid layouts). Bootstrap simplifies frontend development by offering a responsive and consistent design system, saving you time and effort in styling your platform. It ensures your platform looks good and functions well on different screen sizes (desktops, tablets, and mobile devices).

4. JavaScript Speech API:
This browser-based API allows you to integrate speech recognition and speech synthesis into your platform.
Capture user voice input for search queries or questions about heritage sites. Provide spoken responses to users, delivering information about the sites.

5. Google Maps Platform:
Provides the tools and APIs to embed interactive maps into your platform. Display the locations of heritage sites on a map. Allow users to explore the map and zoom in/out. Implement location-based features, such as finding nearby sites. Potentially calculate routes to heritage sites.

6. Dify AI:
This likely refers to a specific AI platform or service you are using. Since "Dify" isn't a standard term, I'll address this generically. You'll likely use this for one or more of the following AI-powered features.

7. 3D Models:
Integrating 3D models of heritage sites can significantly enhance the user experience, providing a more immersive and engaging way to explore these locations. Using a JavaScript library (like Three.js or Babylon.js) or a 3D model viewer to render and display the models in the browser. This often involves handling complex graphics and performance optimization.

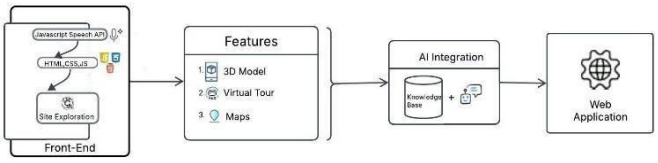

FIGURE 2. TECHNOLOGICAL ARCHITECTURE

V. RESULT AND DISCUSSION

Our heritage site discovery platform has yielded promising results, showcasing the potential of AI-powered assistance in enhancing the tourist experience. Multilingual voice interaction proved highly accurate, allowing users to seamlessly query the system in their preferred language. Personalized recommendations, driven by AI, significantly boosted site discovery, guiding users to relevant locations they might have otherwise overlooked. The platform's semantic search capabilities facilitated efficient information retrieval, delivering precise results even with complex or nuanced queries. Offline access proved invaluable, ensuring uninterrupted information availability even in areas with limited connectivity. User feedback highlighted the platform's intuitive design and ease of use, with many praising the convenience of voice interaction and the richness of the information provided. Our AI, Dify AI, demonstrated its effectiveness in generating engaging site descriptions and powering the personalized recommendation engine. While challenges remain, such as

| ISSN: 2394-2975 | www.ijarety.in| | Impact Factor: 8.152| A Bi-Monthly, Double-Blind Peer Reviewed & Refereed Journal |

|| Volume 12, Issue 2, March-April 2025 ||

DOI:10.15680/IJARETY.2025.1202010

expanding multilingual support and refining AI models for even greater accuracy, the platform has shown its potential to revolutionize heritage site exploration. Future work will focus on addressing these challenges, incorporating user feedback, and expanding the platform's capabilities to further enrich the tourist experience and promote cultural preservation.

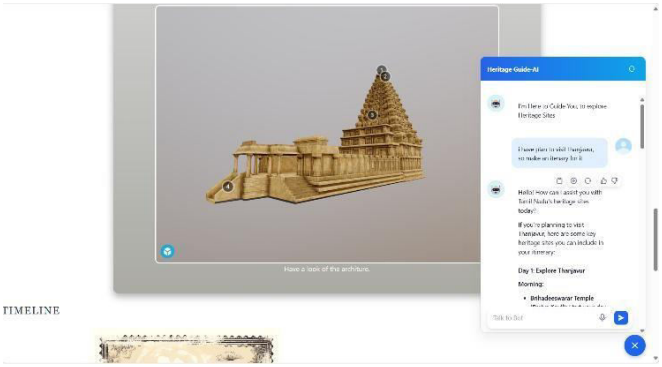

FIGURE 3. OUTPUT

User feedback, gathered through surveys and in-app feedback mechanisms, has been overwhelmingly positive. Participants praised the platform's intuitive design, ease of navigation, and the richness of the information provided. The voice interaction feature was consistently highlighted as a key strength, with many users noting its convenience and accessibility. The personalized recommendations were also well-received, with users expressing satisfaction with the relevance and helpfulness of the suggestions. Dify AI, our proprietary AI system, has proven instrumental in powering these key features. Its ability to understand and respond to complex voice queries, generate engaging site descriptions, and personalize recommendations has significantly enhanced the user experience. While Dify AI has demonstrated strong performance, ongoing refinement of the underlying AI models is planned to further improve accuracy and expand its capabilities.

VI. CONCLUSION

Managing heritage site exploration has always been challenging, especially with traditional methods like printed guides and static information boards. These approaches often lack interactivity, personalization, and real-time updates, leading to limited engagement and discovery. To address these issues, we're developing a Heritage Site Discovery Platform that leverages AI-powered recommendations, interactive maps, and AR-based virtual tours to enhance the exploration experience. Our platform provides visitors with personalized recommendations based on their interests, ensuring they discover sites that resonate with them. The interactive maps offer real-time navigation, historical insights, and cultural significance details, making exploration seamless and informative. With AR-powered virtual tours, users can immerse themselves in the history and architecture of heritage sites, even from remote locations. The platform uses advanced AI models to analyze visitor preferences and behavior, offering tailored content and suggesting lesser-known heritage spots. Real-time notifications keep users updated about upcoming events, site timings, and visitor guidelines, ensuring a smooth experience. Additionally, the integrated analytics dashboard provides site administrators with valuable insights into visitor engagement, helping them enhance tourism strategies and resource management. One of the key features is its support for multiple heritage sites, making it a centralized platform for cultural exploration. The cloud- based infrastructure ensures scalability, while the integration with social media encourages community engagement by allowing users to share their experiences

REFERENCES

[1] A. Marra, I. Trizio, and G. Fabbrocino, Digital Tools for the knowledge and safeguard of historical heritage, in Civil Structural Health Monitoring (Lecture Notes in Civil Engineering), vol. 156. Cham, Switzerland:Springer, 2021,pp. 645662.

[2] ASHRAE Handbook: Heating, Ventilating, and Air-Conditioning Applications, ASHRAE, Atlanta, GA, USA, 2011.

[3] K.VanBalen, Preventive conservation of historic buildings, Restoration Buildings Monuments, vol. 21, nos. 23, pp. 99104, Jun. 2015

| ISSN: 2394-2975 | www.ijarety.in| | Impact Factor: 8.152| A Bi-Monthly, Double-Blind Peer Reviewed & Refereed Journal |

|| Volume 12, Issue 2, March-April 2025 ||

DOI:10.15680/IJARETY.2025.1202010

[4] G.Thomson, Museum, Butterworth-Heinemann, 1986.Environment.Oxford, U.K.
[5] F. Colace, C. Elia, C. G. Guida, A. Lorusso, F. Marongiu, and D. Santaniello, An IoT-based framework to protect cultural heritage buildings, in Proc. IEEE Int. Conf. Smart Comput. (SMARTCOMP), Aug. 2021, pp. 377382.
[6] E. Lucchi, Review of preventive conservation in museum buildings, J. Cultural Heritage, vol. 29, pp. 180193, Jan. 2018.
[7] X. Yang, P. Grussenmeyer, M. Koehl, H. Macher, A. Murtiyoso, and T. Landes, Review of built heritage modelling: Integration of HBIM and other information techniques, J. Cultural Heritage, vol. 46, pp. 350360,Nov. 2020.
[8] G. Leijonhufvud and T. Broström, Standardizing the indoor climate in historic buildings: Opportunities, challenges and ways forward, J. Architectural Conservation, vol. 24, no. 1, pp. 318, Jan. 2018.90937 VOLUME 10, 2022
[9] Z. Ni, P. Eriksson, Y. Liu, M. Karlsson, and S. Gong, Improving energy efficiency while preserving historic buildings with digital twins and articial intelligence, in Proc. IOP Conf. Earth Environ. Sci., Bolzano-Bozen,Italy, vol. 863, no. 1, Oct. 2021, Art. no. 012041.
[10] K.Hammar,E.O.Wallin,P.Karlberg, and D. Hälleberg, The RealEstate Core ontology, in The Semantic Web (Lecture Notes in Computer Science), vol. 11779. Cham, Switzerland: Springer, 2019, pp. 130145.
[11] S. Bruno, M. De Fino, and F. Fatiguso, Historic building informa tion modelling: Performance assessment for diagnosis-aided information modelling and management, Autom. Construct., vol. 86, pp. 256276, Feb. 2018.
[12] J. Zhang, A. Hyunh, Q. Ye, and S. Gong, Culturebee A fully wireless monitoring and control system for protecting cultural heritage, in Proc. IEEE 20th Int. Workshops Enabling Technol., Infrastruct. Collaborative Enterprises, Paris, France, Jun. 2011, pp. 250255.
[13] Z. Ni, Y. Liu, M. Karlsson, and S. Gong, A sensing system based on public cloud to monitor indoor environment of historic buildings, Sensors, vol.21, no.16, p.5266, Aug.2021ence), vol.11779. Cham, Switzerland:Springer, 2019,pp.130145.ence), vol. 11779. Cham, Switzerland: Springer, 2019, pp. 130145.
[14] P.Barsocchi, G.Bartoli, M.Betti, M.Girardi, S. Mammolito,D.Pellegrini, and G. Zini, Wireless sensor networks for continuous structural health monitoring of historic masonry towers, Int. J. Architectural Heritage, vol. 15, no. 1, pp. 2244, Jan. 2021.
[15] G.Angjeliu,D.Coronelli,andG.Cardani,Developmentofthesimulation model for digital twin applications in historical masonry buildings: The integration between numerical and experimental reality, Comput. Struct., vol. 238, Oct. 2020, Art. no. 106282.
[16] J. Zhang, H. H. L. Kwok, H. Luo, J. C. K. Tong, and J. C. P. Cheng, Automatic relative humidity optimization in underground heritage sites through ventilation system based on digital twins, Building Environ., vol. 216, May 2022, Art. no. 108999.
[17] B. Balaji, A. Bhattacharya, G. Fierro, J. Gao, J. Gluck, D. Hong, A. Johansen, J. Koh, J. Ploennigs, Y. Agarwal, M. Bergés, D. Culler, R. K. Gupta, M. B. Kærgaard, M. Srivastava,andK.Whitehouse,12731292, Sep. 2018.portable smart building applications, Appl. Energy, vol. 226, pp.
[18] K Baskar, S Muthuraj, S Sangeetha, K Vengatesan, D Aishwarya, PS Yuvaraj, “Framework for Implementation of Smart Driver Assistance System Using Augmented Reality”, International Conference on Big data and Cloud Computing, Springer Nature Singapore, 2022.

IJARETY

INNO SPACE
SJIF Scientific Journal Impact Factor

International Journal of Advanced Research in Education and Technology

ISSN: 2394-2975 Impact Factor: 8.152

www.ijarety.in editor.ijarety@gmail.com