Conception Phase – Project: EcoRoute Planner

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This software engineering project will strive to create EcoRoute Planner, a new web-based application that will enable eco-conscious city commuters (the target audience will be the 25-40-year-old professionals of the European cities) to learn about the most eco-friendly travel paths and select the one they prefer. In contrast to current navigation applications that are concerned with speed or distance, EcoRoute Planner compares and visually depicts the real-time carbon footprint of multimodal paths (public transport, a bicycle, walking, sharing e-scooters) and rewards users with an eco-badge as a reminder of long-term behavioral change. The application brings definite customer value as sustainable value and sustainable rewards, as well as monthly reports of the CO2-saving, and this can be utilized as a green-tax incentive or green-employer sustainability programmes.

Some of the early design concepts are a route search interface with intuitive design, open APIs (OpenStreetMap, local transit feeds, weather, etc.), and a custom carbon-emission calculator, using the EU/EPA factors, to compare routes and activities, user accounts with badge levels, and optional email summaries. Advantages: engaging user activity, based on gamification, scalable on the cloud with free-tier services, and cheap to use services (free). Disadvantages: Reliance on third-party APIs after the availability and accuracy of emission models. Initial Figma wireframes and responses of five prospective users proved that the aspect of eco-gamification had high demand, whereas superior mobile responsiveness was also expected.

Its architecture is a typical three-tier architecture (React on the frontend, Node.js/Express on the back end, MongoDB in the database), and these maps are lightweight maps with Leaflet.js. Non-functional requirements involve < 3-second page loads, GDPR-compliant handling of data, offline-able routes caching, and being entirely responsive.

The reason I will use the Agile/Scrum methodology and three two-week sprints is that it can help to achieve refinement through iterations, risks can be identified in the initial stages, and tutor feedback can be integrated without any difficulty, which is perfect when one works on a creative solo project. The tools were carefully selected as part of the JavaScript ecosystem (React, Node.js, Express, MongoDB, Leaflet, Chart.js) to minimize context switching and facilitate speedy development without compromising on modern and maintainable code.

Success in the project profile is characterized by≥ 85 percent route calculation accuracy, supplying five main MVP features, and a GitHub repository containing adequate documentation. Some of the most significant threats (API downtimes, scope creep) will be addressed with the help of daily stand-ups (self-logged issues), fallback data, and prioritization of the backlog.