Application for 2-Wheeler Rider Risk Estimation

Problem Statement

The "2-Wheeler Rider Risk Estimation" app calculates a real-time risk score based on rider data like lean angle and cumulative speed. It helps identify high-risk scenarios to enhance safety and reduce accidents.

Importance of the Problem

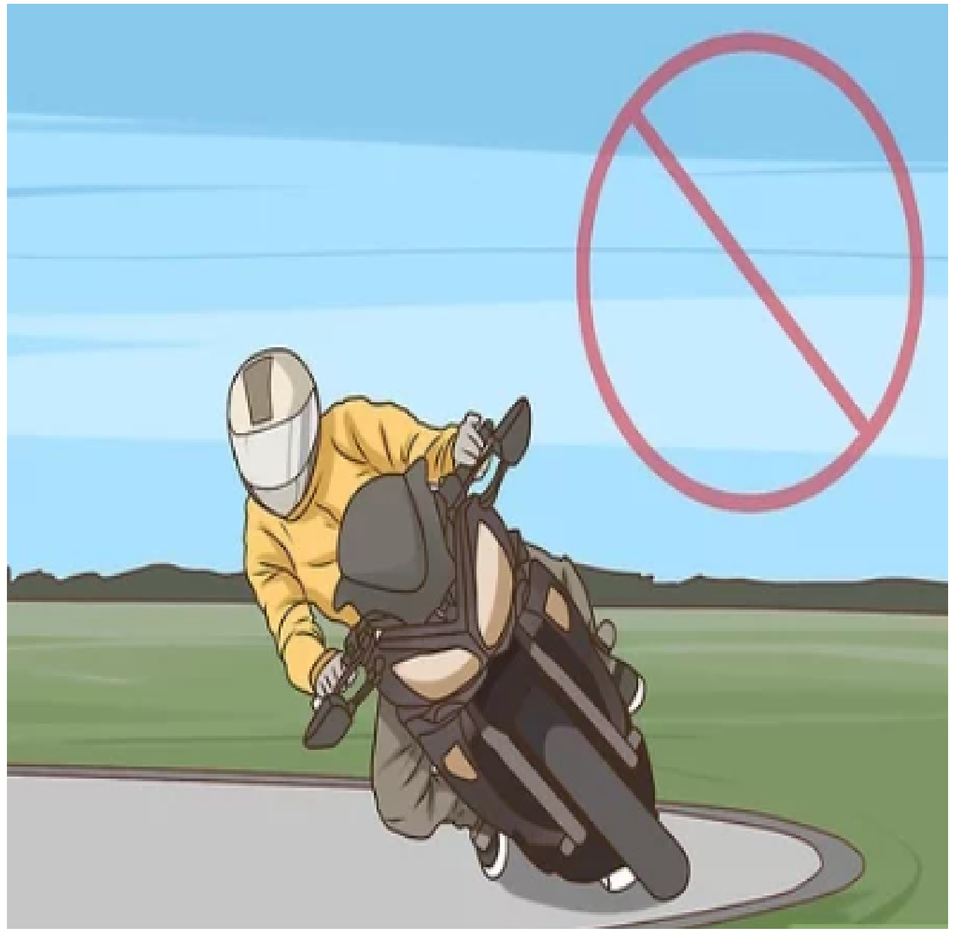
Enhance rider safety by reducing accidents in high-risk scenarios such as

- Skidding
- Collisions, and
- Loss of control.

Identify, quantify, and mitigate factors contributing to risky driving patterns using real-time feedback.

Provide insights based on lean angle and cumulative speed to help riders make safer decisions.

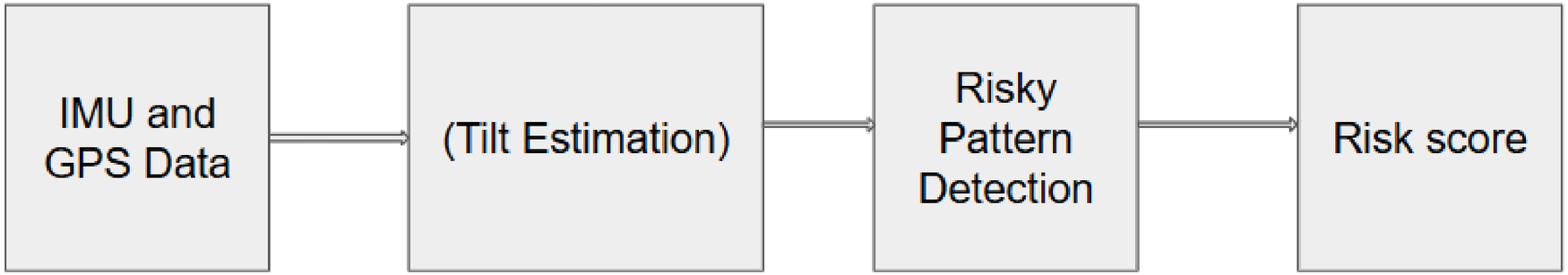
Address the growing need for improved safety measures in two-wheeler transportation.



Objectives

- Tilt estimation
- Risky driving pattern detection
- Application Design

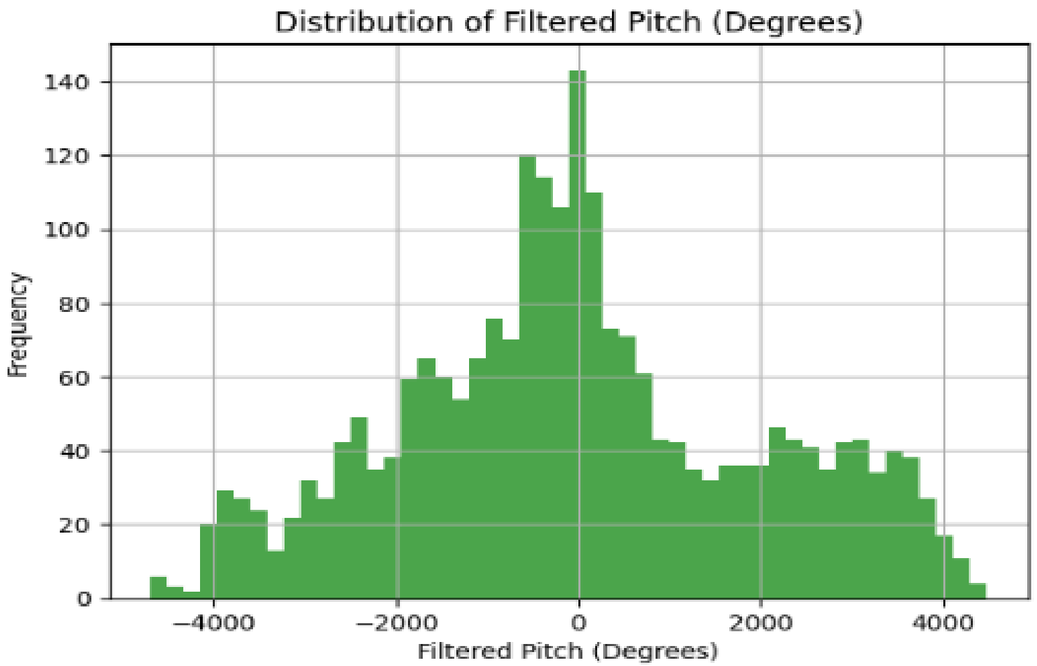
Project Flow

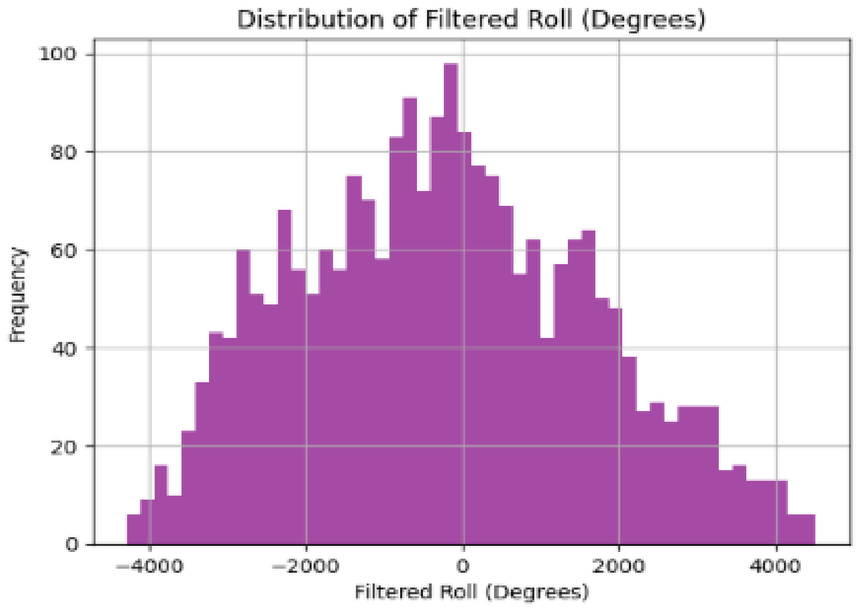


Methodology

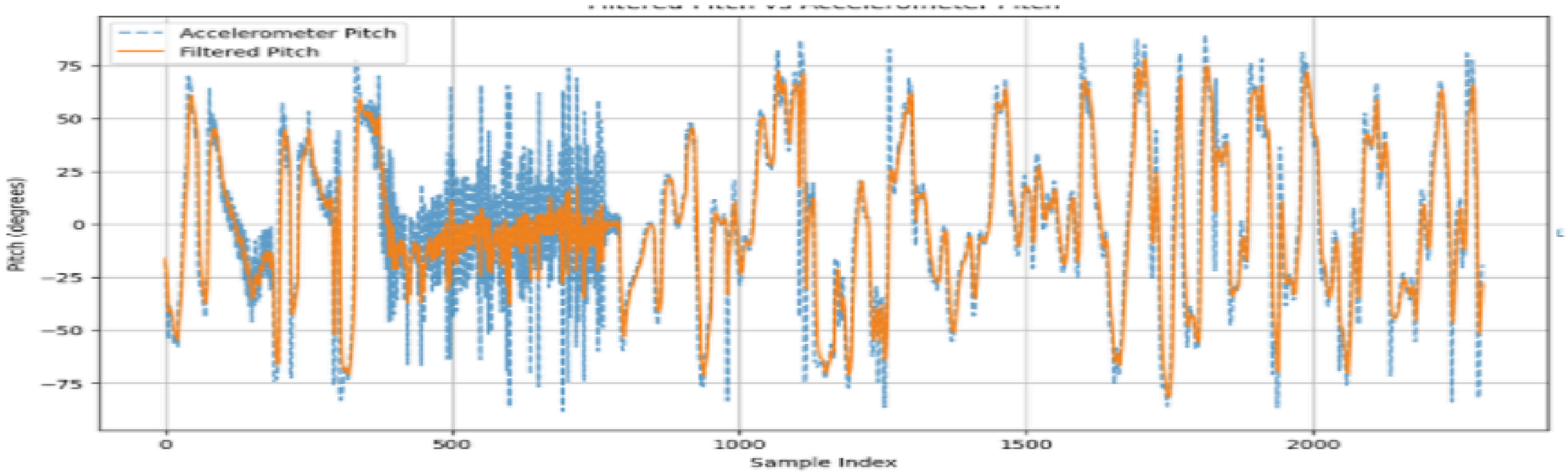
Feature Extraction:

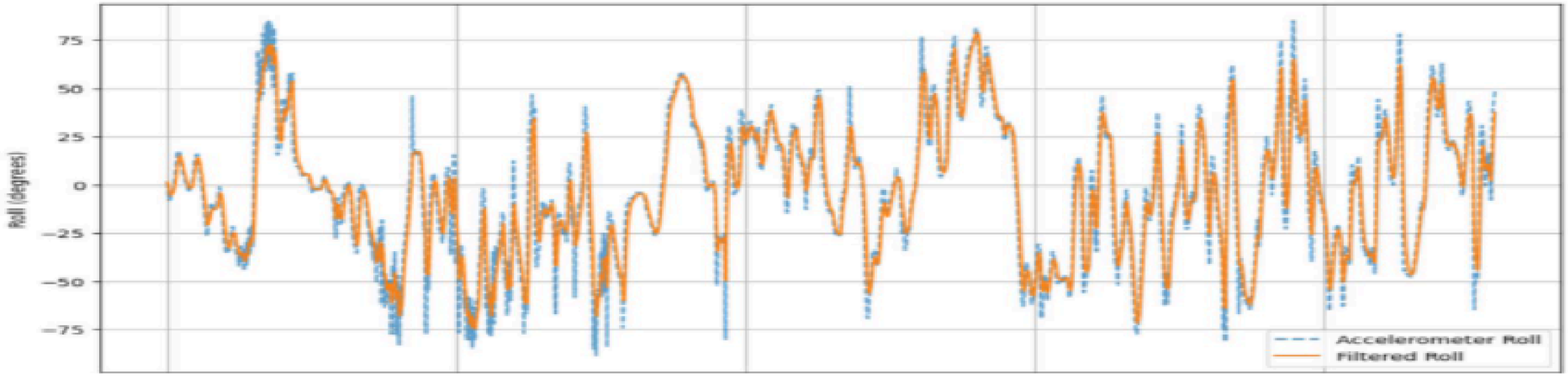
Compute physical metrics (pitch and roll) based on accelerometer data



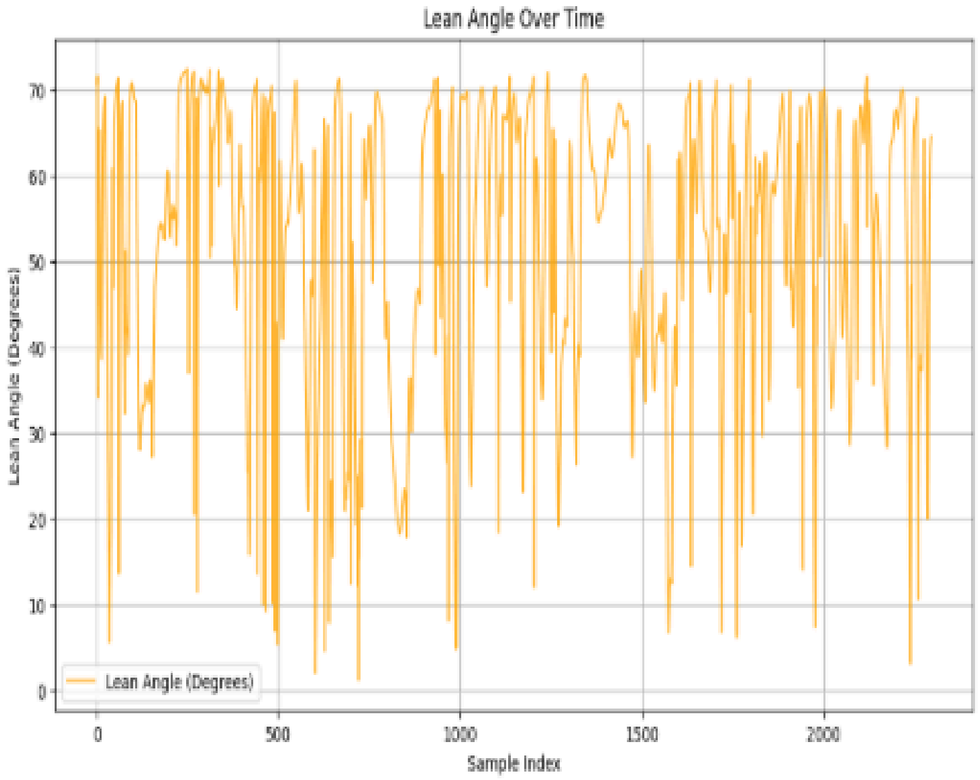


Kalman Filter Implementation

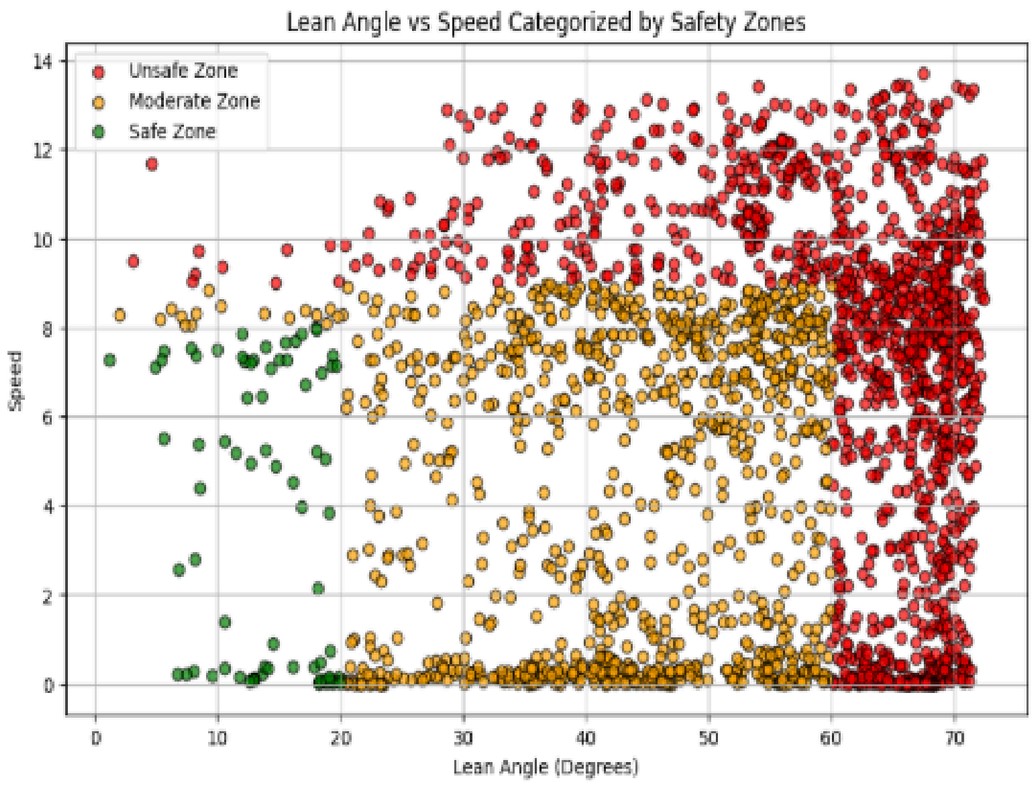




Lean Angle and Clustering

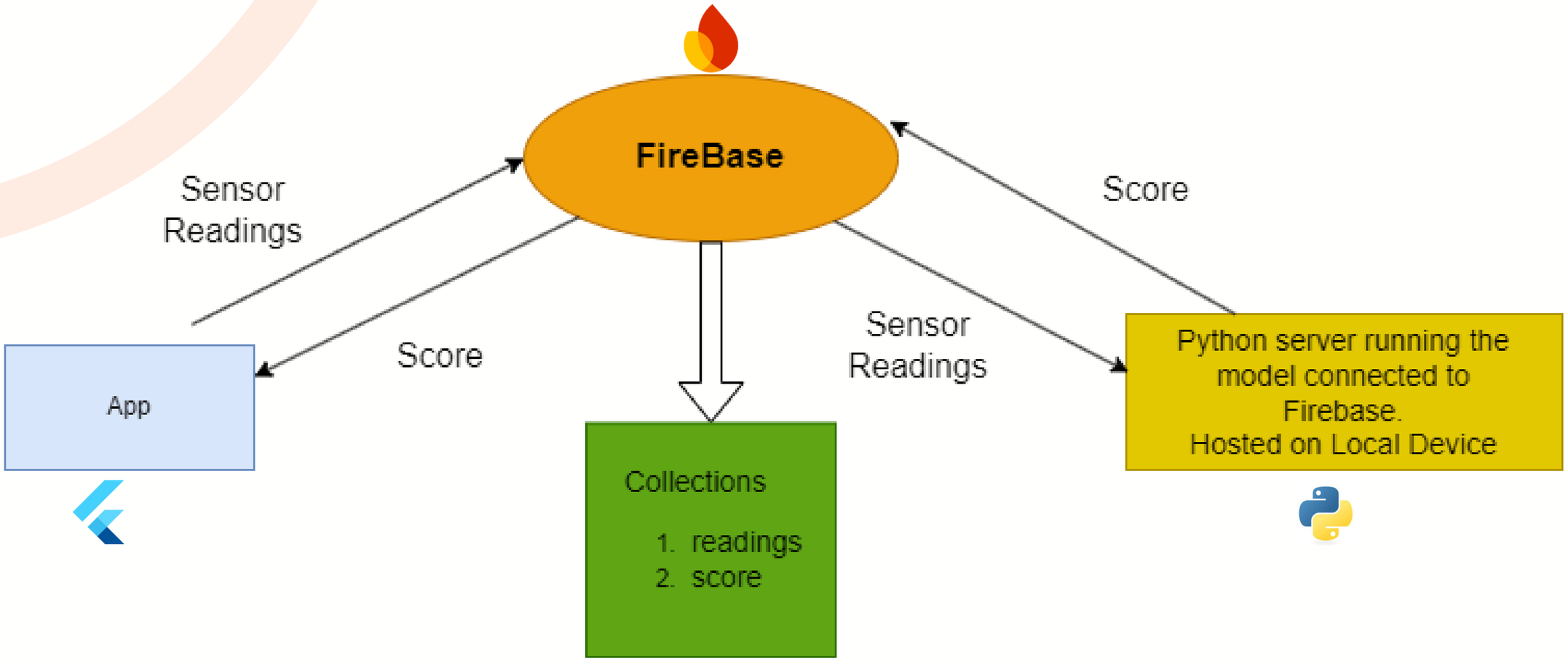


Cumulative Lean Angle

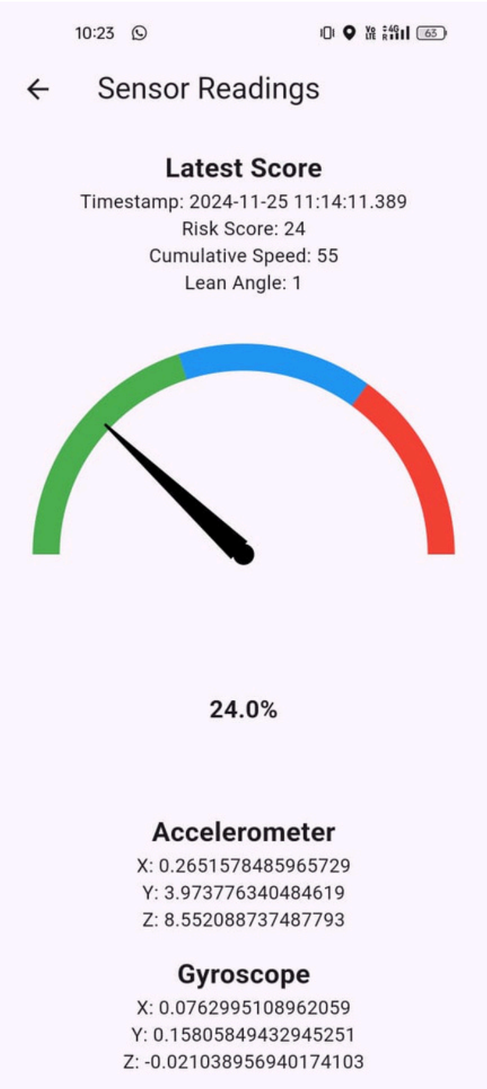


Clusters

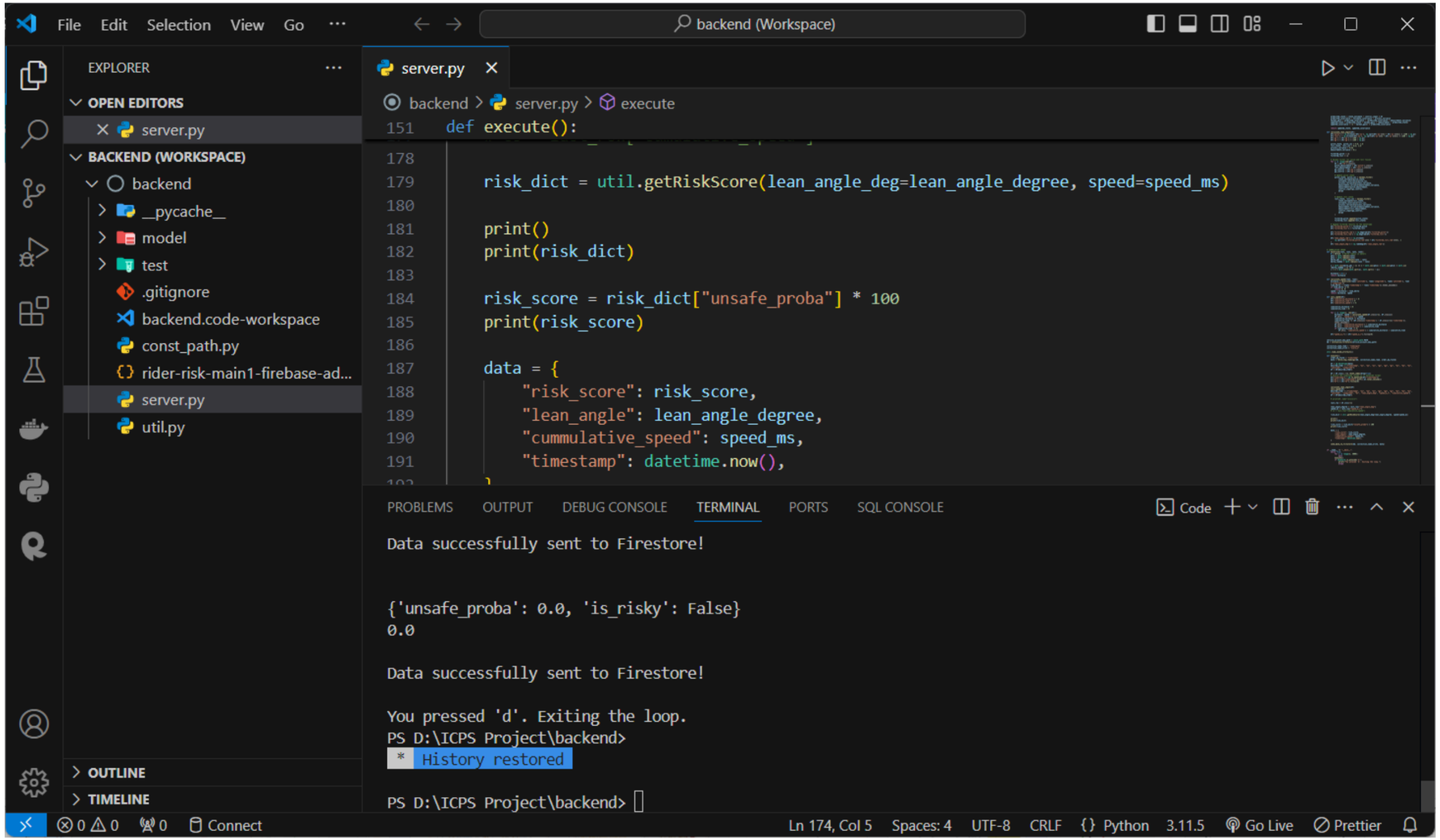
Functioning of the App



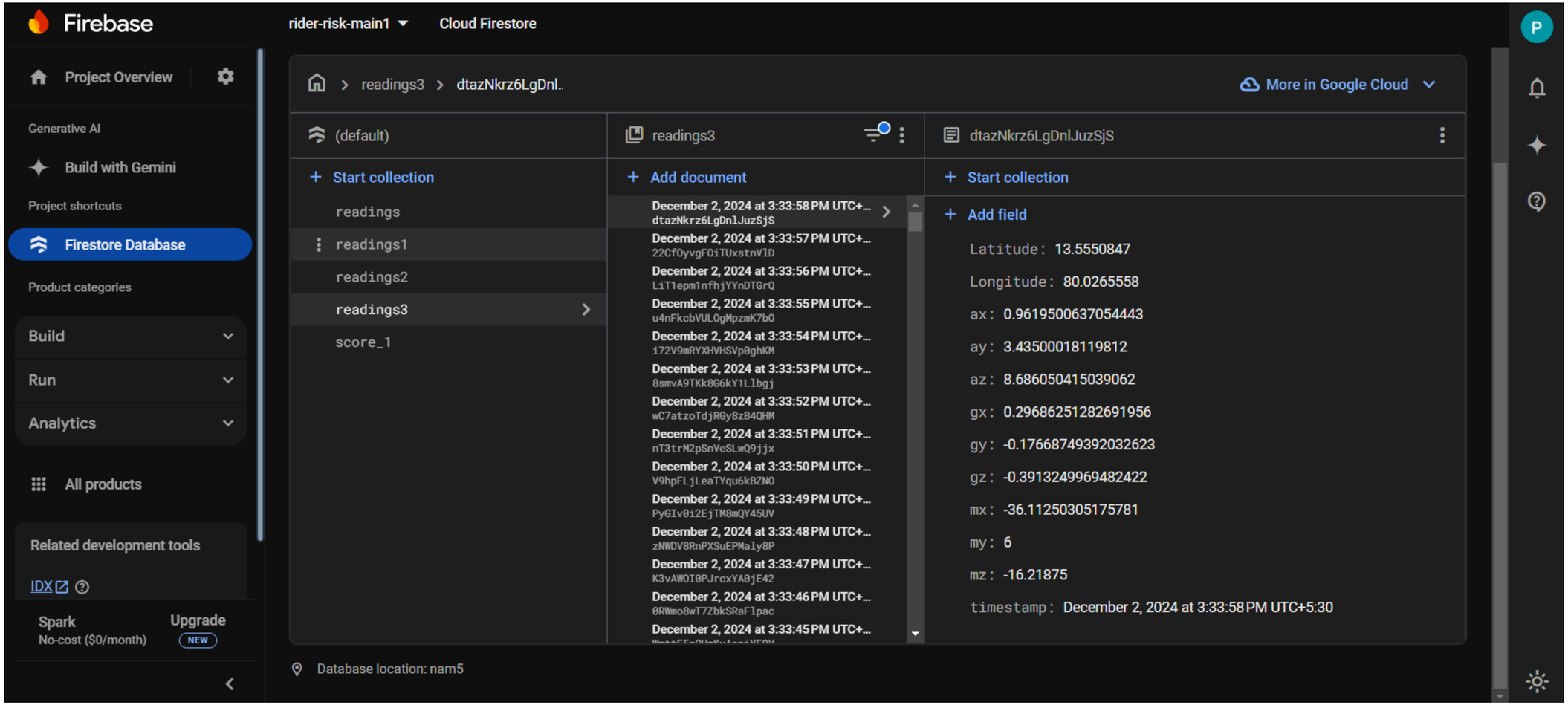
Snapshots of the App



Backend Preview - Python Server



Backend Preview - Firebase



Challenges

- Real-Time Data Accuracy
- Variability in Riding Styles
- Dynamic Environmental Factors

Future Plans

- Weather-Integrated Risk Adjustment
- Terrain and Elevation Analysis
- Traffic-Aware Risk Assessment
- Insurance comapnies using it to determine premiums