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ENHANCING TOURIST ENGAGEMENT THROUGH MOBILE ITINERARY MANAGEMENT AND LOCATION-BASED SERVICES: DESIGN AND DEPLOYMENT EXPERIENCE IN IPOH, MALAYSIA

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ABSTRACT

Tourism in Ipoh still faces challenges due to the lack of personalized digital guidance and itinerary support. The main problem encountered by tourists is the difficulty in planning their trips, the absence of tailored recommendations, and inefficient navigation within the city. The objective of this study is to develop the iGuide Ipoh mobile application to assist tourists in planning itineraries, receiving real-time navigation, and exploring recommended attractions. The methodology adopted was Agile development, using Android Studio, Java, Firebase, and Google Maps API. The application was tested through functional and integration testing, followed by surveys with two stakeholder groups (Tourism Perak officers and the public). The results show that most respondents found the application easy to use, beneficial for trip planning, and potentially supportive of local tourism promotion (e.g., 87% of public users indicated they would recommend the app to others). The conclusion highlights that mobile applications with location-based services have strong potential to enhance tourist satisfaction, although further improvements such as offline functionality, multilingual support, and deeper integration with local businesses are recommended.

1. Introduction

The growth of mobile technology has significantly impacted how tourists plan and experience their travel. In cities like Ipoh, Malaysia known for its cultural heritage and scenic attractions, tourists often face difficulties in organizing their itineraries and navigating the city without localized digital guidance. Despite the growing reliance on mobile apps, there is still a gap in tailored solutions that provide personalized itinerary planning, navigation, and attraction recommendations within the local context.

Smart tourism applications have the potential to transform visitor experiences by integrating mobile technology with user-centered design. Smart tourism apps that incorporate location-

based services have been shown to positively influence tourist engagement and loyalty, especially when ease of use and perceived autonomy are prioritized (Xiong & Zhang, 2024). Popular platforms such as TripAdvisor, Klook, and TripIt have demonstrated the effectiveness of features like user reviews, curated experiences, and travel planning tools. For example, (Wong et al. 2022) developed Go. Travel, a smart tourism guide application using LBS, which demonstrated the usefulness of integrating real-time navigation into travel applications. Inspired by these platforms, the iGuide Ipoh application as in Figure 1 was developed with the aim of offering a simplified, feature-rich mobile experience tailored for tourists exploring Ipoh.

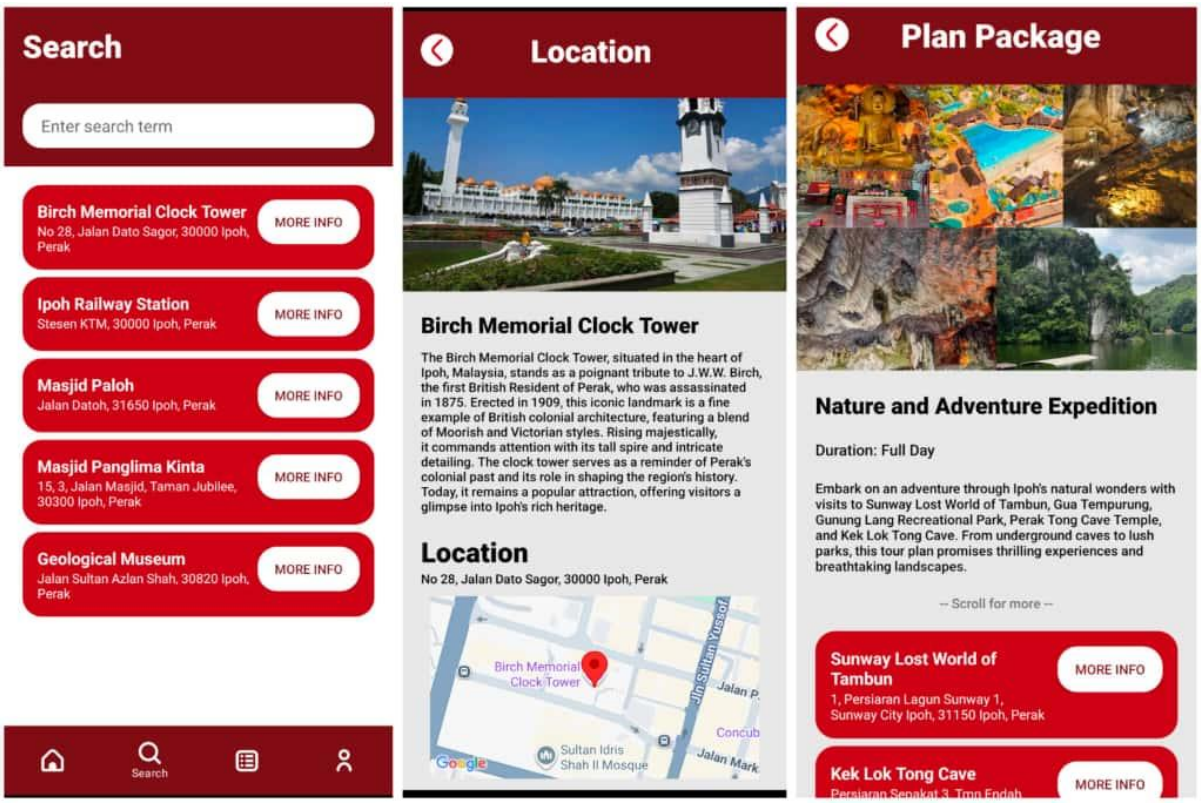

Figure 1. Sample user interface screens of iGuide Ipoh application

This paper presents a case study on the design, development, and evaluation of the iGuide Ipoh mobile application. It addresses the research problem of limited personalized guidance for tourists in Ipoh by introducing a digital solution that combines itinerary management and location-based services. The study also explores how intelligent mobile applications can improve tourist engagement and support local tourism through user-friendly interfaces and context-aware functionalities.

Roadmap: The remainder of this paper is structured as follows: Section 2 presents the methodology used in developing the iGuide Ipoh application, Section 3 describes the results and stakeholder feedback, Section 4 provides a discussion of findings, and Section 5 concludes the study with recommendations for future improvements.

2. Methodology

The iGuide Ipoh application was developed using the Agile methodology, which emphasizes iterative development and continuous user feedback. The project spanned 15 weeks, with tasks scheduled and tracked through a Gantt chart.

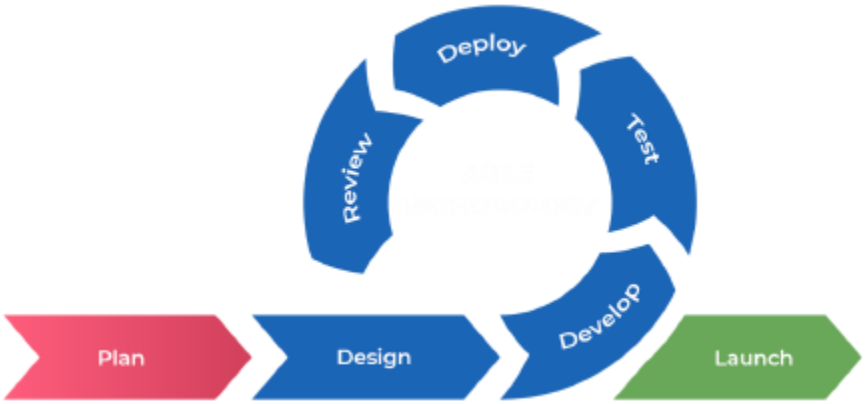

Figure 2. Diagram Agile Methodology

1. **Planning phase:** Defined project goals, focusing on itinerary planning, navigation, and recommendations.
2. **Design phase:** Created wireframes, mock-ups, and database architecture. User interface prototypes were developed to prioritize usability.
3. **Development phase:** The app was incrementally built using Android Studio and Java. Firebase was implemented for authentication and real-time data storage.
4. **Testing phase:** Rigorous unit and integration testing were carried out, covering login, profile management, itinerary creation, navigation, and recommendation modules.
5. **Deployment phase:** The application was deployed for controlled testing with selected participants rather than a public release on app stores.
6. **Review phase:** Feedback was collected from both Tourism Perak representatives and public users via structured questionnaires.

The Agile approach provided flexibility, ensuring continuous iteration based on real-world testing and input. Firebase was used to manage user accounts, save itinerary data, and provide access to recommendations. The integration with Google Maps allowed real-time navigation, enhancing the location-based functionality of the app.

3. Acknowledgements

The effectiveness of the iGuide Ipoh application was evaluated through surveys with two key stakeholder groups: Tourism Perak representatives (n=10) and public users (n=29).

3.1 Feedback from Tourism Perak:

Feedback from Tourism Perak was gathered through structured questionnaires and review sessions. Officials highlighted that:

- The application aligns with Tourism Perak's mission to promote Ipoh as a cultural destination;
- The app simplifies trip planning by integrating itinerary creation, attraction recommendations, and navigation;
- The interface was considered user-friendly, with potential to strengthen local tourism initiatives.

3.2 Feedback from Public Users:

A total of 29 public users participated in the evaluation survey. The feedback was highly positive across several dimensions (see Figure 3).

- Ease of navigation: 86.2% of respondents reported that the application was easy to use in navigating and finding information, while 13.8% felt otherwise;
- Unique insights: 96.6% agreed that the app provided new insights or attractions in Ipoh that they would not have discovered on their own;
- Helpfulness of itineraries: 93.1% indicated that the suggested tours and itineraries were helpful in planning their visit, while only 6.9% found them less useful;
- Willingness to recommend: 86.2% of respondents stated that they would recommend the app to friends or family visiting Ipoh, while 13.8% were neutral or not likely to recommend.

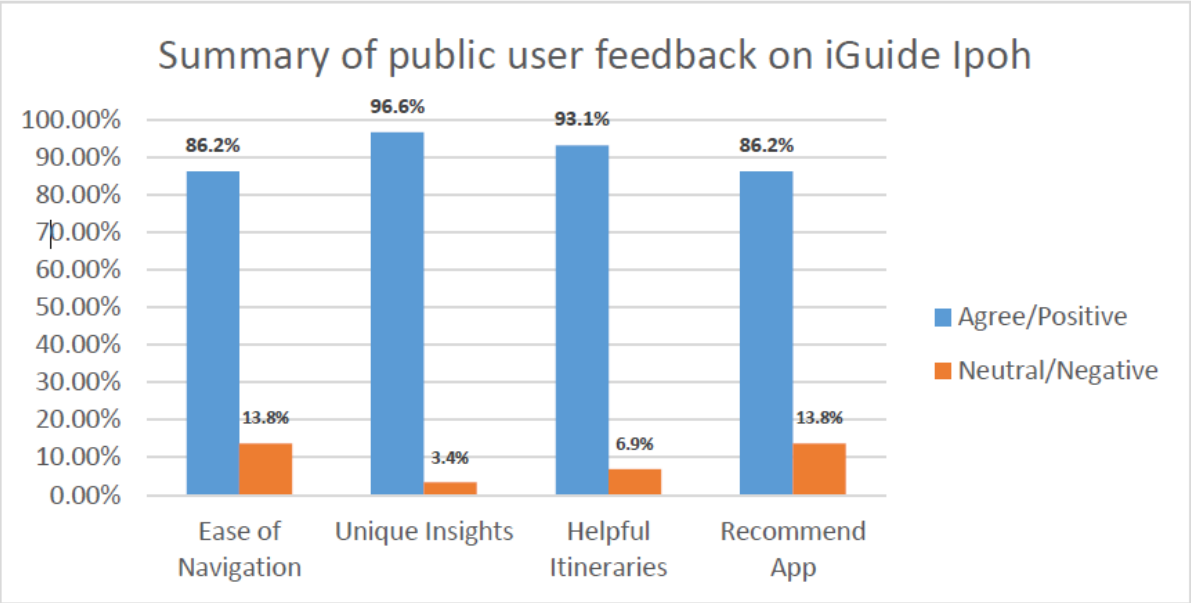

Figure 3. Summary of public user feedback on iGuide Ipoh

Overall, most public users expressed satisfaction with the application's usability, content relevance, and practical support for trip planning. This suggests that the iGuide Ipoh application

can enhance tourist engagement and improving awareness of local attractions.

4. Discussion

The positive feedback from both stakeholders confirms that mobile itinerary planning combined with location-based services can significantly improve the tourist experience in heritage cities like Ipoh. Compared to traditional paper maps or generic travel apps, iGuide Ipoh offers a focused, localized solution that leverages mobile technology to meet tourist needs. This is in line with recent reviews that highlight how smart travel apps provide more personalized and efficient travel planning through mobile-based features (Sia, Saidin, & Iskandar, 2022).

The modular structure of iGuide Ipoh comprising itinerary planning, interactive maps, navigation, and personalized recommendations mirrors successful features found in global platforms like TripIt and Klook. These features have been identified as key drivers of continued usage and user loyalty in mobile tourism apps (Putra, Wahyumurti, & Budi, 2022). However, unlike these general-purpose apps, iGuide Ipoh emphasizes local relevance, supporting sustainable tourism by promoting lesser-known sites in Ipoh.

Usability was a central focus in development, and the Agile methodology ensured that interface enhancements could be quickly implemented in response to user feedback. The use of Firebase for authentication and data management streamlined both performance and maintenance, while Google Maps integration enabled real-time and accurate navigation assistance.

The results support existing literature on smart tourism and mobile usability, suggesting that well-designed apps not only aid individual tourists but also play a role in broader tourism promotion efforts. Well-designed mobile tourism applications must also prioritize usability evaluation during development to ensure better user satisfaction (Hashim & Isse, 2019). Future versions of the app may integrate AI-driven recommendations and multilingual support to reach an even wider audience. Future enhancements may include AI-driven itinerary recommendations, following approaches such as BERT-based trajectory models designed for personalized tour suggestions (Ho, Lee, & Lim, 2023).

5. Conclusion

iGuide Ipoh was developed to enhance the tourist experience in Ipoh through a mobile solution that integrates itinerary planning and location-based services. The app successfully addressed common travel issues by offering easy-to-use features such as attraction search, navigation, and trip planning.

Feedback from both public users and tourism officials indicated that the app was well-received, with praise for its user interface, ease of navigation, and practical usefulness. The application not only supports individual tourists but also contributes to the promotion of Ipoh as a travel destination.

In conclusion, mobile applications like iGuide Ipoh demonstrate strong potential in supporting

smart tourism, especially when grounded in local context and built using iterative, user-centred approaches. Further development can enhance functionality by incorporating features like offline access, multilingual interfaces, and advanced personalization.

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