WayPoint

CSIS 4495

Section 1

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Introduction

Traveling to British Columbia (BC) offers a rich tapestry of experiences, from serene natural landscapes to dynamic cultural festivals and adrenaline-fueled adventures or even just a relaxing day by the water. Despite the province's immense potential as a destination, trip planning often becomes an overwhelming task due to the sheer volume of information scattered across travel blogs, review platforms, and event websites. This inefficiency leaves travelers struggling to create personalized itineraries that zalign with their preferences, resulting in missed opportunities to fully explore BC's offerings.

In recent years, advances in technology have revolutionized how people plan their journeys. Mobile apps and AI-powered tools now play an integral role in simplifying trip planning. However, many of these solutions provide generic recommendations that fail to account for individual travel styles and preferences, leaving a gap for a truly personalized and dynamic travel planning experience.

Existing research highlights the increasing role of AI in enhancing user experiences in the travel sector. Applications leveraging AI, such as Google Travel and TripIt, streamline planning processes by integrating calendar-based itineraries and location services. However, these platforms often lack a deep level of personalization, especially for specific destinations like BC. Generic itineraries fail to consider niche preferences, such as travelers seeking culturally immersive experiences versus those seeking outdoor adventure. Additionally, platforms like Yelp and Eventbrite provide valuable insights into local events and dining options but lack seamless integration into a single itinerary management system. Research indicates that travelers prefer unified platforms that combine recommendations, itineraries, and offline access, yet few solutions address these needs comprehensively. This gap presents an opportunity to merge these functionalities into a single, cohesive travel planning application.

The goal of WayPoint is not only to simplify travel planning but also enhances the overall travel experience by delivering hyper-personalized suggestions. By incorporating AI, geolocation services, and real-time data, the application aims to reduce the time spent on research while maximizing the quality of recommendations, empowering travelers to explore BC more efficiently and effectively.

Hypotheses and Assumptions:

WayPoint operates under the hypothesis that a personalized travel planning application tailored to BC can significantly enhance users' travel experiences by reducing the time spent on research and increasing satisfaction with their trips. Key assumptions include:

- Users will be willing to complete a travel style quiz to receive more tailored recommendations.
- Integration of third-party APIs (e.g., Google Maps, Yelp, Eventbrite) will provide sufficient data for location-based and interest-specific suggestions.

- An AI-driven itinerary generator will simplify trip planning, making it more engaging and efficient.
- Offline mode and real-time updates will address connectivity challenges and improve usability for travelers.

Potential Benefits

The WayPoint application aim to provide several benefits:

- For travelers: Simplified trip planning, personalized recommendations, and enhanced experiences in British Columbia.
- For BC's tourism industry: Increased visitor engagement with local attractions, events, and businesses.
- For future research: A model for personalized travel applications that could be expanded to other regions or industries.

Proposed Research Project

This research aims to develop WayPoint, an intelligent travel planning application tailored specifically for visitors to British Columbia, focusing on simplifying the process of itinerary creation and enhancing user experience. The primary objectives of this project are to deliver a personalized and efficient solution that caters to individual preferences and travel styles, integrate diverse data sources into a cohesive platform, and leverage advanced technologies such as AI-driven recommendations and real-time geolocation services.

The methodology is rooted in insights from existing studies and knowledge gained from coursework in software development and database systems. The frontend, backend, database systems, and APIs are to be developed and integrated into the system design. Implementation involves the development of a cross-platform mobile app using cutting-edge frameworks, ensuring scalability and high performance. The final phases focus on testing and refinement, including usability testing and performance optimization to align the application with user needs. While similar studies have employed AI and geolocation technologies for travel planning, many lack localized, user-focused customization. This research seeks to bridge that gap by offering a more personalized and regionally tailored solution through WayPoint.

The data collection process will involve multiple sources, including API integrations to gather real-time data from platforms such as Google Maps, Yelp, and Eventbrite, and usage analytics to monitor user interactions with the app. A sample size of at least 60 participants will be targeted for surveys to ensure diverse representation of travel styles, as well as a test group of 6 users will evaluate the app's functionality and provide feedback during the development process. The research will follow a structured procedure and result in the development of a ready-to-use mobile application, followed by updates based on feedback.

To implement WayPoint, the research will utilize a robust technology stack. The application will be cross-platform, developed using React Native for deployment on both Android and iOS. The frontend will feature React Native with Native Base or React Native Paper for responsive design, while the backend will be built with FastAPI in Python to provide scalable RESTful APIs. State management will rely on React hooks and Redux, ensuring efficient data flow across the application. The database layer will consist of Firebase Realtime Database for real-time synchronization and PostgreSQL for structured data storage. Additionally, third-party APIs such as Google Maps, Yelp, Eventbrite, OpenWeatherMap, and OpenAI will be integrated to provide dynamic maps, event and restaurant data, weather-based recommendations, and AI-powered chatbots for personalized travel advice. Development tools such as Visual Studio Code and GitHub will support collaborative coding and version control.

This project will involve learning new technologies, including React Native for cross-platform app development, FastAPI for backend API creation, and PostgreSQL for structured database management. Additionally, the team will explore Firebase Realtime Database for real-time data synchronization and integrate third-party APIs such as OpenAI, Google Maps, and Yelp. These skills will significantly enhance the team's expertise in mobile app development and modern software technologies.

The anticipated results of this research include the creation of a fully functional mobile application, WayPoint, that streamlines travel planning by providing personalized recommendations, real-time updates, and dynamic itineraries. The app is expected to demonstrate high usability and positive user feedback, reducing the time spent on travel research while increasing satisfaction with travel experiences. This project will contribute to the academic and practical domains by offering a case study on the integration of AI and geolocation technologies in travel planning, providing a scalable model for expanding to other regions, and supporting BC's tourism sector by promoting local attractions, events, and businesses. By addressing the fragmented nature of existing travel planning resources, WayPoint aims to set a new benchmark in personalized travel experiences, offering a seamless and efficient solution to users.

Project Planning and Timeline

Design Phase (January 24 – February 1)

Milestones:

- Completion of app screen wireframes
- Database schema design finalized by February 1.

Deliverables:

- High-fidelity wireframes showcasing the app's user interface and flow.
- A well-documented database schema outlining the structure for user data, itineraries, and recommendations.

Team Responsibilities:

- Simone: Lead the design of app wireframes using Figma, ensuring user-friendly layouts and seamless navigation.
- Russell: Focus on designing the database schema, ensuring efficient data handling and integration with APIs.

Project Setup (February 2 – February 5)

Milestones:

- GitHub repository initialized
- Frontend (React Native) and backend (FastAPI) environments set up

Deliverables:

- A centralized GitHub repository for version control.
- Fully configured frontend and backend environments ready for development.

Team Responsibilities:

- Simone: Set up the frontend environment and establish a consistent folder structure.
- Russell: Set up the backend environment and document the initial API structure.

Frontend Development (February 6 – February 23)

Milestones:

- Travel Style Quiz completed
- Personalized Recommendations screen implemented
- Interactive Map screen developed

Deliverables:

- Fully functional frontend components for the quiz, recommendation screen, and map.

Team Responsibilities:

- Simone: Develop and integrate the Travel Style Quiz and Personalized Recommendations screen.
- Russell: Develop the Interactive Map screen and ensure compatibility with backend APIs.

Backend Development (February 6 – February 28)

Milestones:

- RESTful APIs for the Travel Style Quiz completed

- APIs for recommendations implemented
- Google Maps API integrated
- Firebase configured for real-time data synchronization

Deliverables:

- Fully functional backend with tested APIs for quiz, recommendations, and geolocation features.

Team Responsibilities:

- Russell: Develop all API endpoints and integrate Google Maps API.
- Simone: Configure Firebase and test backend services for performance.

Testing Phase (March 1 – March 14)

Milestones:

- Unit testing for frontend and backend completed
- End-to-end testing finalized

Deliverables:

- Comprehensive test reports for frontend and backend functionality.
- A fully integrated and tested application ready for deployment.

Team Responsibilities:

- Simone: Conduct frontend unit testing and end-to-end user testing.
- Russell: Perform API testing and assist with integration testing.

Integration and Deployment (March 15 – March 23)

Milestones:

- Frontend and backend integration completed
- Backend deployed to Heroku

Deliverables:

- A seamlessly integrated application deployed on both Android and iOS.

Team Responsibilities:

- Simone: Oversee frontend-backend integration and ensure responsive design compatibility.
- Russell: Handle backend deployment and ensure the app functions correctly on Heroku.

Documentation and Finalization (March 24 – March 28)
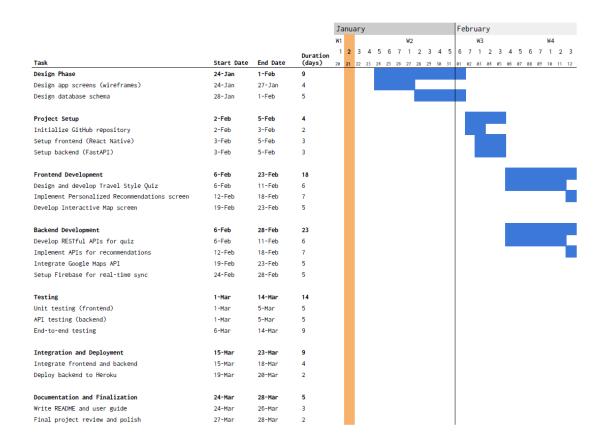
Milestones:

- README and user guide completed
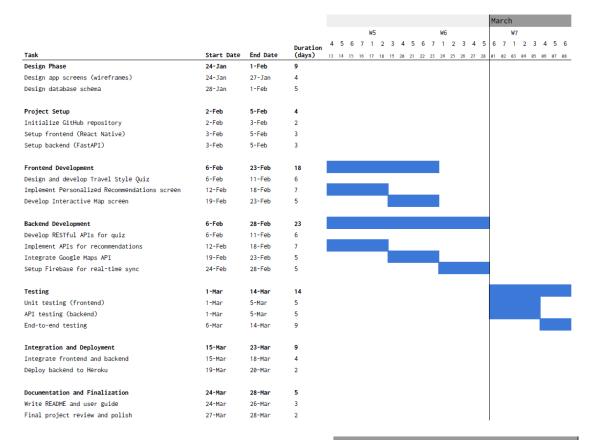- Final project review and polish

Deliverables:

- Comprehensive documentation, including a user guide, project README, and developer notes.
- A polished and fully functional version of WayPoint ready for submission or presentation.

Team Responsibilities:

- Simone: Write the user guide and ensure the app's design is polished for the final review.
- Russell: Document technical aspects in the README and address any remaining bugs or issues

Task	Start Date	End Date	Duration (days)
Design Phase	**24-Jan**	**1-Feb**	**9**
Design app screens (wireframes)	24-Jan	27-Jan	4
Design database schema	28-Jan	1-Feb	5
Project Setup	**2-Feb**	**5-Feb**	**4**
Initialize GitHub repository	2-Feb	3-Feb	2
Setup frontend (React Native)	3-Feb	5-Feb	3
Setup backend (FastAPI)	3-Feb	5-Feb	3
Frontend Development	**6-Feb**	**23-Feb**	**18**
Design and develop Travel Style Quiz	6-Feb	11-Feb	6
Implement Personalized Recommendations screen	12-Feb	18-Feb	7
Develop Interactive Map screen	19-Feb	23-Feb	5
Backend Development	**6-Feb**	**28-Feb**	**23**
Develop RESTful APIs for quiz	6-Feb	11-Feb	6
Implement APIs for recommendations	12-Feb	18-Feb	7
Integrate Google Maps API	19-Feb	23-Feb	5
Setup Firebase for real-time sync	24-Feb	28-Feb	5
Testing	**1-Mar**	**14-Mar**	**14**
Unit testing (frontend)	1-Mar	5-Mar	5
API testing (backend)	1-Mar	5-Mar	5
End-to-end testing	6-Mar	14-Mar	9
Integration and Deployment	**15-Mar**	**23-Mar**	**9**
Integrate frontend and backend	15-Mar	18-Mar	4
Deploy backend to Heroku	19-Mar	20-Mar	2
Documentation and Finalization	**24-Mar**	**28-Mar**	**5**
Write README and user guide	24-Mar	26-Mar	3
Final project review and polish	27-Mar	28-Mar	2

Task	Start Date	End Date	Duration (days)
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Deploy backend to Heroku	19-Mar	20-Mar	2
Documentation and Finalization	**24-Mar**	**28-Mar**	**5**
Write README and user guide	24-Mar	26-Mar	3
Final project review and polish	27-Mar	28-Mar	2

Timeline header (first chart): March — W5, W6, W7
4 5 6 7 1 2 3 4 5 6 7 1 2 3 4 5 6 7 1 2 3 4 5 6
13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 01 02 03 04 05 06 07 08

Timeline header (second chart): W8, W9, W10, W11
7 1 2 3 4 5 6 7 1 2 3 4 5 6 7 1 2 3 4 5 6 7 1
09 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31

Project Contract

Project Name: WayPoint
Team Members: Simone Lue (Team Lead) – 300276605, Russell Han Josef – 300369073

Date: January 25, 2025

Scope of Work and Timelines:

Russell Han Josef and Simone Lue agree to collaboratively develop WayPoint, an intelligent travel planning application tailored for visitors to British Columbia. The application will include features such as a Travel Style Quiz, personalized recommendations, interactive maps, an AI-driven itinerary generator, and real-time updates.

The scope of work includes:

Design Phase (January 24 – February 1): Creating app wireframes and database schemas.

Project Setup (February 2 – February 5): Initializing repositories and setting up development environments.

Frontend Development (February 6 – February 23): Building user interfaces for the Travel Style Quiz, Personalized Recommendations, and Interactive Map.

Backend Development (February 6 – February 28): Creating RESTful APIs, integrating third-party APIs (Google Maps, Firebase, Yelp, etc.), and setting up real-time synchronization.

Testing (March 1 – March 14): Performing unit, integration, and end-to-end testing.

Deployment (March 15 – March 23): Deploying the application on Heroku and preparing it for release on Android and iOS platforms.

Documentation (March 24 – March 28): Writing a user guide, README, and finalizing the project for submission.

Meetings

We agree to meet once weekly throughout the project. Meetings will be held:

Format: Virtual (Zoom or Teams)

Frequency: Monday

Agreement

We, the undersigned, agree to the scope of work, responsibilities, and timelines outlined in this contract. We commit to contributing equally to the success of WayPoint and adhering to the communication and meeting protocols.

Signatures:

Simone Lue: Simone Lue_____ Date: _1/25/2025_____

Russell Han Josef: _Russell Han Josef_____ Date: _1/25/2025_____

Work Date/Hours logs for student (or each team member)

Russell:

Date	Number of Hours	Description of Work Done
Jan 17, 2025	1	Meeting. Distribution of work. Choosing team lead. Decide on the app.
Jan 18, 2025	1	Planning on the project scope and role distribution.
Jan 20, 2025	1.5	Research on screens to have. Finding screens inspiration. App name and branding.
Jan 22, 2025	2	Research on Heroku Dynos and Postgres workflow
Jan 22, 2025	1	Researched about conducting surveys and user testing.

Simone:

Date	Number of Hours	Description of Work Done
Jan 17, 2025	1	Meeting. Distribution of work. Choosing team lead. Decide on the app.
Jan 20, 2025	1	Project Proposal Draft writing - Started the introduction section.
Jan 21, 2025	2	Project Proposal writing - Finalizing draft writing -> Proposed Research Project, Project Planning and Timeline, Project Contract
Jan 22, 2025	2	Figma initialization, developing wireframes, general idea of screens
Jan 22, 2025	1	Wireframe for homepage
Jan 24, 2025	1	Wireframing for quiz screens
1/25/25 12:00 AM	0.5	Finalized proposal, ready for submission

Closing and References

https://fastapi.tiangolo.com

https://reactnative.dev/docs/getting-started

https://code.visualstudio.com/docs/python/tutorial-fastapi

https://realpython.com/fastapi-python-web-apis/

https://medium.com/@HatmanStack/cloud-bound-react-native-and-fastapi-ml-684a658f967a

https://github.com/cloudeyes/rn-fastapi-app

https://javascript.plainenglish.io/integrating-react-native-with-fastapi-a-seamless-approach-to-modern-app-development-2d12959871ff

https://youtu.be/0zb2kohYZIM?si=nPoKcSRk6WJBvVcY

https://youtu.be/Z5kgcBNrcGU?si=5PEhhzFP96EHvrWW

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https://youtu.be/QdhwYWwYfc0?si=PUa05IOB2f9RqLqq

https://www.heroku.com/dynos

https://www.heroku.com/github-students