

MOBILE SOFTWARE FOR GUIDING TOURISTS IN UTTARAKHAND

*Charvi Rathod

**Prem Sharma

***Akash Singh

****Komal Dhule

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Corresponding Author: Akash Singh; Email: akash.singh123469@gmail.com doi:10.46360/globus.mgt.120242006

Abstract

This paper reviews the enthralling category in the world of mobile software - Tourist Guidance Systems. When stuck at a tourist spot, one would assumingly be unfamiliar with the place and naturally, would need some sort of assistance to know more about the surroundings. In a situation as such, an aid available at the tip of one's fingers would be of great benefit. The proposed mobile software is just the aid an individual might need. In this guidance system, the authors have implemented a framework of Google that will allow the users to have a familiar and friendly experience with the User Interface of the application. Features and functionalities are invoked in the form of widgets. These widgets serve as the interactive UI in the application. Some additional features of the proposed software include vital information and a list of things to be looked out for before visiting Uttarakhand, a state with extreme temperatures and intensely variable geography, so the tourists can be well prepared. Along with that is the information of all nearest services based on the location that the tourist can turn to in the hour of emergency. Furthermore, the authors state the advantages of using this software as compared to the existing systems and how the gaps are bridged.

Keywords: Tourist Guidance System, Mobile Software, Google Framework, User Interface, Widgets.

Introduction

Hands-free devices also known as mobile phones have made a critical excursion in the province of tourism. These devices have shown different intricate qualities that allow the tourist to look for assistance in an isolated environment. Since tourism seems to have a substantial influence in augmenting a nation's economy and societal employment, the creation of mobile guidance software is essential. Nowadays, the most fundamental issues appear to have been resolved, and the sophistication of smartphones and tablet assistants has risen, leading to the establishment of research and commercial brand names (e.g., Mobile Travel Buddy, Mobile Travel Guide).

However, numerous limitations of mobile computing must be thoroughly examined by tourist-related service providers: limited energy capacity, constrained computing power, quantity of memory and storage space; smaller screen layout, inadequate color and font number support, compact and stressful to even use keyboard; low network bandwidth and exorbitant cost of wireless connections. Most existing conventional applications and research methodologies throughout the discipline of mobile tourism fall into three broad categories, which may include:

- Tourist or exhibition help guide with pre-installed software packages, i.e., content that is rigidly defined and cannot be customized based on user preferences.
- Digital phones always like to connect mobile browsers and web portals to search for tourist information.
- Wireless handheld guides are devices that access context-aware services via wireless or mobile network or GPS connections.

In this study, we suggested a model for a travel guide app developed by the Indian government specifically for Uttarakhand. The government will use this model to help create policies for digital tourism. Since almost 90% of people in society use mobile devices-specifically, smartphones-to find information connected to travel, these devices are used for model implementation. Because of this, we concentrated on the laws governing these three

platforms-mobile web, Android, and iOS-as well as the difficulties associated with creating applications.

The process of developing a smartphone application was employed in this study. MASAM, SLeSS, and Mobile-D are a few development methodologies created. This method was discovered in 2008 with the work process, namely preparation, embodiment, development, and commercialization, and it is suitable for development in small businesses. SLeSS is a SCRUM development method that has five work steps: definition, measurement, analysis, improvement, and control. SLeSS was discovered in 2011, and its application was specifically for embedded software development, whereas Mobile D is a pioneering method in the field of mobile application development processes. The Mobile D method can be done in groups of up to ten individuals, and the time required for computation is relatively short, taking less than ten weeks. Mobile-D first appeared in 2004; it is a development method that prioritizes speed in both development and change processes, with five stages, namely: explore, initialize, production, stabilize, system test, and fix.

The following is how the paper is organized. Section 3 discusses previous surveys in the field of mobile tourist guides, while Section 5 introduces our evaluation framework, which includes a classification of mobile tourist services as well as a definition of certain services' design dimensions. Section 6 discusses the findings and implications for future research before concluding the paper with a summary in Section 8.

Objectives

The primary objectives of this study are to develop a tailored mobile application model for the Uttarakhand government, aiming to facilitate the formulation and implementation of digital tourism policies. The study aims to contribute to the advancement of mobile technology in the tourism sector, fostering improved user experiences and supporting the growth of the local economy. They are as follows:

- Create a mobile application model tailored for the Uttarakhand government to aid in the formulation and implementation of digital tourism policies.
- Identify and mitigate challenges faced by tourist-related service providers, such as limited energy capacity, computing power, and network bandwidth, ensuring a more robust and user-friendly mobile tourism experience.
- Introduce features that allow users to customize their tourism experience, moving beyond rigid pre-installed software, and

offering personalized content based on individual preferences.

- Focus on the development of the mobile application for popular platforms, including Mobile web, Android, and IOS, to maximize accessibility and utility for the approximately 90% of society using smartphones for tourism-related information.
- Assess and compare mobile development methods (e.g., MASAM, SLeSS, Mobile-D) to determine the most effective approach for creating the travel guide application, considering factors like development speed, adaptability, and suitability for small businesses.

Literature Survey

The focused study that was conducted on a variety of websites and applications created to provide information to tourists is presented in this section as its result. It might be possible to find a range of flaws in these websites and applications through critical examination that would make consumers dissatisfied. A lack of user-friendliness, a failure to receive detailed information anonymously due to the fact that many applications require users to register with their personal email addresses or Facebook identities in order to receive more information, and a lack of security owing to the fact that personally identifiable information, such as tour plans, places visited with times and dates associated with those visits, etc., is stored on the servers of the service provider, are among the biggest shortcomings encountered. Lack of targeting was another significant problem noticed, as there was no segmentation of tourists and numerous websites included various points of interest, including shopping outlets, entertainment venues, and other tourist destinations, on a single page or listing.

According to the research done by Deepak Kaushal, Anuj, Kamal Pant and Mandakini Sharma (2020), customers are significantly influenced by mobile applications when deciding on their travel location. Data was gathered from clients as well as tour operators in order to achieve this goal. The study's findings indicate that customers' choices about their trip destinations are significantly influenced by mobile applications. This comprises the crucial elements of perceived trust and utility, as well as the mediation of attitudes toward mobile applications, which help travel and tourism-related businesses improve their offerings for better outcomes. Any company that works in the tourism sector, if it manages its mobile application well, may benefit from a competitive edge over its rivals.

C. Grün, H. Werthner, B. Pröll, W. Retschitzegger and W. Schwinger (2008) proposed an extensive framework based on a comprehensive evaluation

framework that goes beyond previous ones by offering a classification of services as well as three design dimensions for how those services might be tailored for the end user. The emphasis has shifted away from technical concerns and mobile limits in mobile applications and toward the total value of the services. The evaluation methodology assists suppliers of mobile tourist guides in gaining a comprehensive perspective of their services and developing methods for differentiating their services from others. It can be used as the foundation for consumer field research on how people react to various types of services in terms of service delivery, service commencement, and service modification.

Chawda, Yogendra Singh (2022), present the creation of a tourist guide system based on Android. The system is built on a three-tiered design. The system allows users to search for information about tourist attractions such as hotels, restaurants, museums, and live entertainment. The system combines a smartphone and the Internet to facilitate the user's journey. A new Semantic Web framework for information sharing and reuse is presented. The Semantic Web enforces information expressed in web resources by applying agent technologies. This opens it up to collaboration between humans and computers, possibly in conjunction with intelligent network services such as search agents.

Challenges

In this part, we list the difficulties that need to be resolved for the prototype mobile application designed for Uttarakhand travellers to function. A few apps that provide information about Uttarakhand tourism and are accessible on the Android Play Store and the iOS Appstore serve as examples of these difficulties. The majority of applications don't go into great detail about B2B (business-to-business) processes; instead, they merely offer information about tourism.

- **Difference between Mobile Platforms:** The first factor that makes mobile development a topic is the variation between mobile platforms. Numerous users and communities utilize several platforms, including mobile web, Android, and iOS.
- **Internet Access:** Although Uttarakhand has recently gained access to internet connectivity in the major places, the lack of broadband connection has been a problem that has so far taken on a life of its own. The existing disparity in internet connection between major regions of Uttarakhand continues to be concentrated mostly in areas with the potential to attract tourists.
- **Unorganised Travel Guide:** There are numerous tourist attractions in Uttarakhand that visitors can visit, although this is

restricted by limited infrastructure and the availability of travel guides. Tourists find it challenging to visit Uttarakhand's tourist attractions because the majority of travel guides are written by people from outside the region. Making a guideline and a blueprint that the Government of India can adopt for Uttarakhand to enhance tourist attractions is therefore important.

Methodology

Problem Statement

Tourists visiting Uttarakhand face challenges in finding comprehensive and reliable information about tourist destinations, activities, and services in the region. As a result, they often miss out on key experiences and miss opportunities to fully enjoy their visit. There is a need for a comprehensive, easy-to-use mobile app that provides tourists with accurate and up-to-date information about the region, including recommendations for things to do and see, places to stay, and local services.

This problem definition sets the stage for the development of a tourism app that addresses the needs and challenges of tourists visiting Uttarakhand. The app should be designed to provide tourists with the information they need to make the most of their visit, including recommendations for tourist destinations, activities, and services in the region.

Mobile-D Development

Currently, creating mobile applications is an extremely challenging undertaking because of the unique requirements and the technological limitations of the mobile environment, such as

- Terminal devices' restricted efficiency and rapid evolution,
- Various standards, protocols and network technologies,
- Must be able to run on a variety of platforms,
- Particular requirements of the mobile terminal user and,
- Strict time to market requirements.

We are using the Mobile-D agile development approach to address the difficulties associated with developing mobile applications. With the help of the Mobile-D technique, a group of fewer than ten developers working in a shared workspace may produce a highly integrated mobile application in under ten weeks. Three firms that produce mobile software products and services collaborated to form Mobile-D. The approach has passed the certification testing for CMMI level 2.



Figure 1: Mobile-D Flowchart

Research and Analysis

- By conducting surveys and interviews we can understand the profiles of a typical tourist visiting Uttarakhand, including their age, interests.
- We can also analyze existing tourism apps and websites that cater to tourists visiting Uttarakhand, and identify their strengths and weaknesses.
- Conducting research to understand the key tourist destinations, activities and services that are most in demand in Uttarakhand.
- Conducting user testing sessions to gather feedback on the app's design and features, and to validate the research findings.

This research and analysis will provide a comprehensive understanding of the market and target audience for a tourism app focused on Uttarakhand which is a beautiful yet difficult terrain. By taking these steps, the app can be designed to meet the needs of the target audience and provide a positive experience for tourists visiting Uttarakhand.

Conceptual Design

Uttarakhand is difficult terrain and it shouldn't be treated like normal tourist spots. After the heart-wrenching "cloudburst" of 2013 there is still fear among people regarding visiting Uttarakhand especially Kedarnath which is a very important pilgrimage among Hindus. Despite the government's continuous efforts to improve the infrastructure, there is still some work that needs to be done in order to make things better. This app can promote tourism in Uttarakhand. The basic approach is simple.

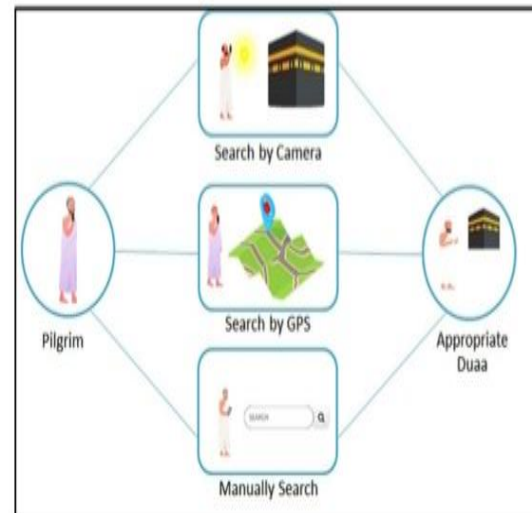


Figure 2: E-Tourism Design

The methods for gathering data will include field observations, library research, and interviews. It is helpful to explore the library for references related to earlier studies. Furthermore, the KNN method is used in this research's implementation. Based on the training data that are closest to the item, the KNN algorithm is used to classify objects. The given data creates independent clusters. Finding the shortest distance between the data to be evaluated and its nearest neighbour in the training data is the foundation of the K-Nearest Neighbour (KNN) algorithm.

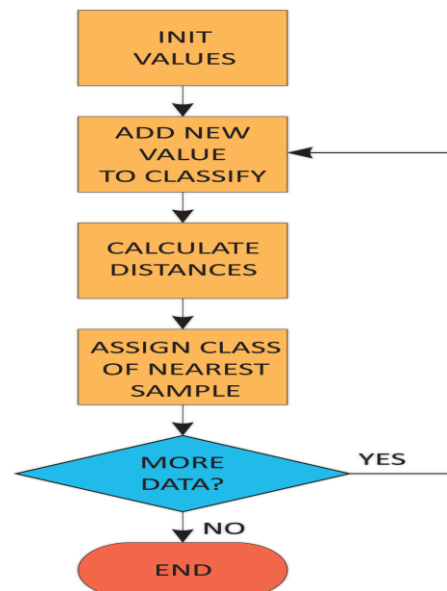


Figure 3: KNN Flowchart

Flutter is a cross-platform framework for creating a high-performance framework. Flutter was chosen as Google's application-level framework since it relies on the device's OEM widgets instead of just

consuming web views. Flutter applications run on Fuchsia in addition to Android and iOS. The hot reload feature in Flutter is known as stateful hot reload, and it is an important factor in shortening the development cycle. Dart is used to write every application in Flutter. Dart is a programming language created and maintained by Google.

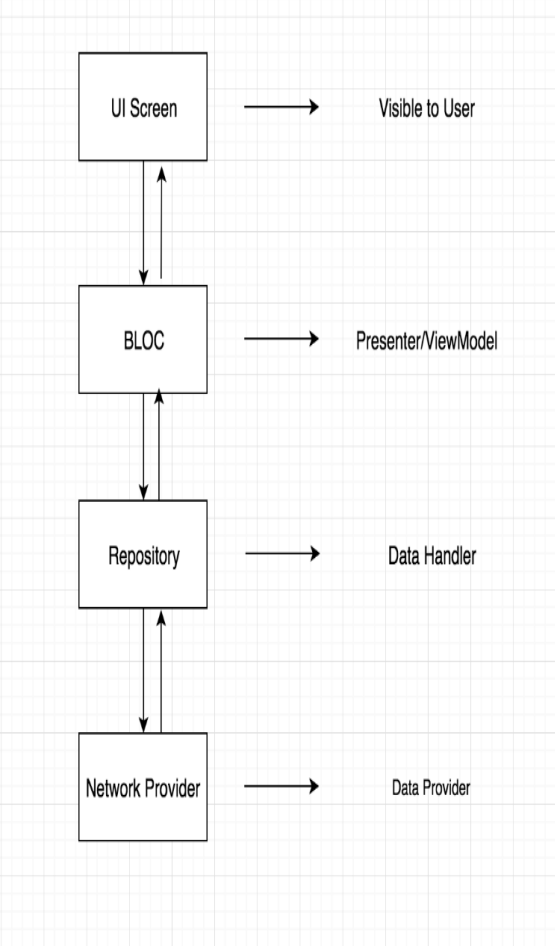


Figure 4: Google Flutter Block Diagram

Result

The application, developed using the Mobile-D methodology and Google-Flutter framework, strategically addresses these challenges by minimizing communication overhead, preserving battery life, and incorporating a data-caching technique to handle user queries locally, thereby reducing the cost of wireless network traffic. The emphasis on UI development ensures an engaging and user-friendly experience for tourists, empowering tour guide service providers with tools to understand their offerings comprehensively. Furthermore, the integration of the K-closest neighbour algorithm enhances the application's accuracy in categorizing newly discovered unlabelled data, facilitating effective customization and adaptation to diverse scenarios in the dynamic tourism landscape of Uttarakhand.

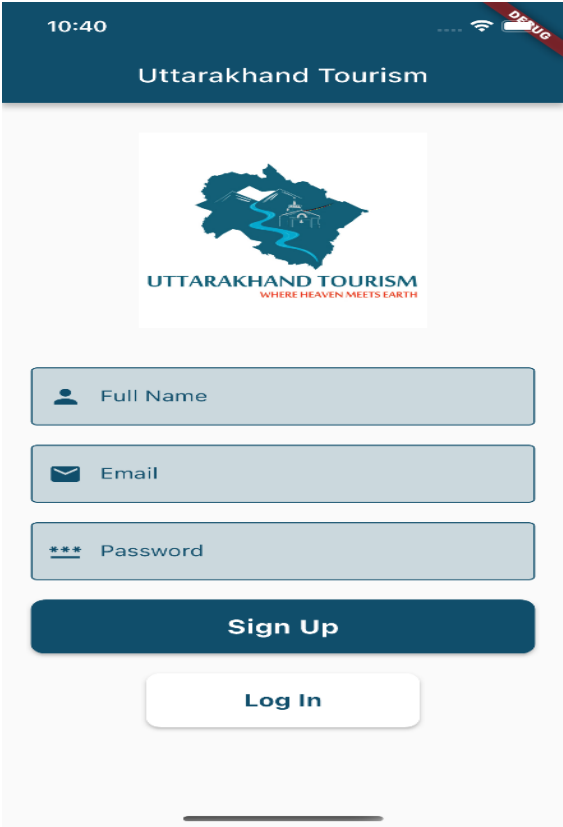


Figure 5: Registration Page of the Mobile Application

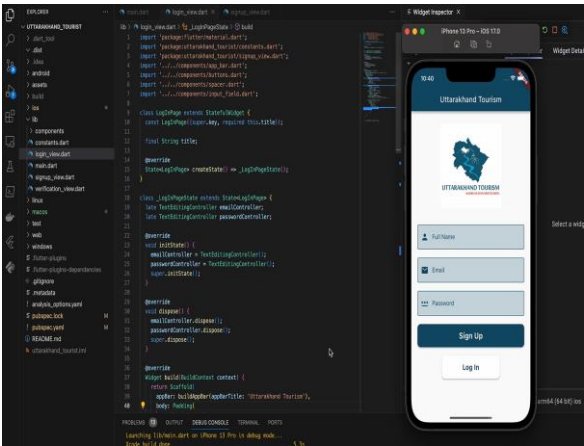


Figure 6: Application on an IOS device

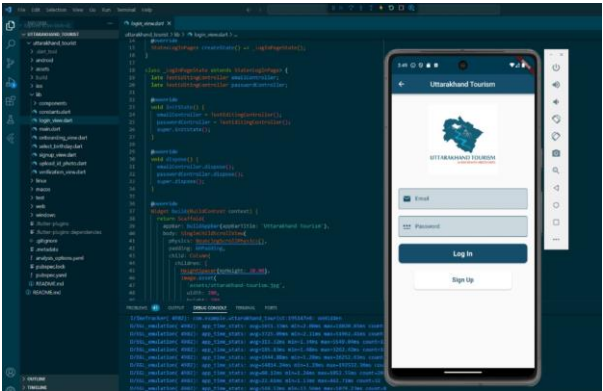


Figure 7: Application on an Android device

Conclusion

The state's enormous geographical, natural, and distinctive ecology, surrounded by gorgeous forests and rivers, provides significant opportunities for tourists to experience Uttarakhand. There are various roadblocks in the way of the state's tourist development that the government and locals must overcome.

The suggestion we make via a system based on mobile applications for tour operators in the Government of India for Uttarakhand. The government will use this approach to help with digital tourism policymaking. Utilizing the development method process, we leverage the steps of creating mobile applications in the proposed methodology (Mobile-D). We also create systems that minimize communication overhead and preserve battery life. A portion of the user's query can be handled locally using the data-caching technique, lowering the cost of wireless network traffic.

The Google framework i.e., Google-Flutter, aids mobile tour guide service providers in gaining a comprehensive understanding of their offerings and in formulating plans to set them apart from competitors' offerings. Additionally, the Google framework can serve as the foundation for field studies on customers' responses to various service delivery, commencement, and customization scenarios.

K-nearest neighbour is an easy-to-use, highly accurate approach that has proven effective in several scenarios. The nearest neighbour algorithm uses the classes of its closest neighbours to classify recently found unlabelled data.

Future Scope

The future scope of this mobile application extends beyond its initial implementation for Uttarakhand, presenting a promising opportunity for collaboration with other state governments in India. A potential avenue for expansion involves establishing partnerships with various state governments to customize and deploy the application for their respective regions. By securing tie-ups with multiple states, the mobile application could serve as a versatile and scalable platform, contributing to the overall digital transformation of tourism across the country. Such collaborations would enable the adaptation of the application to diverse geographical, cultural, and touristic landscapes, fostering a unified digital tourism ecosystem. Additionally, aligning with government initiatives at the national level could open avenues for standardization, creating a cohesive framework for tourism development. This expansion not only enhances the applicability and impact of the mobile

application but also positions it as a pivotal tool in the broader context of India's digital tourism policymaking and implementation.

Conflict of Interest

The authors declare that there are no significant competing financial, professional, or personal interests that might have influenced the performance or presentation of the work described in this manuscript.

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