ISSN: 2582-7219

International Journal of Multidisciplinary Research in Science, Engineering and Technology

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

Impact Factor: 8.206 **Volume 8, Issue 7, July 2025**

© 2025 IJMRSET | Volume 8, Issue 7, July 2025| DOI:10.15680/IJMRSET.2025.0807056

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

Tourism Explorex: An AI-Driven Location-Based Travel Recommendation System

Mr P Alagu Manohar[1], UdhayaKumar[2], Dhanushya[3], Aswin John[4], Prithishakaran[5]

Assistant Professor(sg), Department of Computer Science and Engineering, Karpaga Vinayaga College of Engineering and Technology, Chengalpattu, Tamil Nadu, India[1]

Department of Computer Science and Engineering, Karpaga Vinayaga College of Engineering and Technology, Chengalpattu, Tamil Nadu, India[2-5]

ABSTRACT: Tourism Explorex is a machine learning-powered travel companion system designed to provide real-time, personalized travel recommendations. This paper presents the architecture, methodology, and implementation of a mobile/web platform that integrates AI algorithms, GPS navigation, weather APIs, and natural language processing to enhance user travel experiences. The system leverages clustering, classification, and sentiment analysis to tailor suggestions to individual travelers while improving tourism service optimization. This study demonstrates how intelligent automation and user-centric design can drive sustainable, data-driven travel experiences.

KEYWORDS: Tourism, Machine Learning, Location-Based Services, Travel Recommendation, Artificial Intelligence, NLP.

I. INTRODUCTION

Traveling is one of the most enriching activities, yet it often poses various challenges for modern tourists, especially in unfamiliar places. Common issues include identifying relevant destinations, determining suitable accommodations, and accessing reliable navigation and weather information. With the rise in tourism and the widespread use of smartphones, there is a significant need for intelligent applications that can assist users in planning and experiencing their trips efficiently.

Tourism Explorex aims to address these challenges by offering a comprehensive, AI-powered platform that enhances decision-making through personalized recommendations, real-time navigation, weather updates, and intelligent virtual assistance. The increasing availability of travel data from social media, review platforms, and location services provides an opportunity to build such smart systems. This paper introduces Tourism Explorex and details its system design, technological stack, performance evaluation, and potential for large-scale deployment.

II. LITERATURE REVIEW

Numerous studies have investigated the use of context-aware systems and recommendation algorithms in tourism. For instance, Abowd et al. [1] conducted foundational work on context-aware computing, while Adomavicius and Tuzhilin [2] examined the framework for recommender systems. These studies form the backbone for modern AI-driven travel platforms.

Google Maps, TripAdvisor, and Airbnb Experiences are widely used platforms, yet they lack integrated personalization and often require users to consult multiple sources. Research by Liu et al. [3] on using geotagged photos to predict travel patterns reveals how big data can optimize recommendations. Similarly, context-aware applications [4] and deep learning models [5] have been proven effective in refining personalized experiences.

Additionally, recommendation systems using collaborative filtering, content-based filtering, and hybrid models have shown success in other domains like e-commerce and entertainment [6][7]. These principles can be effectively translated to tourism when combined with GPS and environmental data. Despite these advancements, existing systems still fail to

© 2025 IJMRSET | Volume 8, Issue 7, July 2025| DOI:10.15680/IJMRSET.2025.0807056

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

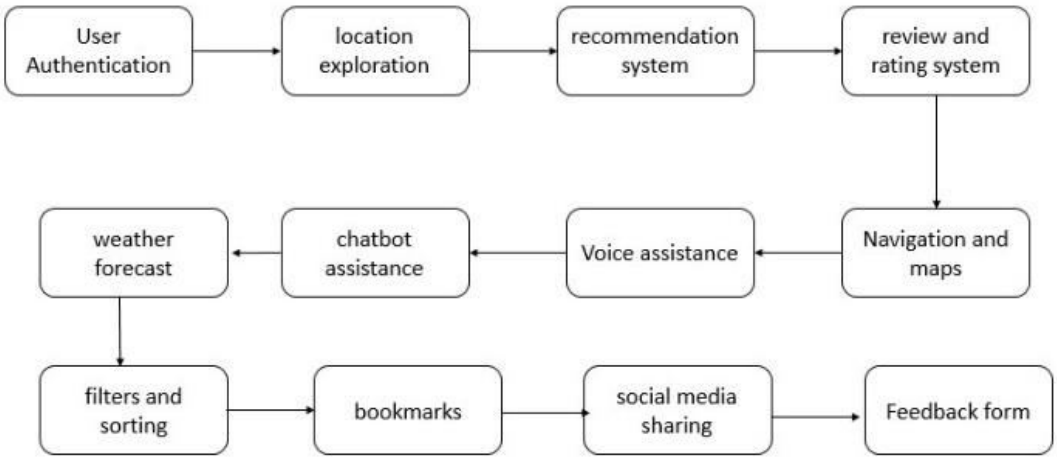
(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

unify navigation, recommendations, real-time weather updates, and virtual assistance. Tourism Explorex aims to fill this gap with an integrated and intelligent platform.

III. SYSTEM ARCHITECTURE AND DESIGN

A. System Overview

Tourism Explorex is designed with modular components to ensure scalability and flexibility. It offers personalized travel experiences through interconnected features including: location-based search, AI recommendations, chatbot/voice assistance, and weather alerts. The modular design allows components to function independently while interacting seamlessly.



B. Architecture & Modules

The system follows a client-server architecture:

- Frontend: Built using React.js for web and React Native for mobile.
- Backend: Flask (Python) handles logic and API routing.
- Database: MysqlDB stores user data, preferences, locations, and reviews.
- APIs: Integration with Google Maps API for navigation, OpenWeather API for forecasts

Key Functional Modules:

- Recommendation Engine: Uses ML models (K-Means, Decision Trees, Logistic Regression) to suggest destinations.
- Navigation Module: Offers directions, maps, and nearby places using geolocation.
- Chatbot & Voice Assistant: Facilitates user queries, feedback, and travel advice.
- Weather Forecast Module: Displays real-time climate updates to support trip planning.
- Review Sentiment Analyzer: Parses user reviews and assigns scores using NLP techniques.

C. UML & Data Flow Diagrams

The use case diagram highlights core user interactions such as login, search, view details, and feedback submission. Sequence diagrams illustrate how user requests traverse the UI, backend, and third-party APIs. Activity diagrams show end-to-end flows of a search-recommendation-bookmark cycle.

D. Database Design

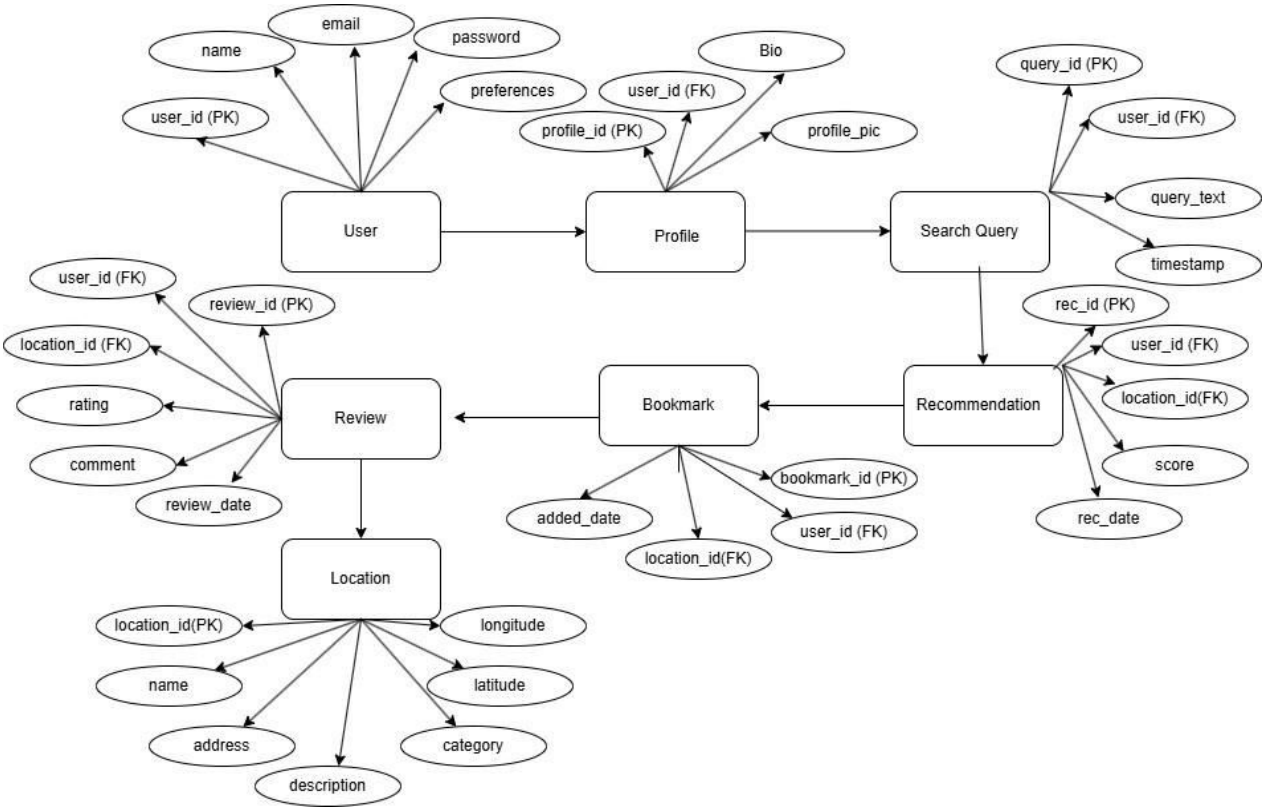
The ER diagram comprises entities like Users, Locations, Reviews, Bookmarks, and Recommendations. Relationships are optimized through normalization and indices to ensure performance. Primary keys and foreign key constraints maintain integrity. Data security is ensured through encrypted fields and access roles.

© 2025 IJMRSET | Volume 8, Issue 7, July 2025| DOI:10.15680/IJMRSET.2025.0807056

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

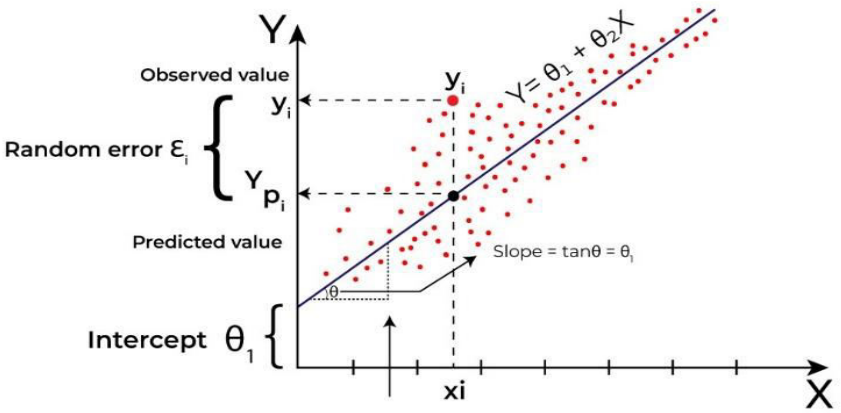


IV. IMPLEMENTATION AND TECHNOLOGIES

A. Backend & Frontend Development

Frontend interfaces are built with modern UI libraries and designed to be responsive. Backend development leverages Flask's routing and session management capabilities. REST APIs support data exchange between client and server. Firebase Authentication ensures secure sign-in and token validation. MongoDB handles large unstructured data efficiently.

B. AI Algorithms Used



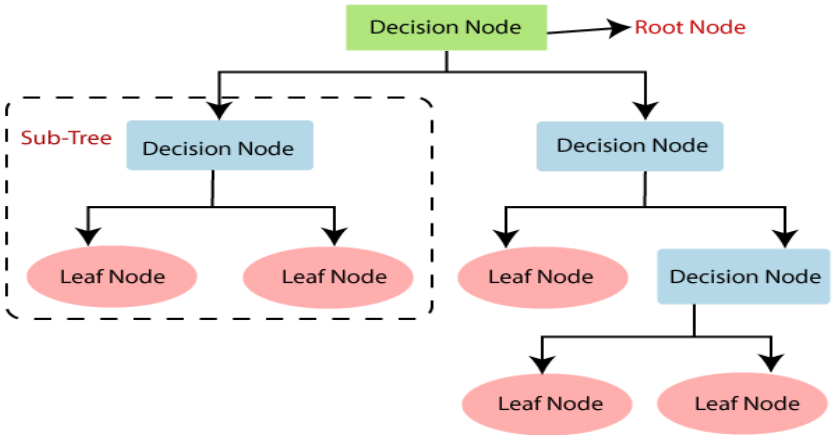
© 2025 IJMRSET | Volume 8, Issue 7, July 2025| DOI:10.15680/IJMRSET.2025.0807056

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

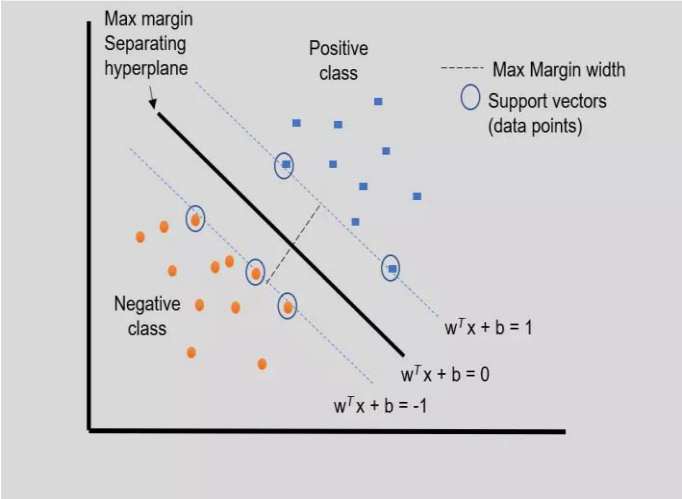
International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

1. Logistic Regression: For binary classification tasks such as filtering visited vs unvisited places.
2. K-Means Clustering: Groups similar locations based on user interests and geographic proximity.
3. Decision Trees: Used to dynamically adjust suggestions based on input attributes like weather, time, and budget.



4. NLP Techniques: Applied to analyze user reviews and extract sentiment scores using libraries like NLTK and spaCy.
5.



C. Modules & Functionalities

- Authentication: OAuth2.0 for social logins, JWT for session handling.
- Search: Real-time query of locations using category, radius, and filters.
- Feedback & Ratings: Users rate and comment on visited locations.
- Weather Assistant: Notifies changes in weather with suggestions.
- Chatbot (NLP): Powered by spaCy or NLTK, offering interactive help.
- Voice Commands: Uses speech recognition libraries for hands-free actions.
- Bookmarking & Sharing: Allows users to save and share favorite spots.

V. TESTING AND RESULTS

A. Testing Methodology

Testing included:

- Unit Testing: Testing individual modules such as login, recommendation.
- Integration Testing: Verifying combined functionality, e.g., map and navigation sync.
- System Testing: Full application testing in staging environment.

© 2025 IJMRSET | Volume 8, Issue 7, July 2025| DOI:10.15680/IJMRSET.2025.0807056

ISSN: 2582-7219 | www.ijmrset.com | Impact Factor: 8.206| ESTD Year: 2018|

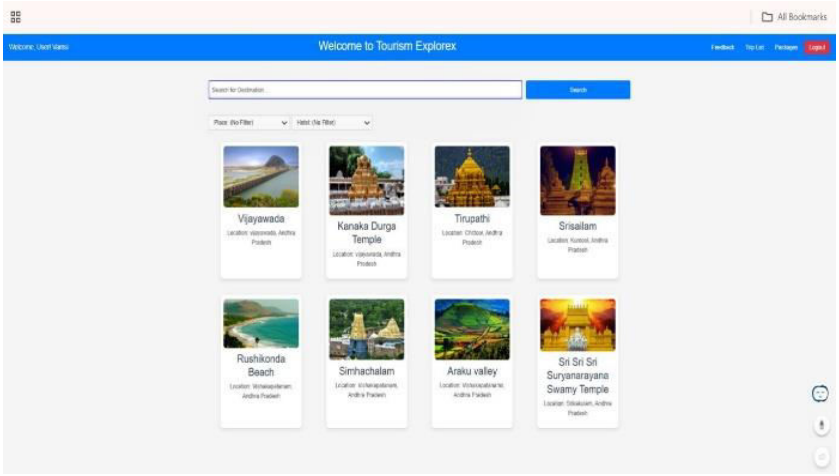
International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

(A Monthly, Peer Reviewed, Refereed, Scholarly Indexed, Open Access Journal)

- Testing: SQL Injection, authentication spoofing, and session hijack simulations.
- Usability Testing: Assessing the user interface and ease of navigation with real users.

Test Case	Description	Expected Result	Status
TC01	User Login with OAuth	Access granted and session created	Pass
TC07	Real-time weather fetch	Accurate current forecast shown	Pass
TC12	Recommendation Update	Personalized list updates on feedback	Pass
TC16	Voice Assistant Functionality	Correct response to voice commands	Pass
TC21	Bookmark Save/Share	Bookmark saved and shared correctly	Pass

B. Test Case Highlights



VI. CONCLUSION AND FUTURE WORK

Tourism Explorex successfully demonstrates the use of machine learning and contextual data to enhance user travel experiences. The system's integration of diverse modules into a single platform helps users make informed decisions and improves satisfaction.

Future enhancements include:

- Augmented Reality integration for immersive navigation.
- Expanding the recommendation engine using deep learning models like LSTM or BERT.
- Multilingual support to reach global users.

- Offline functionality for areas with poor connectivity.
- Improved data privacy protocols and GDPR compliance.
- User behavior prediction using historical logs.

Tourism Explorex not only bridges existing gaps in tourism apps but also sets the groundwork for future intelligent travel companions.

VII. ACKNOWLEDGMENT

The author would like to thank the project guide, faculty mentors, and peers for their valuable support and feedback throughout the development of this system.

REFERENCES

1. Chen, G., & Kotz, D. (2000). “A survey of context-aware mobile computing research”. Dartmouth Computer Science Technical Report.
2. Adomavicius, G., & Tuzhilin, A. (2005). “Toward the next generation of recommender systems”. IEEE Transactions on Knowledge and Data Engineering, 17(6), 734-749.
3. Resnick, P., & Varian, H. R. (1997). “Recommender systems”. Communications of the ACM, 40(3), 56-58.
4. Zheng, Y., Zha, Z.-J., & Chua, T.-S. (2012). “Mining travel patterns from geotagged photos”. ACM Transactions on Intelligent Systems and Technology (TIST), 3(3), 1-18.
5. Li, Y., & Liao, J. (2018). “A location-based recommendation system for tourism using deep learning. Expert Systems with Applications”, 91, 366-372.
6. Buhalis, D., & Amaranggana, A. (2015). “Smart tourism destinations: Ecosystems for tourism destination competitiveness”. In Information and Communication Technologies in Tourism 2015. Springer, Cham.
7. Werthner, H., & Ricci, F. (2004). “E-commerce and tourism”. Communications of the ACM, 47(12), 101-105.
8. Hwang, J., & Kim, H. (2020). “Smart tourism: AI and big data applications”. Tourism Management Perspectives, 33, 100626.
9. Schilit, B., Adams, N., & Want, R. (1994). “Context-aware computing applications. In
10. Proceedings of the 1st International Workshop” on Mobile Computing Systems and Applications (pp. 85-90). IEEE.
11. Bao, J., Zheng, Y., Wilkie, D., & Mokbel, M. (2015). “Recommendations in locationbased social networks: A survey”. In GeoInformatica, 19(3), 525-565.
12. Statista Research. (2023). “Market size of location-based services worldwide 2023. Statista”. Retrieved from www.statista.com
13. Google Travel Insights. (2022). “Trends in traveller behaviour post-pandemic”. Google Research. Retrieved from www.google.com/travel
14. McKinsey & Company. (2021). “The future of digital tourism: How technology is shaping travel experiences”. McKinsey Digital Report. Retrieved from www.mckinsey.com
15. “Google Maps API Documentation”. (2024). Google Developers. Retrieved from https://developers.google.com/maps
16. OpenAI GPT for Travel Recommendations. (2023). “AI for Travel & Tourism”.
17. Retrieved from https://openai.com/research

INTERNATIONAL STANDARD SERIAL NUMBER INDIA

INTERNATIONAL JOURNAL OF MULTIDISCIPLINARY RESEARCH

IN SCIENCE, ENGINEERING AND TECHNOLOGY

| Mobile No: +91-6381907438 | Whatsapp: +91-6381907438 | ijmrset@gmail.com |

www.ijmrset.com