

Itiner-Ease

Explore with ease—your itinerary, your way.



Spring 2025

CS410 - Team Copper



Your Itinerary

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Team Biography



Crystal Rivas is a second degree seeking student in Computer Science at ODU with a background in math education. Her expertise in problem solving drives the transition and aims to develop innovative and impactful solutions.

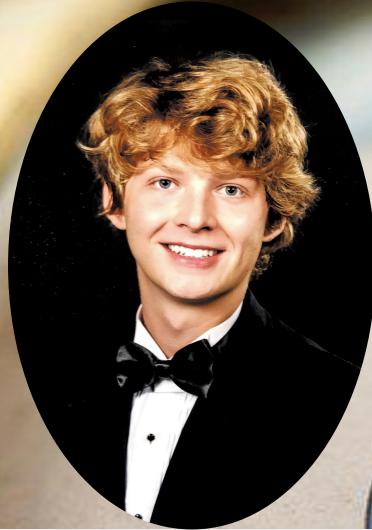


Stephen Usselman is a senior at ODU majoring in computer science. He is looking to pursue a career as a Software Developer after university.



William Mbandi is a senior at ODU majoring in computer science with a minor in cyber security. Wants to work as a Software Developer after he graduates.

Team Biography



William Poston is a senior at ODU majoring in computer science with a minor in data science. After school, he dreams of being an AI prompt engineer.



Jandra D. Arias Tavarez is a second degree seeking student at ODU working on her bachelor in Computer Science. She aspires to work as a Software Developer after graduating.



Fredrick Terling is a senior at ODU majoring in Computer Science. He is currently hoping to get his foot in the door for most tech job opportunities but dreams of being a Game Developer and ultimately a Game Producer.

Background - Tourism

- When considering how to spend your time off, traveling is often the first idea that comes to mind making tourism an area worth investing in.
- According to the graph 71% of Americans have taken at least 1 private trip in the last 12 months.
- According to the latest World Tourism Barometer from UN Tourism, an estimated 1.4 billion tourists travelled internationally in 2024. [1]
- 2024 Economic Impact Trends Report, has revealed the U.S. as the world's most powerful Travel & Tourism market, contributing a record-breaking \$2.36 TN to the nation's economy last year.[2]

How Often Do Americans Travel?

Share of U.S. respondents who have embarked on the following number of private trips in the last 12 months



10,138 respondents (18-64 y/o) in the United States; Jan.-Dec. 2024
Source: Statista Consumer Insights



Source: Statista [3]

statista

Why Travel?

- One of the main benefits of travel is collecting new experiences. They can be physical, emotional, or psychological.
- When we stay in our bubble for a long time, we get used to our own ways. We all have our rituals and best practices, a routine we follow on a daily basis.
- Something foreign will become easier to sympathise with. It will no longer be just a tale from another country or continent but a personal story - something you have seen or done. [12]
- A study by the Global Commission on Aging, the Transamerica Center for Retirement Studies and the U.S. Travel Association found that travel helps prevent depression, dementia and Alzheimer's Disease.[4]



Why do People NOT Travel?

A 2023 survey conducted by Nerd Wallet asked users what their biggest barriers were when it came to traveling:

- Lack of money: 27%.
- Lack of time off from work or school: 26%
- Family and other commitments: 13% [13]

According to a NerdWallet analysis of data from the consumer price index issued by the Bureau of Labor Statistics, airfares in January 2023 are up 25.6% versus the same month in 2021, and up 3.7% versus the same month in 2019. January 2023 hotel prices are up 16.3% versus January 2020.[13]

Challenges of Self-Booking Travel

Planning trips on your own can pose many challenges:

TIME

Travelers spend an average of 303 minutes, or more than 5 hours per day on travel content during the 45 days before booking. The research showed that in the 45-day period before booking an online trip, travelers are consuming a significant amount of content to help them make a decision. In the seven countries that were surveyed, travelers spent an average of 45 days before booking a trip online.[5]

CHOICE OVERLOAD

On average, the travelers said they spend over four hours comparing and looking for the best deal, the report found. In 2013, people browsed through 38 webpages before booking their trip while now, it's up to 277 webpages – from third-party booking platforms to the official airline or hotel website. [5]



Group Planning Chaos

- You're no longer only planning for yourself , but planning for a group of people with different likes, dislikes, and availability.
- Group travel can bring together people with different personalities and temperaments. It is not uncommon for conflicts to arise due to differences in opinion, communication styles, and personal habits.
- Group members may have different interests and priorities, and conflicting schedules can make it challenging to plan activities. This can lead to frustration and tension within the group.[15]



A Demand for Tour Guides

- Of 1,000 U.S. individuals who traveled for leisure at least once in the past 12 months, 70% planned to book a guided tour for the next year, the survey found.
- Roughly two in five of Millennials and Gen Z travelers surveyed booked a guided tour in the past year, the results show – that's 40% of Gen Z and 42% of Millennials compared to 22% of Gen X and 22% of Boomers.[15]
- Guides who drive business have the responsibility to enhance the travel experience by keeping guests happy, safe and inspired. This is the person who can make or break a trip; therefore, finding the right match for your group is essential.[16]

Why use a tour guide?

1. A guide will tailor a tour to your needs and tastes.
2. A guide can take you to places that you would never know about.
3. A guide will point out things that you would never notice.

4. Using a guide is the best use of your time.
5. A guide is educated and trained to guide and licensed
6. A guide is your personal resource.
7. A guide is a new-found friend in a foreign country [17]

Issues Continue to Arise

BEYOND GENERIC ITINERARIES

Today's travelers crave personalized journeys that resonate with their unique interests and immerse them in local cultures.

- 57% of travelers believe brands should customize information based on personal preferences or past behaviors.[6]
- 62% feel a trip is wasted if it doesn't include authentic local cultural experiences.[7,8]

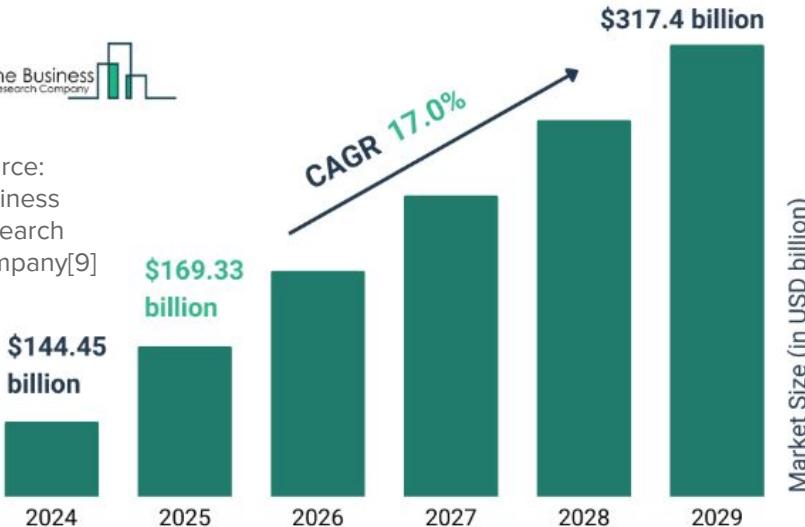
PLANS SHIFT

- Even though we try to plan as best as we can, unforeseen circumstances can make us change our plans.
- Among 80% of travelers, 60% of them experienced some type of travel disruption.[10]

Personalized Travel And Experiences Global Market Report 2025



Source:
Business
Research
Company[9]



Problem Statement

When travelers plan their own trips, all the time, effort, and stress- compounded further by the constraints of group travel- can sour the experience. 76% of travelers turn to planning applications and websites to make the experience easier, but they only provide generic itineraries that lack personalization and flexibility.[11] These leave out the hidden gems that make a trip memorable and also adapt poorly to unforeseen complications.



Problem Characteristics



Choice Overload

- Consumers are given simply way too many options with no easy way to narrow them down.
- Even after you choose one option you find yourself having to make many more choices over the duration of your trip.

Generic Itinerary

- Whether planning it themselves or otherwise, individuals are lead to the most popular locations and attractions, not necessarily the ones the consumer would most prefer.
- Finding that great local spot or hole in the wall location can be a major highlight of any trip.

Rigid Plans

- An unexpected circumstance can throw all your carefully laid plans into disarray and leave you scrambling if you do not already have a backup.

Group Frustrations

- Groups need a way to coordinate and share their plans to prevent conflicts and make suggestions.

Who is Affected?

Users

- Solo Travelers
- Friend Groups & Families
- Frequent travelers
- Adventure Seekers

These target groups face planning overload, decision fatigue, group conflicts, and lack of personalized/localized recommendations.

Customers

- Users
- Parks & Attractions
- Restaurants
- Local Tour Providers

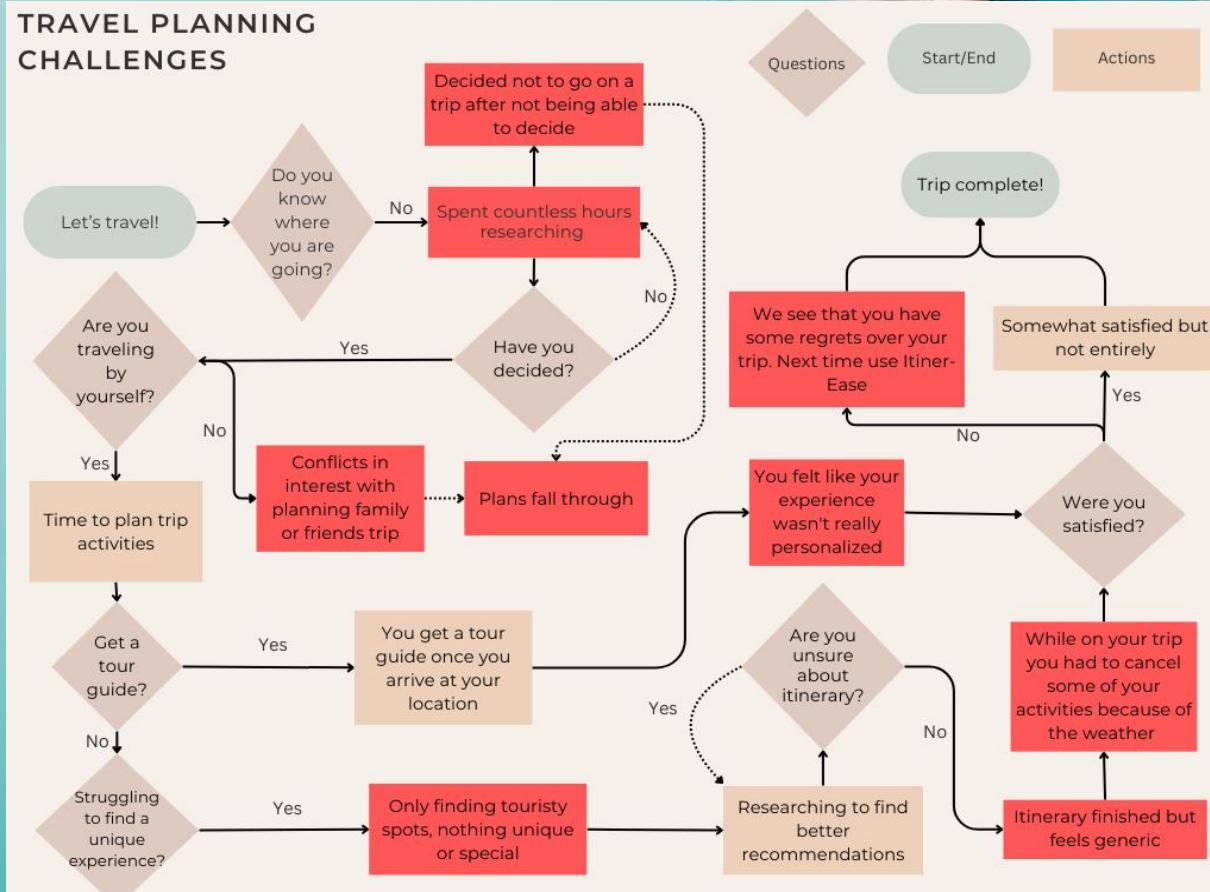
These groups need better ways to reach travelers without solely relying on mainstream booking platforms.

Stakeholders

- Travel & Tourism Industry
- Event Organizers
- Local Businesses

These entities face challenges in attracting travelers who are overwhelmed by mainstream options.

Current Process Flow



Solution

Itiner-Ease is a mobile application designed to simplify and personalize itinerary planning for travelers, new residents, and spontaneous adventurers. Itiner-Ease allows users to generate custom itineraries based on their location and preferences. Users can filter activities, discover overlooked local treasures, and adjust plans in real time. Unlike existing solutions, Itiner-Ease emphasizes user-generated content to give recommendations tailored to your specific interests.

Personalized Itineraries



Personalization Profiles

- **Preferred Activities:** Whether you are a picky eater, looking for a more niche activity, or want to experience the local's favorites we take all these preferences into account when building your itinerary.
- **Customization Options:** Perhaps you want to eat a different kind of food each day or you have specific budgetary restraints you are trying to work under. We have options to modify the recommendations to account for these concerns.

AI-Driven Recommendations

- **Similarity Clustering:** Before our system can get a proper gauge on what exactly takes a place from simply good to one of your new favorites, we rely on users with similar reported interests to base Itiner-Ease's recommendations.
- **Learned Tastes:** As Itiner-Ease gets on your tastes, it gets even better at prioritising the options that you would enjoy the most.

Collaboration and Dynamic Updates

Group Profiles

- **Joint Itineraries:** Going on a family trip or even just a trip with friends? Itiner-Ease can use multiple user profiles to generate an itinerary, taking all your preferences, constraints, and a group voting system to develop a plan that works for all parties.
- **Plan Sharing:** Itiner-Ease can share all or only part of your itinerary to coordinate activities with others in the app or outside it.

Dynamic Itinerary Updates

- **Avoid Disruptions:** It is impossible to plan for everything but that does not mean we cannot minimize it where possible. Itiner-Ease takes a proactive approach to monitor local conditions and notify you of any concerns.
- **Hot Spots:** Relying on reviews means you might miss out on the exciting new location that just opened. If users with interests similar to you are rating it highly recently we may recommend an optional switch in your itinerary.

Explorer Rewards

Local Discovery: Users can create positive reviews for their favorite locations and earn rewards if other travelers also end up enjoying the experience.

Sponsored Businesses: Itiner-Ease will partner with local businesses to increase their visibility in exchange for benefits to our rewards members.

Reward Benefits: Users can use their rewards to spend on our premium content such as discounts at participating locations, local expert guidance, and more.



How about merging them?

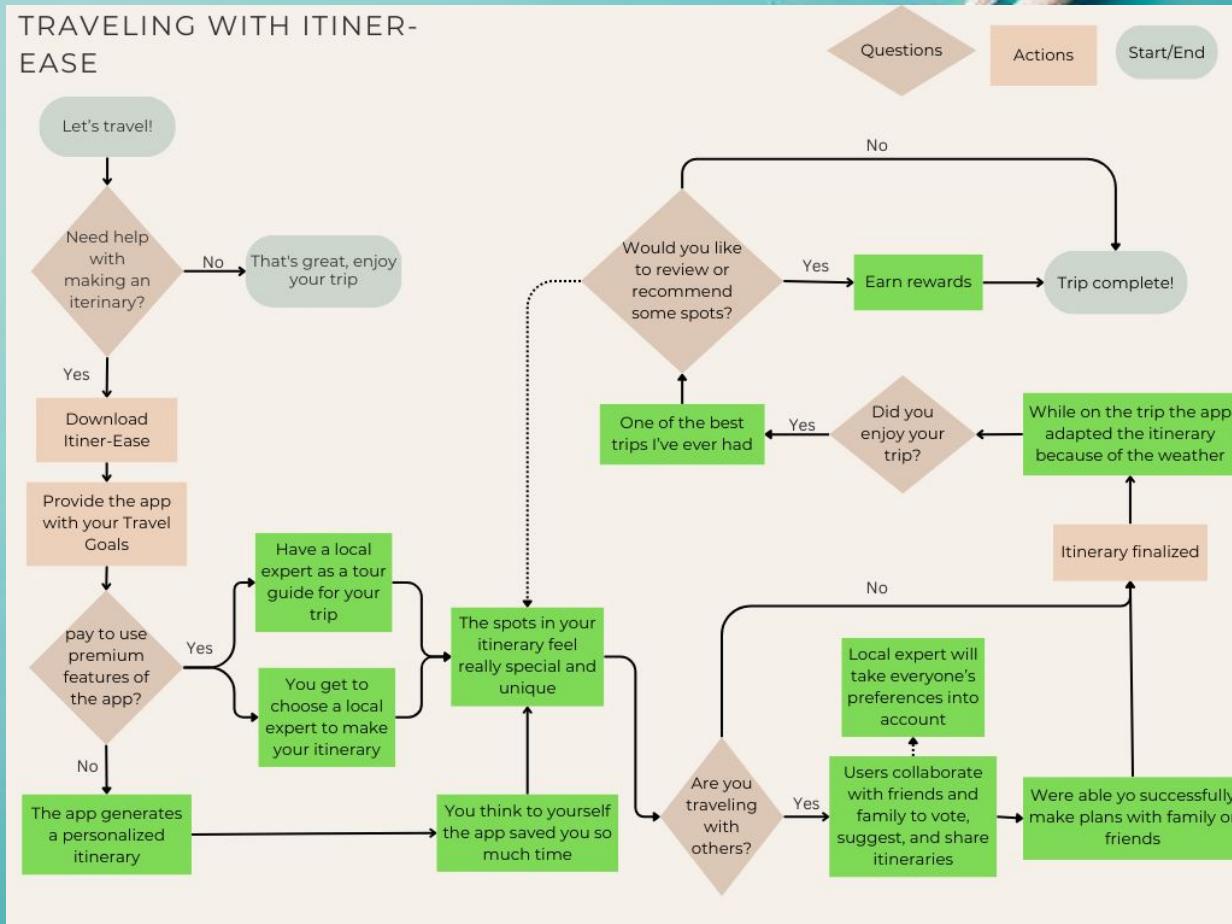
Upgrade With Local Expertise



- **Local Guidance** - Users might be satisfied with just the recommendations our AI creates them, but nothing beats the knowledge of people who actually know the area.
 - Users can pay a fee(need an amount here probably) to have a verified local expert review their itinerary and use it plus the user's preferences to give their plans a more personal touch.
 - Users can also pay extra for a more comprehensive experience depending on the local expert's offerings, giving them a contact point for any issues while on the trip all the way up into personal tours from the expert themselves.
- **Why Become a Local Expert?** - These Local Experts are an integral part of the Itiner-Ease ecosystem, so it is important that they are incentivized properly.
 - The local experts will make the majority of the fees, with Itiner-Ease taking a small cut. Itiner-Ease will also take advantage of these local expert recommendations to refine the AI recommendation algorithm.
 - In addition our Explorer Rewards program can be redeemed for several benefits as discussed earlier. One of the primary ways to gain points are reviews, which our local experts will give in abundance. Working to improve the travel experience of others will pay to improve your travel experience in the future.

Solution Process Flow

TRAVELING WITH ITINER-EASE



What It Will Do

AI-Driven Recommendations

- Through the use of our AI-trained on data and reviews from users with similar interests, Itiner-Ease will narrow down the options to the ones that most accurately fit your desired experience.

Feel Like a Local

- Our baseline personalized itinerary experience is focused on giving you that unique-tailored experience, but users can take it one step further and pay to have verified local experts give them an experience reminiscent of someone visiting their home town and not a completely new place.

Adapt Plans On the Go

- Itiner-Ease monitors disruptive factors such as weather or local holidays and uses a flexible structure to easily propose new options to prevent schedule vacancies.

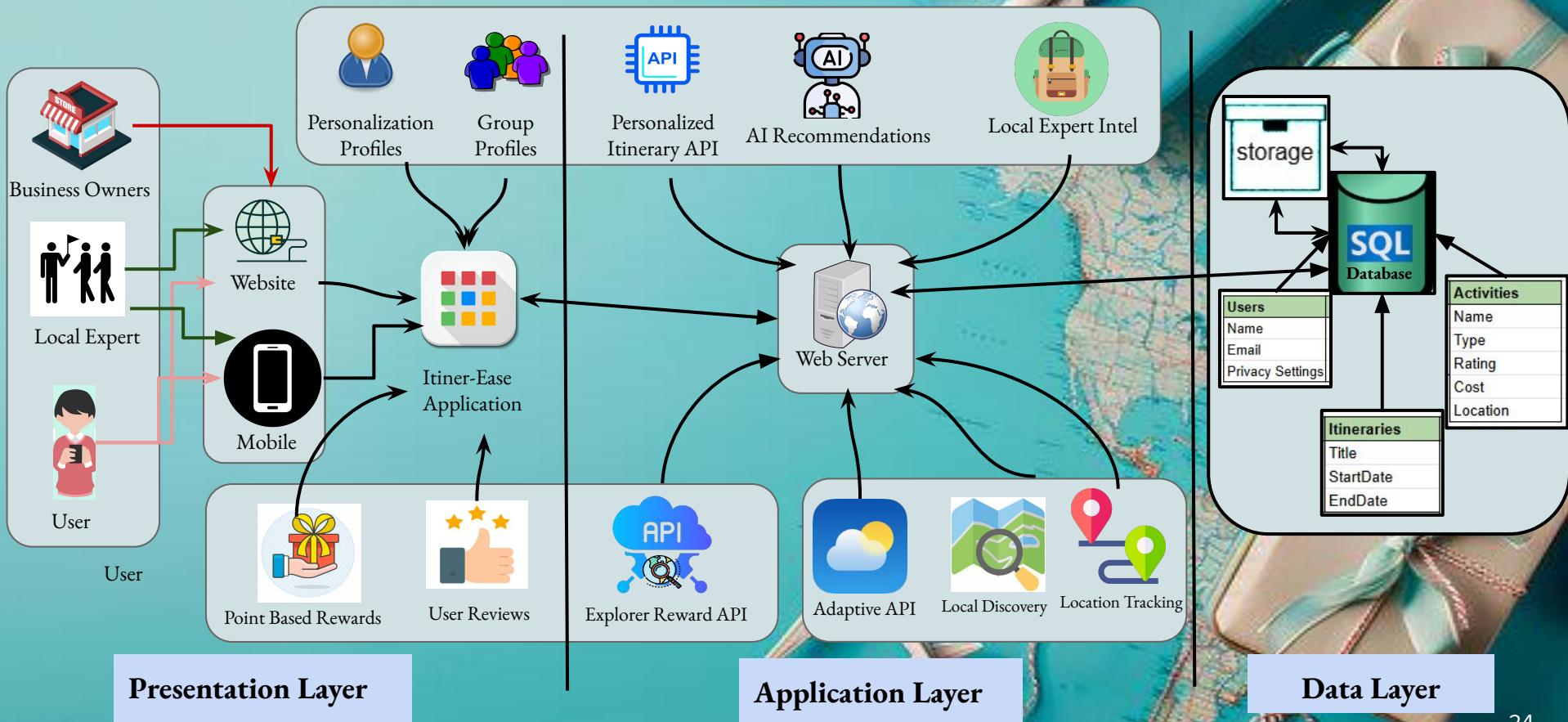
Make Group Planning a Breeze

- Group Profiles will take into account all members' personalization profiles when making suggestions to minimize choice conflict. While also allowing you to input your own preferences for members who either cannot or do not want to make a profile.

What it Will Not Do

- **Itiner-Ease will not provide a way to book flights or hotels:** The user can upload their flight and lodging info to the itinerary.
- **Itiner-Ease will not make reservations or otherwise interact with businesses on the user's behalf:** Entry and reservation requirements will be displayed prominently.
- **Itiner-Ease will not focus on social networking:** Users can invite other users to itineraries but can otherwise not share or publicize their activities in-app.
- **Itiner-Ease will not make generic recommendations:** The recommendations will be primarily based on the user's preferences and not just general popularity.

Major Functional Components Diagram



Presentation Layer

Application Layer

Data Layer

Development Tools

Frontend Languages	HTML, CSS, JavaScript
Backend Languages	Python, JavaScript
Integrated Development Environment (IDE)	Visual Studio Code
Version Control	Git through GitHub
Continuous Integration / Deployment (CI)	GitHub Actions and Workflows
Collaboration	Trello
Database	Firebase (NoSQL)
Documentation	JSDoc

Development Dependencies

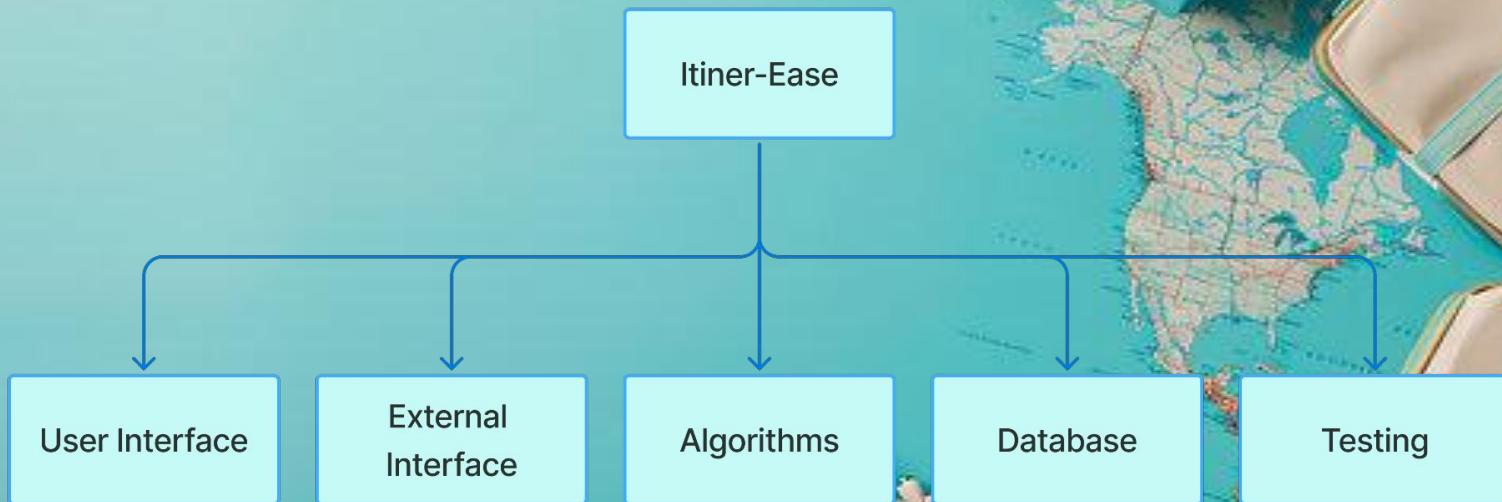
Mobile Framework	React Native
Web Framework	AngularJS
Testing Frameworks	PyTest, Jest
General Libraries	NumPy, Pandas
Machine Learning Libraries	TensorFlow, Scikit-Learn, PyTorch
Application Programming Interfaces (API's)	Google Maps, Yelp, Foursquare, PayPal
Runtime Environment	Node.js
Simulation Containers	Docker

Competition Matrix

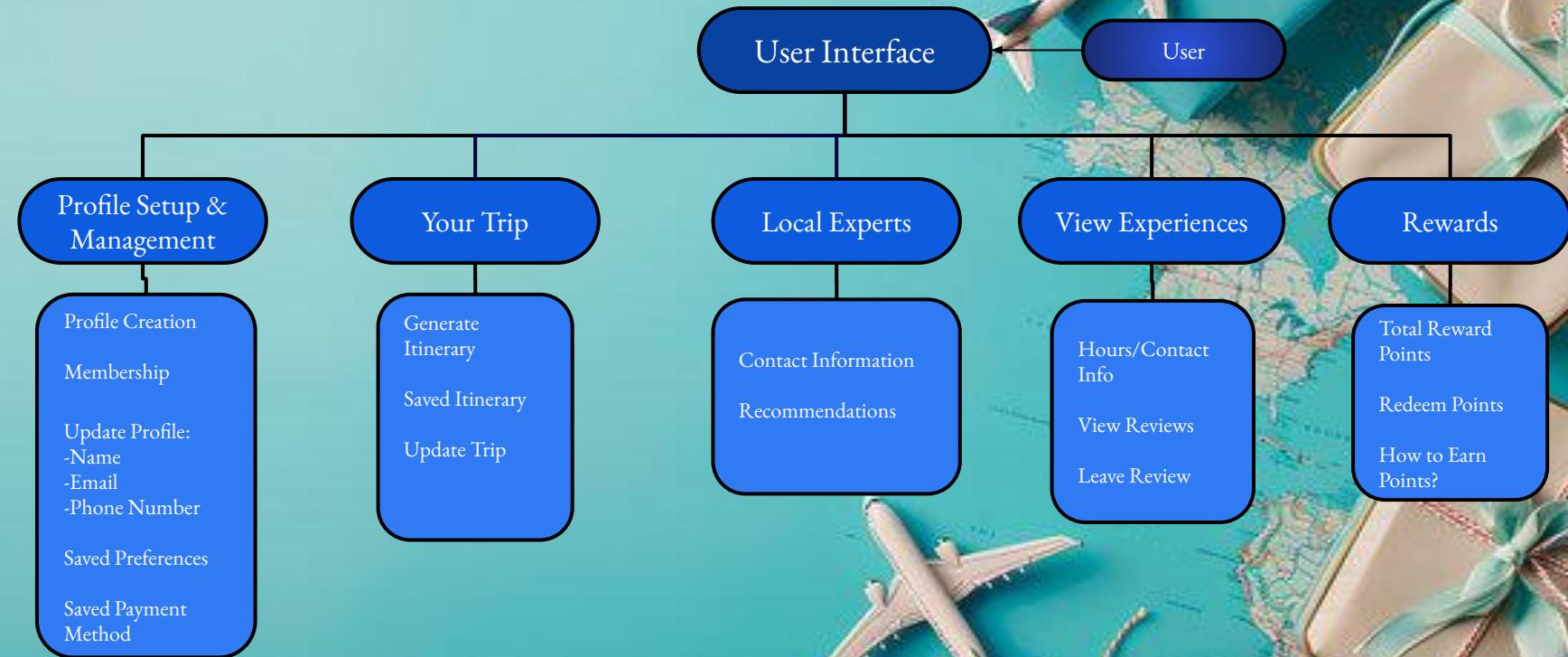
Feature	Itiner-Ease	wanderlog	TROUPE	FRIENZY	TripIt from Concur	Booking.com
Collaborative Itinerary Management	✓	✓	✓	✓		
Hidden Gems	✓	✓		✓		✓
AI-Driven Recommendations	✓	✓	✓	✓	✓	✓
Dynamic Itinerary Updates	✓					
On-Demand Local Expertise	✓					
In-App Booking System		✓			✓	✓

Implementation: full ✓ partial ✓

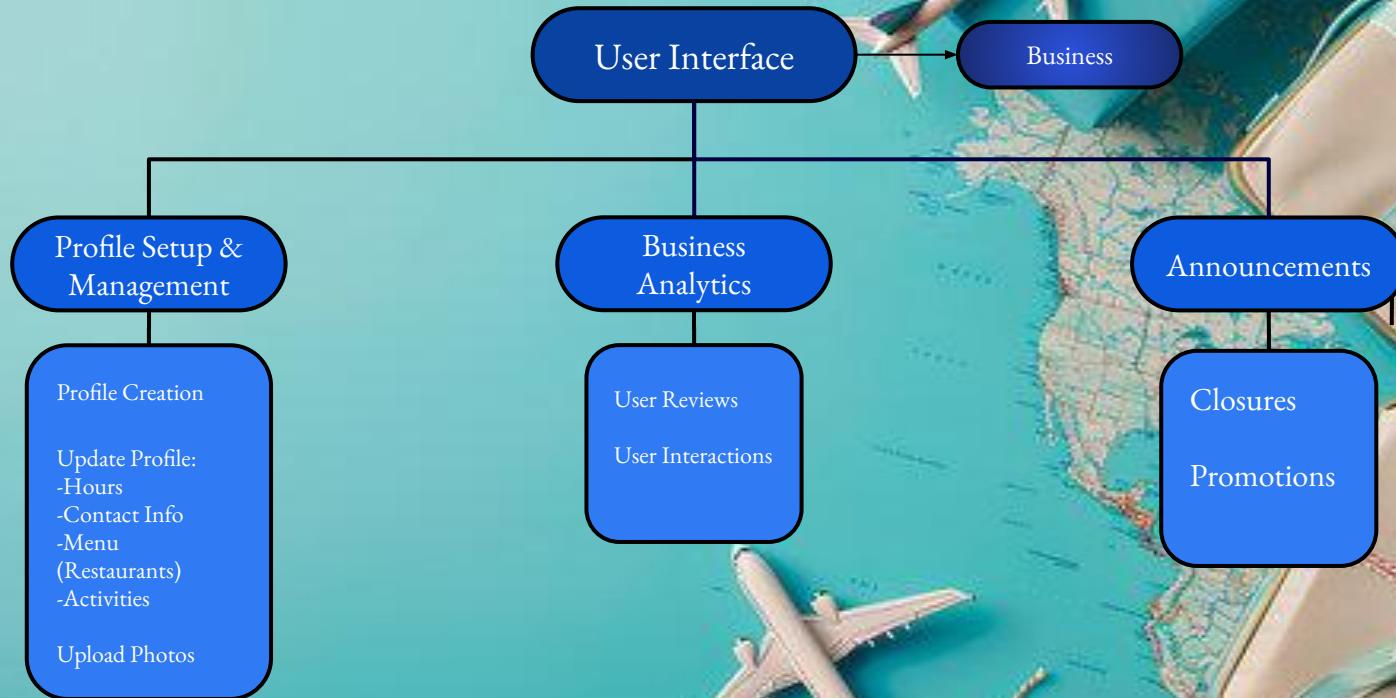
Work Breakdown Structure



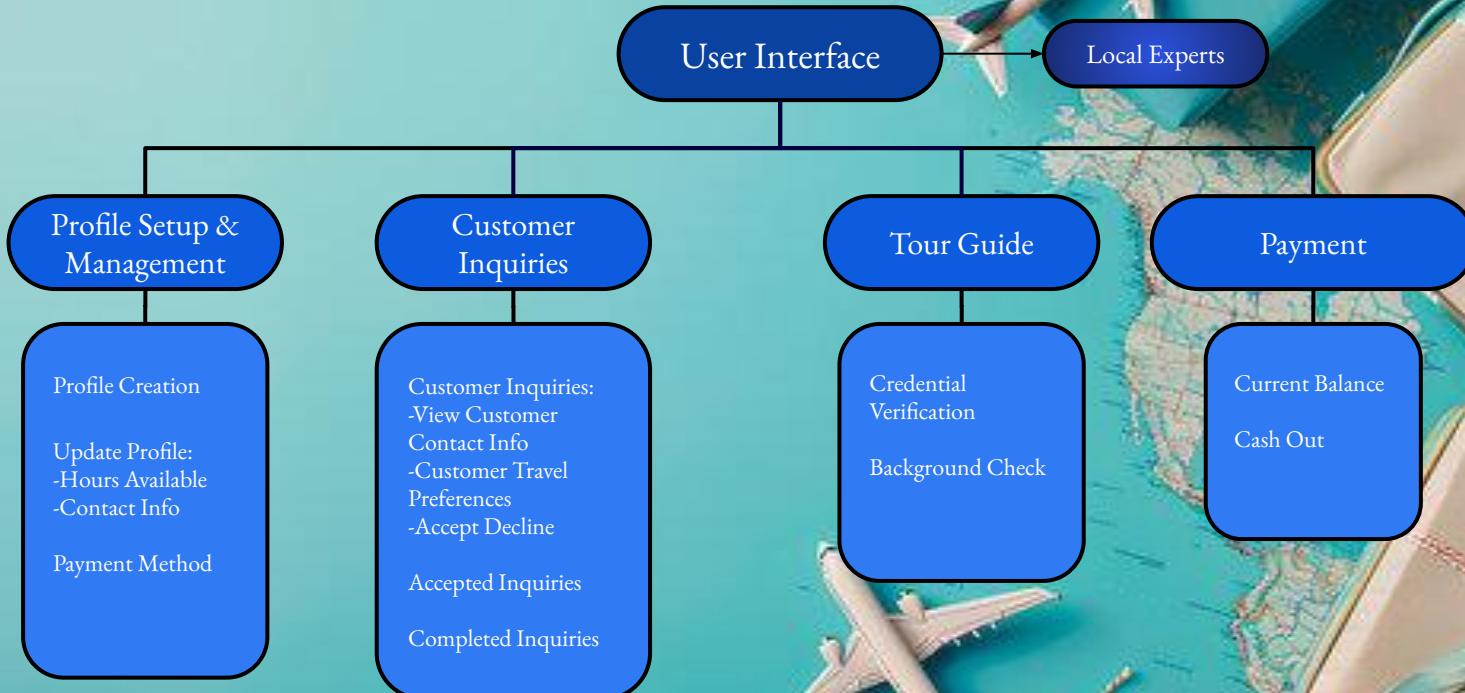
WBS: User Interfaces - Users



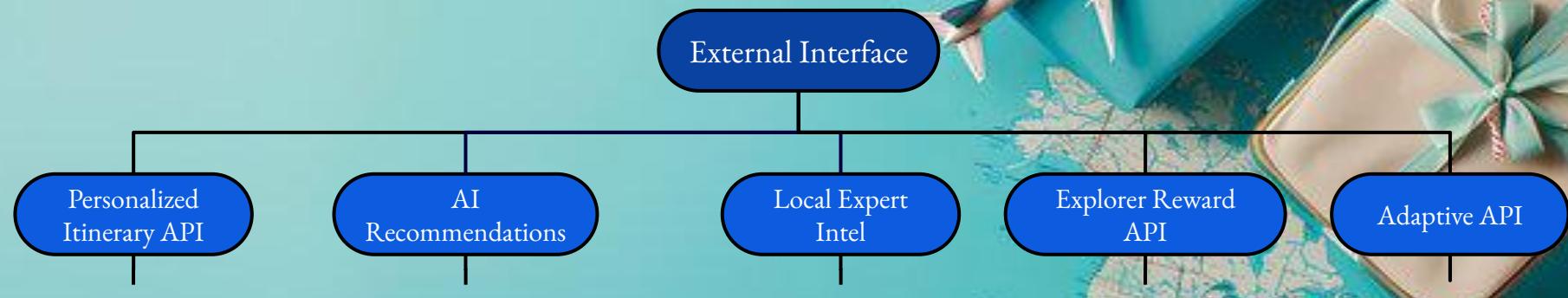
WSB: User Interfaces- Business



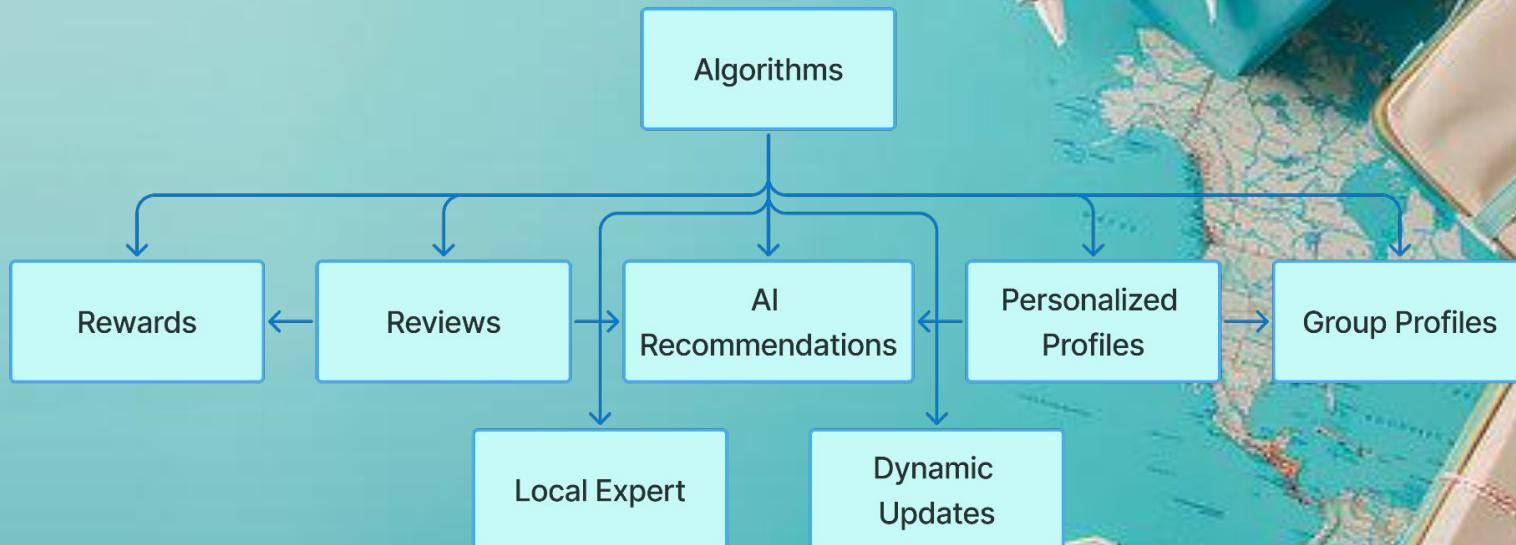
WSB: User Interfaces- Local Experts



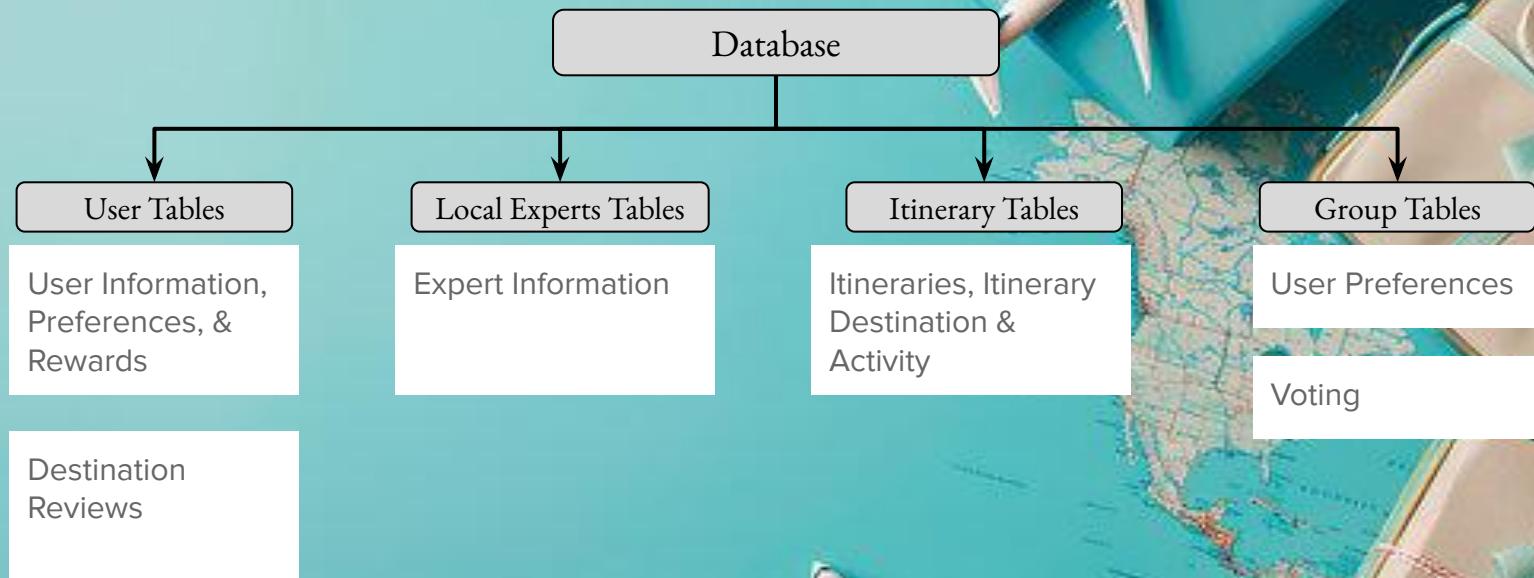
WSB: External Interfaces



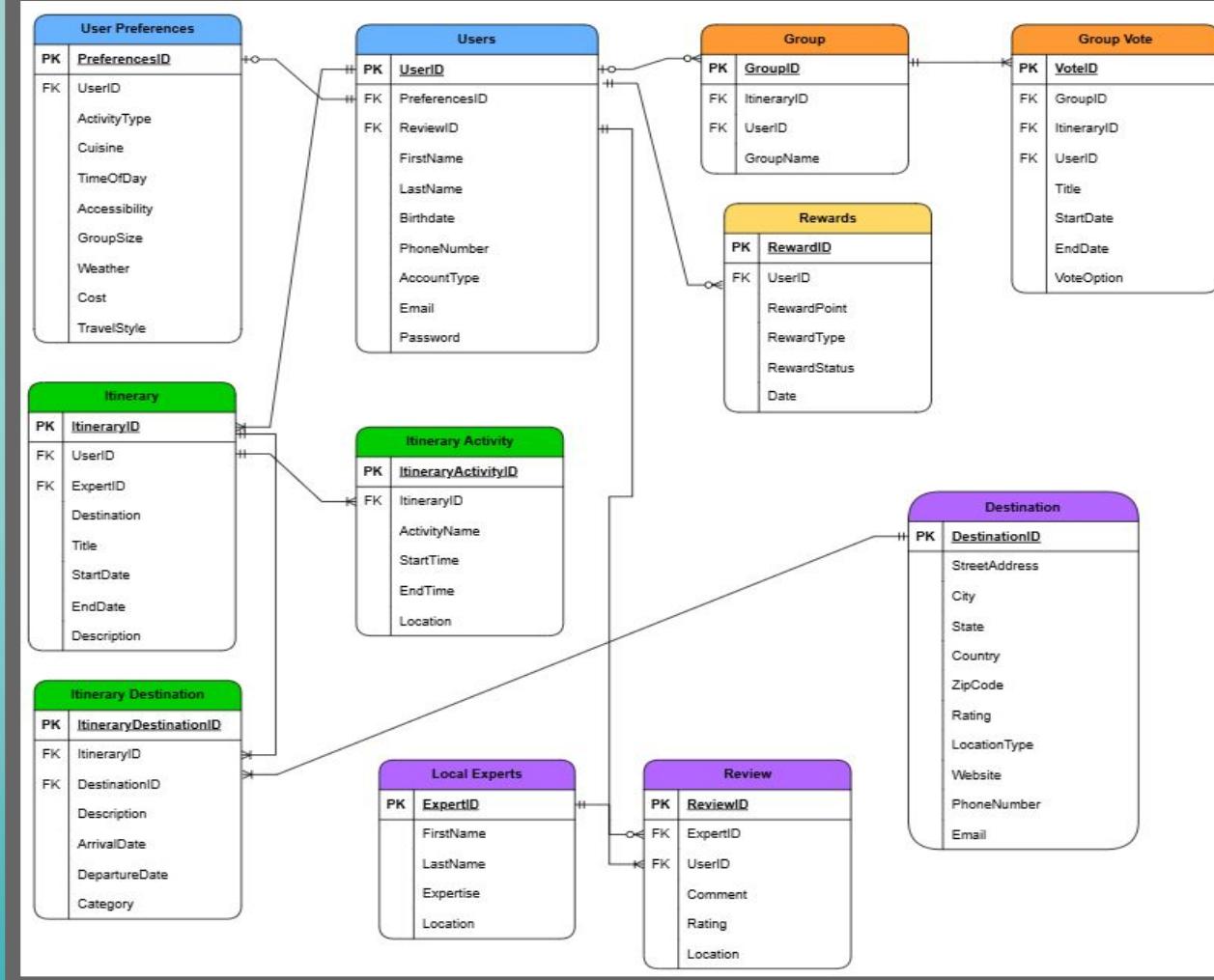
Algorithms



WBS: Database Draft



Database Schema Draft



Feature Table

	Features	Travelers	Local Experts	Businesses	Devs/Testers	Sys Admin
Account Management	Login/Authentication	<input checked="" type="checkbox"/>				
	Account Creation/Deletion	<input checked="" type="checkbox"/>				
	Local Services Offered		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
	Payment Information	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
Itinerary Creation	Personalized Profiles	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	
	AI Recommendations	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
	Business/Location Reviews	<input checked="" type="checkbox"/>				
	Itinerary Customization	<input checked="" type="checkbox"/>				
	Local Expert Upgrades	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>			
Public/Group Profiles	Joint Itineraries	<input checked="" type="checkbox"/>				
	Plan Sharing	<input checked="" type="checkbox"/>				
	Choice Voting and Selection	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>
Dynamic Itinerary Support	Weather Updates	<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Local Event Tracking	<input checked="" type="checkbox"/>				
	Dynamic "Hot Spot" Advocacy	<input checked="" type="checkbox"/>				
Explorer Rewards	Discounts and Coupons	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Review Goals	<input checked="" type="checkbox"/>				<input checked="" type="checkbox"/>
	User Ratings	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>
Data Analytics and Reports	AI Preference Learned Behavior			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Profitability Metrics			<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Income Summary		<input checked="" type="checkbox"/>			<input checked="" type="checkbox"/>
	Popularity Trend Visualization	<input checked="" type="checkbox"/>				
System and Data	Account Management				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Algorithm Updates				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
	Health and Security Monitoring					<input checked="" type="checkbox"/>
	Full Database Access					<input checked="" type="checkbox"/>
	Review Moderation Tools				<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Benefits to Customer Base

Travelers

Reduce Planning Overload

- AI Driven Recommendations simplify decision making.
- Collaborative grouping tools make trip planning with others effortless.
- Dynamic updates help avoid disruptions or provide suggestions for hot spots.

Local Experts

Monetization Opportunities

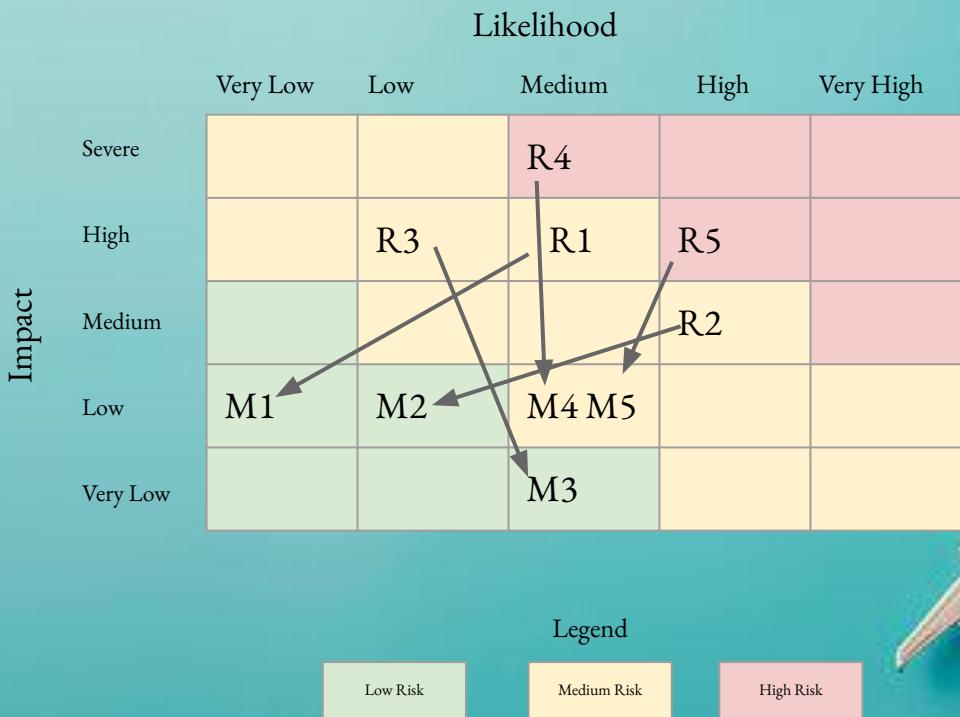
- Flexible engagement through itinerary verification or in-person tours.
- Increased visibility for verified locals to showcase their expertise.

Businesses

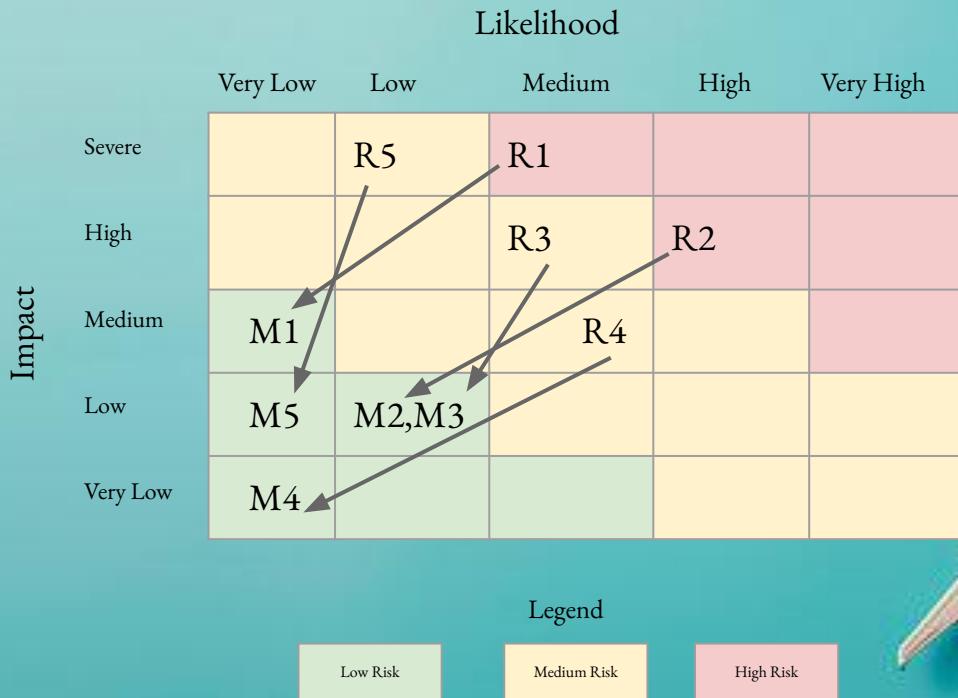
Targeted Traveler Insights

- Data driven analytics help businesses understand traveler preferences.
- Personalized recommendations drive potential customers to relevant experiences.

User Risk Matrix



Customer Risk Matrix



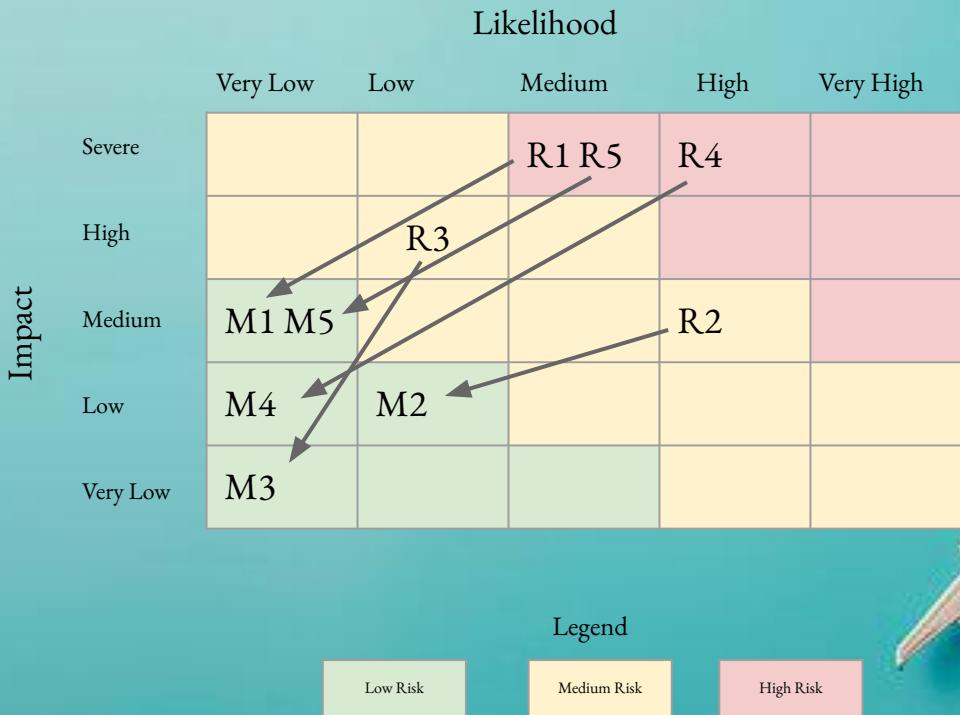
Risks

- R-1: Investors see the app as too niche or risky to fund.
- R-2: Businesses/advertisers don't see value in paying for promotion.
- R-3: Businesses feel underrepresented or struggle to get visibility on the platform.
- R-4: Advertisers worry about ad placements being ineffective or intrusive.
- R-5: Local experts try to refund products to cut out Itiner-Ease.

Mitigation

- M-1: Present clear market research, growth potential, and revenue streams (ads, partnerships, premium features).
- M-2: Offer analytics on user engagement, conversion rates, and ad performance to prove return on investment.
- M-3: Provide affordable listing options, featured spots, and local partnerships.
- M-4: Use non-intrusive native ads and give businesses targeting options to reach the right audience.
- M-5: Strict refund policy preventing unpaid use of itineraries.

Technical Risk Matrix



Risks

R-1: Not enough local support to find obscure locations.

R-2: Application software issues.

R-3: User declines to share location/GPS services.

R-4: Security breach or data leak.

R-5: AI hallucinations and made up data.

Mitigation

M-1: Integrate with existing services like Google Maps, employ web scraping, hire/incentivize local experts to gather data on obscure locations. Offer deals with local businesses.

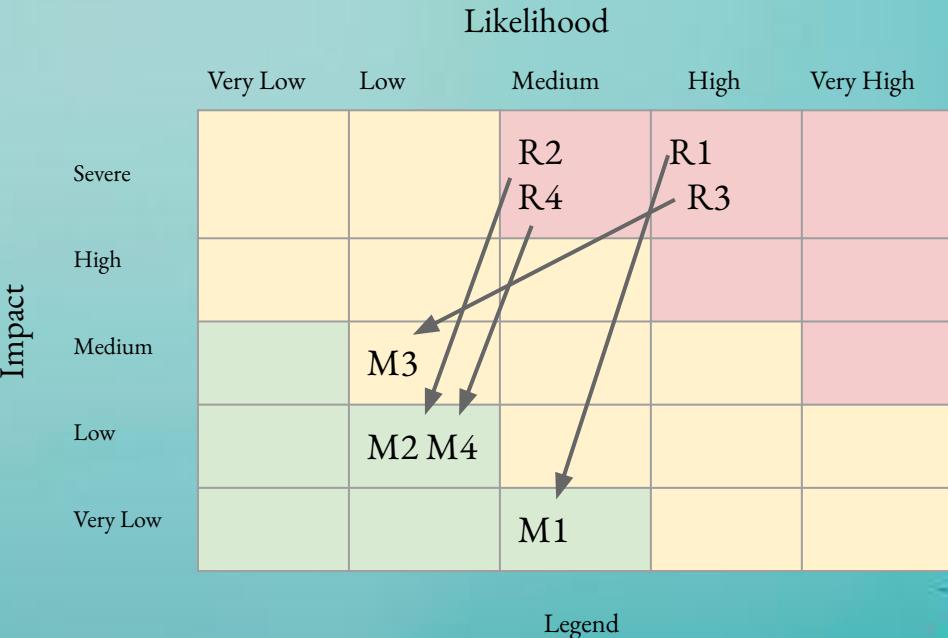
M-2: Prioritize application performance.

M-3: Allow users to search by city/zip code.

M-4: Practice cybersecurity hygiene.

M-5: Local experts provide human verification on paid products.

Legal & Security Risk Matrix



Risks

R-1: Unauthorized sharing of sensitive user data, including age, location, and preferences.

R-2: Potential legal issues arising from differences in religious beliefs, customs, and local laws.

R-3: Health risks related to pre-existing medical conditions, such as allergies or injuries from recommended activities.

R-4: Users' events get cancelled after they already paid for a local expert.

Mitigation

M-1: Itiner-Ease will collect only the necessary data with explicit user consent and will discard it after the itinerary is generated.

M-2: Users will be encouraged to research local laws, while the app will provide relevant legal and cultural information.

M-3: Itiner-Ease will not be liable for physical injuries. Restaurants will be required to disclose allergen information to ensure user safety.

M-4: Intiner-Ease will only provide refunds for any cancellations with a minimum of 48 hours notice.

Key Points

Itiner-Ease is designed to reduce planning overload, improve convenience, and create personalized travel experiences.

- AI-Driven Recommendations
- Group Collaboration
- Dynamic Itinerary Updates
- On-Demand Local Expertise

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