Problem Statement

- **Unpredictable Toll Charges:**
  - **Drivers often encounter unexpected toll charges, leading to frustration and budget concerns.**
  - **Existing toll information systems can be outdated or inaccurate, causing confusion and inconvenience.**
- **Lack of Real-Time Information:**
  - **Many current GPS navigation systems fail to provide real-time toll information.**
  - **Drivers may not be aware of the exact toll amount until they reach the booth, making budgeting difficult.**
- **Need for Safer Roads:**
  - **Speeding is a major contributing factor to road accidents, resulting in injuries, fatalities, and property damage.**
  - **Traditional approaches to speed control, such as fines and penalties, have limitations in effectively changing driver behavior.**

Unique Idea Brief (Solution)

- **Our Solution:**
  - **Develop a user-friendly GPS-based tool that seamlessly integrates toll calculation, toll booth visualization, and speed simulation with a reward system.**
  - **Accurate Toll Calculation: Provide precise, real-time toll fee information based on the user's specific route and distance traveled.**
  - **Toll Booth Visualization: Clearly display toll booth locations on an interactive map to aid in route planning and avoid surprises.**
  - **Speed Reward Points: Incentivize safe driving by awarding points to users who maintain speeds within legal limits.**
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- **Key Benefits:**
  - **Transparency: Eliminate unexpected toll charges and provide accurate cost estimates upfront.**
  - **Convenience: Streamline route planning with clear visualization of toll booth locations.**
  - **Safety: Encourage responsible driving through a gamified reward system.**
  - **Potential Cost Savings: Reward points for safe driving can lead to future discounts or other benefits.**
  - **Enhanced User Experience: Create a holistic and user-friendly tool that addresses multiple aspects of toll management and road safety.**

Features Offered

- **Real-time Toll Fee Calculation: Provide accurate and up-to-date toll fees based on the user's route and distance traveled.**
- **Toll Booth Locations: Display the precise locations of toll booths on an interactive map to facilitate route planning.**
- **Speed Reward Points: Award points to users for maintaining safe driving speeds, promoting responsible behavior on the road.**
- **Simulated Speed Tracking: Demonstrate the functionality of the speed reward system through a simulated environment.**

Process flow

1. **User Interface: Users input their source and destination cities.**

2. **Backend Processing: The Flask backend calculates toll fees based on the provided route, retrieves toll booth locations, and (optionally) simulates speed readings.**

3. **Display Results: The user interface presents the calculated toll fee, the locations of toll booths along the route, and any earned reward points.**

Technologies used

- **Frontend:**
  - **HTML, CSS, JavaScript: Structure, styling, and interactivity of the user interface.**
  - **Leaflet.js: Integration of interactive maps for toll booth visualization.**

- **Backend:**
  - **Flask (Python): Framework for building the web application and handling server-side logic.**
  - **Geopy (Python library): Calculation of geographic distances for accurate toll fee estimation.**

- **APIs:**
  - **Custom RESTful APIs: Facilitate data exchange between frontend and backend.**

- **Data Handling:**
  - **JSON: Format for storing and transmitting data.**

Conclusion

- **Summary:**
  - **The GPS Toll Simulation tool aims to revolutionize the way travelers interact with toll systems.**
  - **By providing accurate toll information, visualizing toll booths, and incentivizing safe driving, we aim to improve the overall travel experience.**
  - **The innovative speed reward system has the potential to significantly enhance road safety.**