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Voice Driven Heritage Tour Assistance for Tamil Nadu's Visitors using AI

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ABSTRACT: The Voice-Driven Heritage Tour Assistance System is designed to enhance the visitor experience at Tamil Nadu's heritage sites by leveraging advanced AI technologies. It combines NLP, Speech Recognition, and geolocation services to deliver site descriptions in personalized multilingual audio, based on the user's language choice via Text-to-Speech. The system also provides location-based suggestions, surrounding site recommendations, and transportation information, including numbers of local cabs, auto and two-wheelers. Also, the "How to Reach" section carries vital travel information. Travelers are able to communicate with the system via voice commands for easy access to contextual site information. The SOS feature provides safety by transmitting emergency messages via email. This innovative system aims to improve site exploration, increase foreign tourism, and deliver a safe, interactive experience.

KEYWORDS: AI in Tourism, Natural Language Processing, Text-to-Speech, Geolocation Services, Personalized Tour Guide, Location-Based Recommendations, Emergency SOS Feature.

I. INTRODUCTION

Artificial intelligence (AI) has transformed different sectors by allowing machines to replicate human intellectual capabilities, including the comprehension and response to natural language. The ability promises positive possibilities across several fields, including heritage tourism. Tamil Nadu, with its resplendent cultural past and multilateral heritage sites, receives an enormous volume of tourists annually. However, most visitors find it hard to walk through and truly appreciate these ancient sites due to differences in languages, lack of visitor information. The vision of the project is to transform the heritage tourism experience in Tamil Nadu by integrating geolocation technology with AI to create an interactive, personalized, and intuitive system for travelers. The system provides location-based services to recommend heritage sites nearby, resulting in users visiting appropriate sites depending on their interests and location. Aside from recommendations, advanced language models enable effortless voice-based interactions, allowing guests to inquire on the history, significance, and traits of where they are heading. By providing instant feedback and support for numerous languages, the system encourages individuals' affective connections with the heritage of Tamil Nadu to make the discovery process more engaging, educative, and effective. This technology-based innovation forges a union between ancient knowledge and modern technology, adapting a groundbreaking approach to Tamil Nadu's heritage tourism.

II. LITERATURE SURVEY

Benaddi et al. [1] explored the use of NLP and Speech Recognition in tourism, highlighting how voice-driven systems can provide personalized, multilingual audio guides to enhance the visitor experience at heritage sites. Their system allows users to receive contextual information about cultural landmarks through Text-to-Speech (TTS), improving accessibility. Yochum et al. [2] examined the role of linked open data in location-based recommendation systems for

tourism. Their approach leverages geospatial data to offer tourists personalized suggestions for nearby attractions, optimizing travel routes and helping with site recommendations based on current location and preferences. Kandikere et al. [3] developed a tour guide robot system integrating AI technologies like NLP and geolocation services to provide tourists with real-time, location-based assistance. The system delivers personalized information about heritage sites, improving interaction and engagement with visitors through voice-based commands. Lombardi et al. [4] investigated the use of chatbots to enhance cultural heritage tourism, allowing tourists to interact and receive instant, personalized information about historical landmarks. The chatbots provide multilingual support and contextual answers, making the tourism experience more accessible and efficient. Sood [5] proposed an intelligent mobile-based tourist assistance system using speech recognition and real-time geolocation to provide personalized assistance to tourists. The system offers location-based suggestions, transportation details, and emergency services, ensuring both convenience and safety during site visits.

III. METHODOLOGY

The system collects data on Tamil Nadu's heritage sites, historical descriptions, and visitor information from Wikipedia and local databases. It further collects geolocation information for location-based suggestions and transportation information for the driver.

Interactive pages of heritage sites with audio, images, and facts are built. Geolocation is utilized to recommend proximate sites and enhance navigation.

Natural Language Processing (NLP) using Hugging Face's QA system processes user questions and responds with information from Wikipedia.

DistilBERT model is used to create responses, which are translated to speech through Text-to-Speech (TTS). TTS technology is utilized to create audio guides for every location, making multiple language support available for multilingual audiences.

User queries are handled by a Flask-based backend API, while SOS alert enables users to forward emergency location-based alerts through email.

IV. EXPERIMENTAL RESULTS

Our experimental results show that the Voice-Driven Heritage Tour Assistance System was able to deliver location-based recommendations with near zero errors in location identification. The audio tour component provided contextually relevant and naturally sounding descriptions. The system's response to voice queries showed high reliability, with minimal delays or inaccuracies in providing information on historical landmarks, architecture, and cultural significance. The geolocation capability was also capable of suggesting nearby locations without any issues, facilitating user navigation.

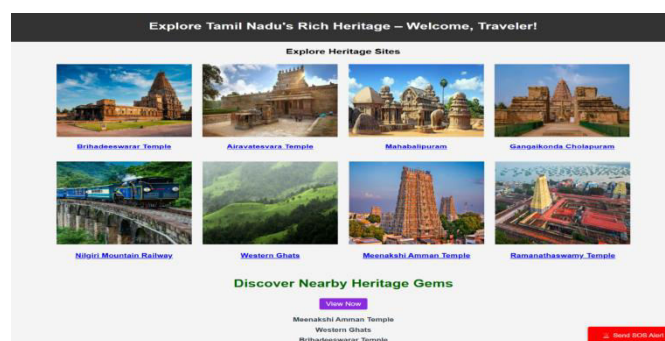


Fig 1: Homepage with nearby sites recommendation

Fig. 1. This is the home page of our system which offers users with intuitive options to view detailed information about their selected sites and also find nearby heritage locations. Additionally, an SOS alert feature is available for users to request emergency assistance by sending their location if needed.

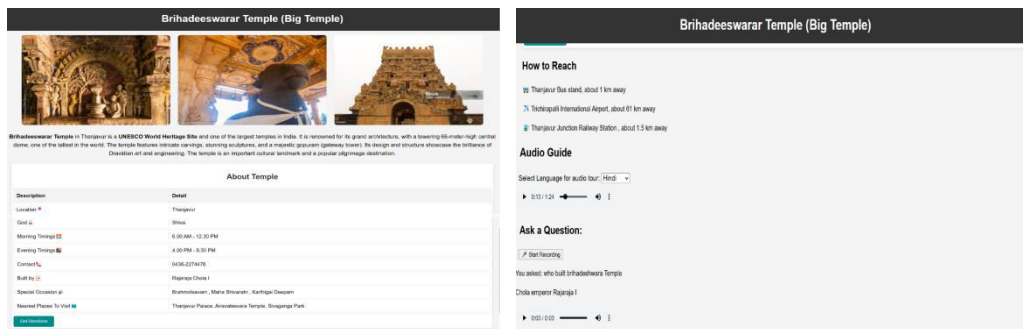


Fig 2 : Sites page

Fig. 2, The page provides options such as the "Audio Tour" button, "Get Directions" feature, Transportation information and a section for entering queries to obtain more information about the site.

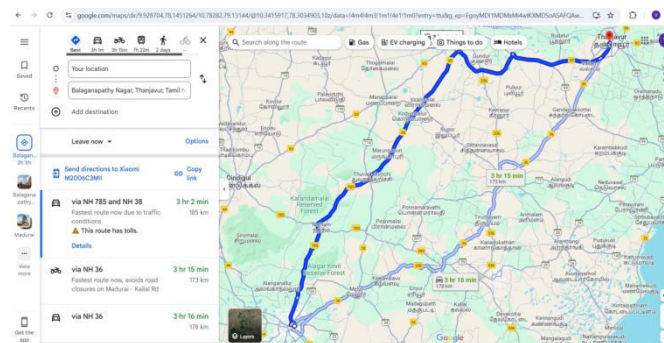


Fig 3: Map directions to the site

Fig. 3, The "Get Directions" button, when clicked, opens Google Maps , providing users with directions to the specified destination coordinates. It also displays the estimated travel time, helping users to plan accordingly.

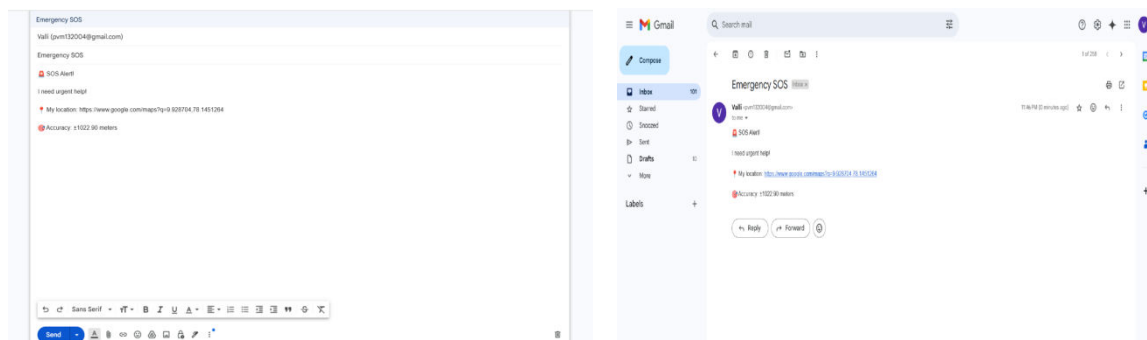


Fig 4 : SOS Alert mail

Fig. 4 the "SOS" button triggers the system to retrieve the user's location and generate an email with the location details. The email is sent to a predefined address for emergency assistance.

V. CONCLUSION

This system demonstrates the potential of AI and geolocation technology to enhance the experience of heritage tourism in Tamil Nadu. With the use of language models, geolocation services, and multi-language support, the system offers an interactive and personalized way to experience heritage sites. Real-time feedback, audio guides, and location-based tips are some of the functionalities that offer a seamless and immersive experience. Challenges like geolocation accuracy, internet reliance, and language translation need to be addressed. Improvements in the coming years should be offline functionality, geolocation accuracy, and augmented reality integration. Ultimately, this system has the potential to transform cultural tourism to be more accessible and interactive for global tourists.

Future development will be on improving geolocation accuracy with advanced technologies such as IPS and Wi-Fi services, incorporating AR for interactive site exploration, providing offline functionality for remote locations, and making personalized recommendations based on user interest. This will offer a more immersive and accessible experience for heritage site visitors.

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