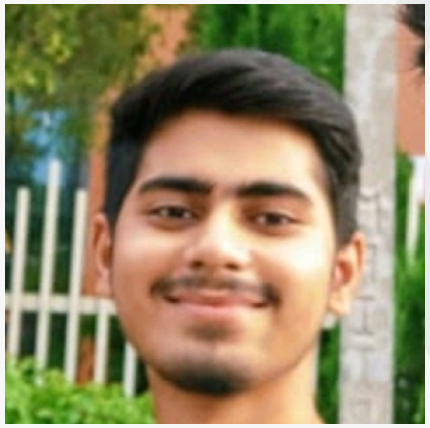
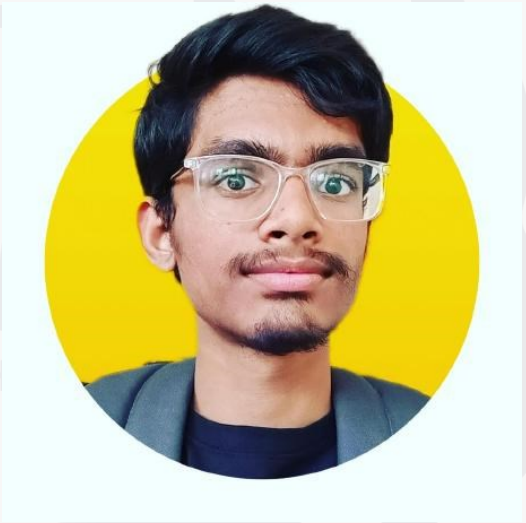
Ctrl+Shift+Win

Team Members –

1. Omkar Kabde



2.Mohammed Imaduddin



Year of Graduation – 2026

Problem Statement

Gamifying Eco-Friendly Transportation

Urban areas face challenges like traffic congestion, air pollution, and carbon emissions due to increased private vehicle usage. To promote eco-friendly transportation options (walking, biking, carpooling, public transit), we need an innovative mobile app that uses gamification and social elements to motivate users, reduce private car dependence, and create sustainable cities. Daily challenges, leaderboards, and a supportive community foster engagement, while real-time incentives, optimized route planning, and carbon footprint tracking enhance the experience and environmental impact awareness. With an intuitive interface and seamless integration, the application must revolutionize urban commuting habits for greener, healthier, and vibrant spaces.

Overview of the solution

ECOmmute is a web platform designed to promote eco-friendly transportation options and address issues like air pollution and traffic. By using gamification elements, social communities, and modern technology to bring it all together, we aim to motivate users to reduce private car dependence, create sustainable cities, and lead healthier lives.

It is a unique and compelling solution for individuals who want to reduce their carbon footprint, promote sustainable transportation, and contribute to a greener, healthier urban environment. It appeals to users who prioritize environmental concerns alongside the convenience and cost savings typically associated with transportation apps.

To tap into this market potential effectively, we are offering a user-friendly, feature-rich app that addresses the specific needs and motivations of its target audience while continuously promoting the benefits of sustainable urban mobility.

Implementing the right combination of technologies will be critical to delivering a robust and user-friendly eco-friendly commuting app.

Key Features

1. User Profiles and Social Integration:
- - Users create profiles and connect with friends.
- - Tracks person eco-friendly statistics
- - Integration with social media platforms for sharing achievements and progress.
- - Users can set personal goals and track progress

2. Daily Challenges and Leaderboards:
- - Users receive daily eco-friendly commuting challenges.
- - Leaderboards display user rankings based on challenge completion.
- - Achievements, scoreboards

3. Community Support / Forums:
- - Users can join or create eco-commuting communities.
- - Share tips, success stories, and encourage each other.
- - Discuss routes and carpooling schedules
- - User profiles with eco-friendly commuting statistics.
- - Community forums for discussions and support.

Key Features

4. Real-time Incentives:
- - Integration with local businesses for discounts and rewards.
- - Users earn rewards for eco-friendly commuting behaviors.

5. Optimized Route Planning:
- - Utilizes GPS and traffic data for real-time route optimization.
- - Recommends walking, biking, carpooling, or public transit options.

6. Carbon Footprint Tracking:
- - Calculates and displays the carbon footprint reduced by eco-friendly commuting.
- - Provides environmental impact awareness.
- - Users can see emission reductions and cost savings
- - Tracks travel carbon footprint based on routes travelled

7. Intuitive Interface:
- - User-friendly design with easy navigation.
- - Interactive maps for route planning.

Gamification Mechanics / Incentivization

- **Goals/challenges**: clear, specific, moderately difficult, immediate and actionable goals/challenges.

When users set and challenge their chosen goals, they create a self-competitive environment that can lead to personal efforts and progress .

- **Points and Rewards** : Generally, the more sustainable the model is, the more points participants receive. In addition to direct rewards, other rewards can be provided in a random manner to promote positive behavior.
- **Personalization**: personalized experiences, adaptive difficulty; challenges that are perfectly tailored to the player's skill level, increasing the difficulty as the player's skill expands.
- **Rapid feedback**: immediate/short feedback cycles, immediate rewards instead of vague long-term benefits.
- **Visible status**: reputation, social credibility and recognition .
- **Unlocking content** : If upgrading involves accessing new content, users will have additional motivation to unlock new content through progress, such as advanced data analysis tools or decorative elements.
- **Freedom of choice**: multiple routes to success, allowing players to choose their own sub-goals within the larger task.
- **Storyline/new identities**
- **Social engagement**: individual and team competitions, cooperation and interaction with other players.

Allowing participants to analyze their performance can improve their sense of achievement and trigger competition, help promote group behavior and improve trust among users.

Proof of Concept and Implementation

User Registration and Login:
Users must register and log in to access the community forums.

Forum Creation:
Users can create new forum threads, providing titles and descriptions.

Forum Discussions:
Users can post comments in threads, reply to existing comments, and upvote or downvote posts
Screenshots and weekly summary are also offered by the app..

User Profiles:
Each user has a profile with a profile picture, username, and bio.

Notifications:
Implement real-time notifications for forum interactions, such as new posts, replies, or mentions.

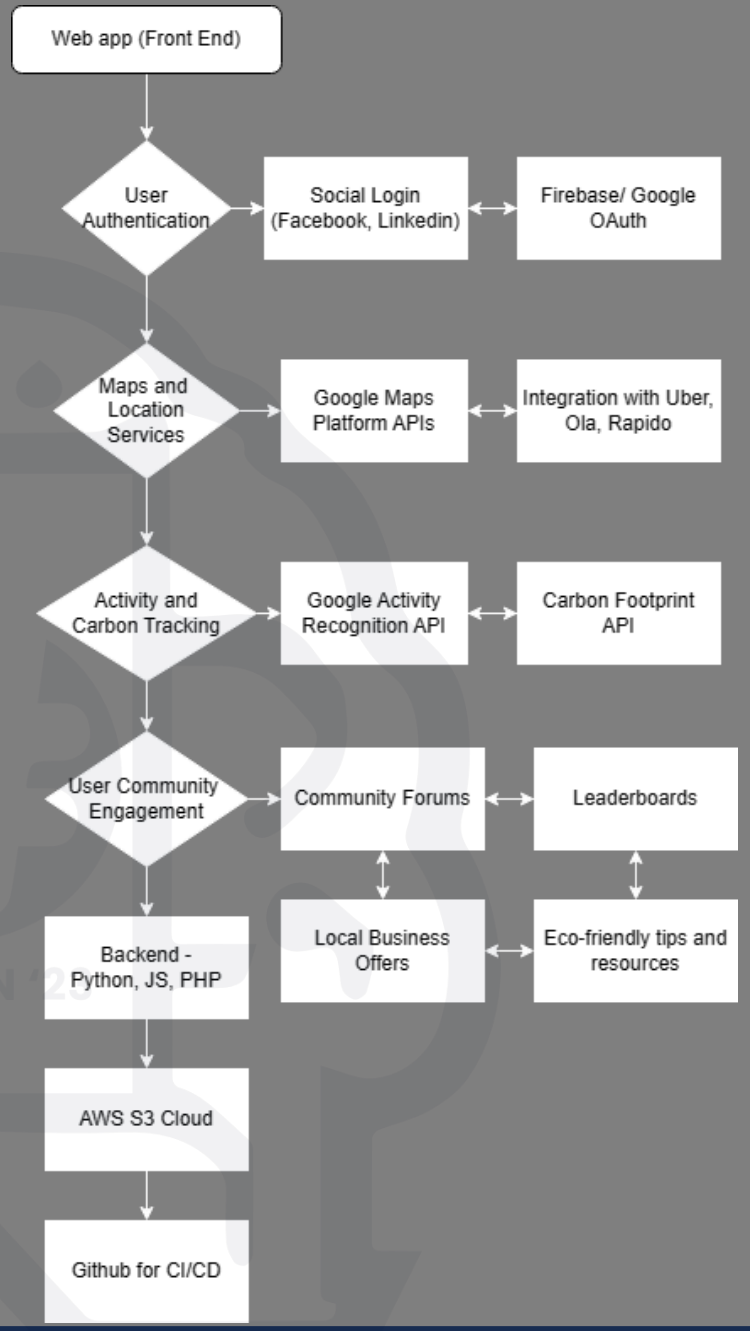
Moderation:
Implement moderation features to monitor and manage forum content, including the ability to report inappropriate content and block users.

Search and Tags:
Add search functionality and topic tags to help users find relevant discussions easily.

User Engagement Metrics:
Track user engagement metrics (e.g., likes, replies, posts) to encourage active participation and recognize top contributors.

Scalability and Performance:
Ensure the forums can handle increasing user activity and scale horizontally if needed.

Feedback Mechanism:
Gather user feedback on the forums' usability and features to make continuous improvements.



Solution Architecture and Design

- Route Optimization – Google Distance Matrix API , Compute Routes Matric and arranging with respect to preferences like transit mode, intermediate stops(waypoints), real-time traffic data
- Carbon Footprint Calculation – Transit mode, distance, fuel efficiency are considered. APIs and Datasets are used to estimate carbon emissions
- Recommendation Algorithms – Content based filtering, analyzing user preferences and historical data to make personalized suggestions
- Real time Traffic Data – obtained using Google Maps JS API
- Community Forum Frameworks - React(front-end), Node.js, Express(Backend), Websocket, GraphQL (real time updates)
- Notification Services – Firebase (push notifications), Twilio (email)

APIs Used

- Carbon Footprint API - https://rapidapi.com/carbonandmore-carbonandmore-default/api/carbonfootprint1

To track carbon emissions of user based on route distance and transit mode.

- Geolocation API - https://docs.abstractapi.com/ip-geolocation

For tracking user locations.

- Directions API - https://developers.google.com/maps/documentation/directions/overview

For suggesting optimized routes based on waypoints and transit modes

- Distance Matrix API - https://developers.google.com/maps/documentation/distance-matrix/overview

To calculate distance between two locations or a route

- Geocoding API - https://developers.google.com/maps/documentation/geocoding/overview

To geocode addresses and optimize API requests

- Static Maps API - https://developers.google.com/maps/documentation/maps-static/overview

- Google Maps JavaScript API - https://developers.google.com/maps/documentation/javascript/trafficlayer

For route planning and real-time traffic data. Can show Traffic data, Transit (Metro routes), Bicycling lanes/routes.

- Google Activity Recognition API - https://developers.google.com/location-context/activity-recognition

Track user activity using device sensors

- Google Fused Location Provider API - https://developers.google.com/location-context/fused-location-provider

Track user location updates and last known locations using GPS and Wi-Fi

USP

The unique selling point of our platform is collaborations and partnerships with local businesses, government agencies, transport and environmental organizations, which can enhance the apps credibility and increase its impact on the society. This can also enable incentives provided to the users to encourage eco-friendly transport and prevent user attrition or abandonment after initial usage. Local businesses and communities can help the app foster a sense of belonging and collective impact. Recreational events like visits to exhibitions, lazy bicycle rides, eco-tourism routes can be implemented to enable people to share their experiences , getting to know each other, and in general , support each other and foster a long-lasting change in the eco-friendly mobility behavior.

Technology Stack

1. Front-end:
- - Framework: HTML, CSS, React JS and Redux Toolkit
- - Real-time updates: WebSocket for leaderboard and challenge notifications.

2. Back-end:
- - Framework: Python ,JavaScript and PHP, Node.js/Express
- - Database: PostGRES for comments and forums, MongoDB for user profiles, challenges, and achievements.

3. Mapping and Location Services:
- Google Maps Platform APIs for mapping and location services, Google Places API and Autocomplete for local business integrations.

4. Gamification and Social Integration:
- - Firebase for user authentication and Google OAuth social login.
- - Integration with social media APIs for sharing updates and achievements

5. Carbon Footprint Tracking:
- - Carbon Footprint API to calculate carbon emissions based on distance and type of transit mode

Market Potential and Audience

The primary audience is eco-conscious individuals, daily commuters, public transit users , cyclists, walkers and carpooling enthusiasts.

The market potential is significant, given the rising awareness in environmental issues like global warming, urban congestion, traffic and pollution. Many urban and suburban areas lack decent public transport or are not up to the mark. There is growing desire for convenient and sustainable public transport solutions.

By collaborating with major ride-sharing apps currently present in the market, i.e., Uber, Ola and Rapido, our platform can seek to engage with people in the age-group of 18-45 years, who are financially independent, young, office workers, tourists and college students.

Market Factors

1.Government initiatives to support sustainable transport and reduce emissions can be favorable for such platforms

2. Rising urbanization and shifting mobility preferences lead to higher demand for efficient transport solutions.

3. Economic factors like rising fuel costs, inflation and the desire to save money can motivate people to consider green commuting options.

4. Popular tourist destinations are now plagued with traffic and pollution. They can be benefited by ecofriendly transport solutions that can reduce the environmental impact of tourism.

5. Widespread tech adoption and infiltration makes it easier to introduce and market such platforms

Risks/ Challenges / Dependencies

1. User Adoption – Convincing users to use the app and switch to eco friendly options is difficult
2. Data Privacy – Collecting and storing user activity and location data should be done in a transparent and proper manner
3. Technical Integration – Managing real-time traffic and location data, accurate carbon tracking, and planning routes can be complex.
4. Local Collaborations - Have to focus on relationships and networking with local transport organizations, communities and retailers for incentivizing the platform. Can develop APIs for seamless integration.
5. Market Entry- There are well-established ride-sharing and navigation apps in the market. Can differentiate our platform from them or can collaborate with them.

References

- **Gamification to Promote Sustainable Transportation**

By - Pritesh Pimpale (Cal State University)

URL - Gamification to Promote Sustainable Transportation (calstate.edu)

- **Initiatives and challenges in using gamification in transportation**

By – Wang et al (European Transport Research Review) – 13 September 2022

URL - https://etrr.springeropen.com/counter/pdf/10.1186/s12544-022-00567-w.pdf?pdf=button%20sticky

- **Changing commuters' behavior using rewards**

By – Eran Ben-Alia, Dick Ettema (Transportation Research Part F) – 18 May 2011

URL - https://www.sciencedirect.com/science/article/abs/pii/S1369847811000428?via%3Dihub

- **A Large Scale, App-Based Behaviour Change Experiment Persuading Sustainable Mobility Patterns**

By – Dominik Bucher, et al (ETH Zurich, Switzerland) – 10 May 2019

URL - https://www.mdpi.com/2071-1050/11/9/2674

- **Promoting sustainable travel behaviour through the use of smartphone applications**

By – Alfred Andersson , et al (Lund University, Sweden) – 10 January 2018

URL - https://www.sciencedirect.com/science/article/abs/pii/S2214367X17301643?via%3Dihub