

Web Application: Stay Alive – Think and Drive

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Traffic Accidents Cause Huge Economic and Emotional Costs

36,000
People Killed

4.5m
People Injured

23m
Vehicles Damaged

\$340bn
Economic Costs



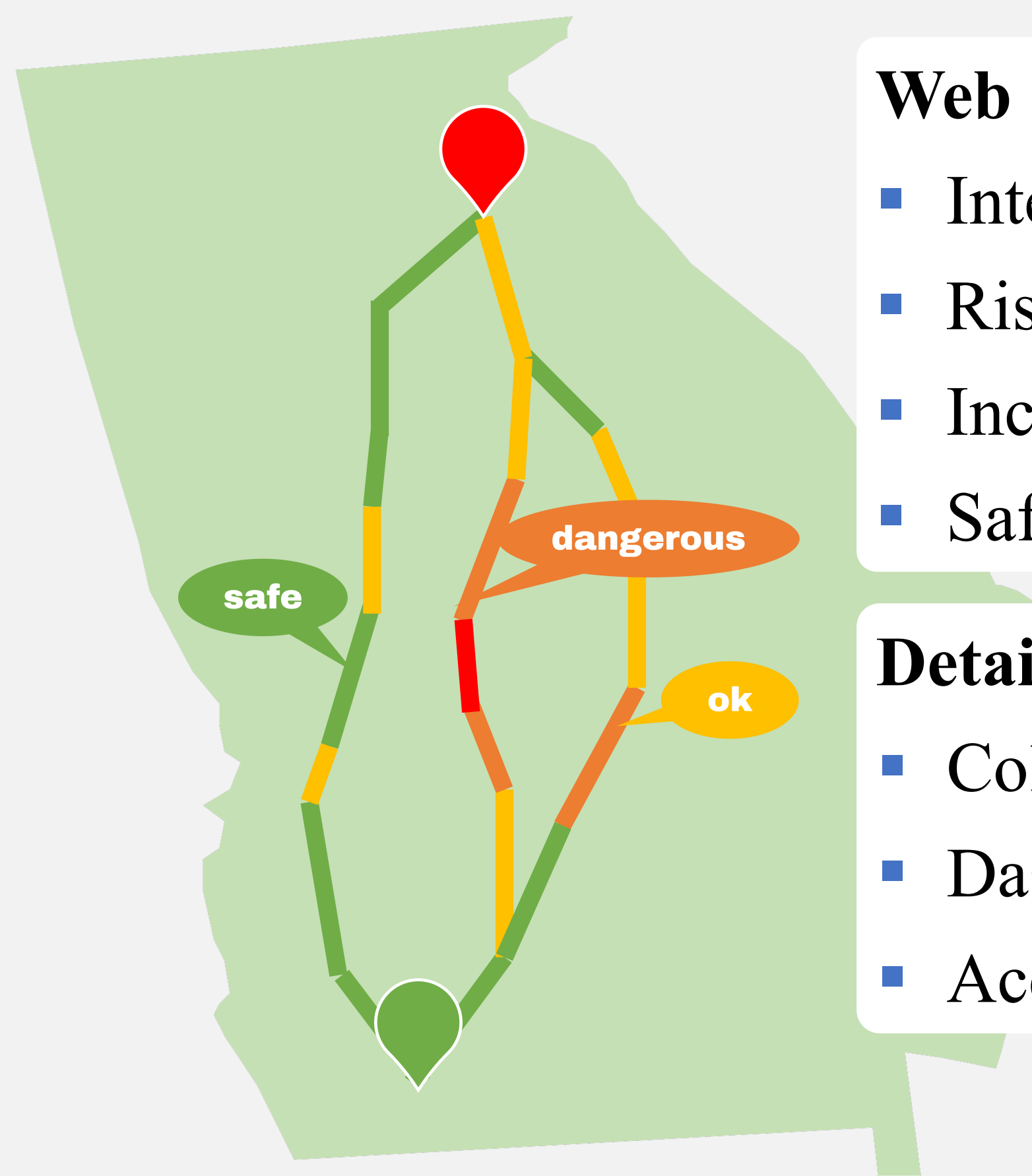
>1bn
Monthly Google Maps Users

Providing a **safety feature in routing apps** could be used by millions and have **enormous impact**

Statistics for 2021

Our Approaches

Desired Solution



Web application

- Interactive route planning
- Risk-prediction per segment
- Inclusion of live data
- Safety-based suggestions

Detailed insights through

- Color-coded segments
- Dashboard next to map
- Accident risk explanations

Accident Propensity Index

Calculation of the riskiness of a route segment

$$Propensity = \frac{\sum_{i=1}^{Accidents\ on\ Spline} accident * severity}{\sum_{i=1}^{All\ U.S.\ Accidents} accident * severity}$$

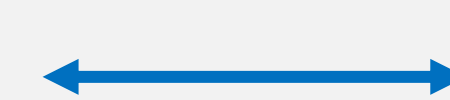
Odds Ratio of Accident Increase

Impact of real-time weather on accident risk

$$Odds = \frac{P(accident|weather_{now}, time_{now}, location_{current})}{P(accident|weather_{avg}, time_{now}, location_{current})}$$



weather



location

Used Data



kaggle.com/datasets/sobhanmoosavi/us-accidents

- Highway traffic accident dataset
- Covers continental U.S.
- Created by OSU researchers
- Available via kaggle.com

2.8m
Accidents

2016-2021
Timeframe

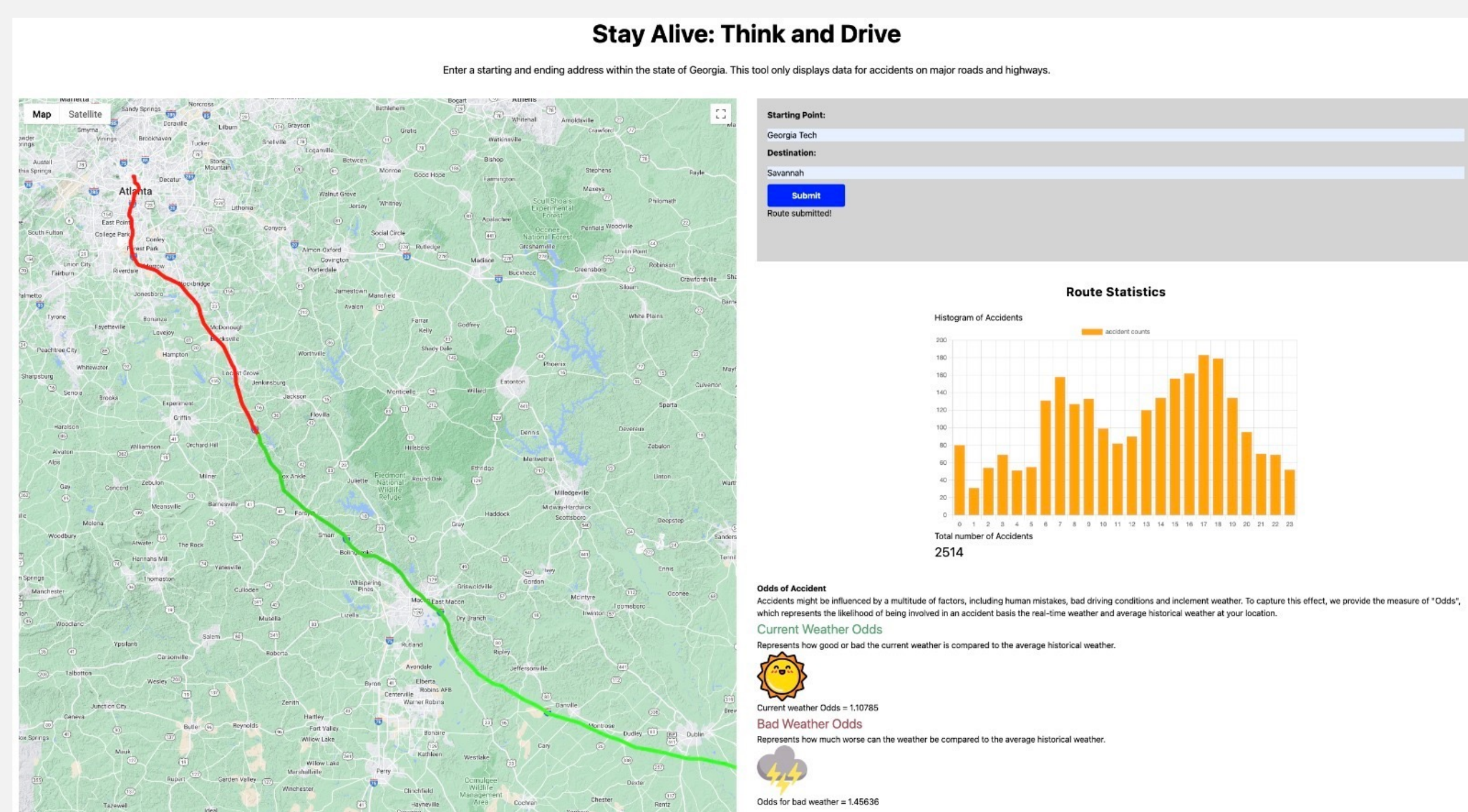
1.15GB
Size on Disk

47
Features

Features include coordinates, date, description, accident reason, severity, weather, sunlight times

Results & Experiments

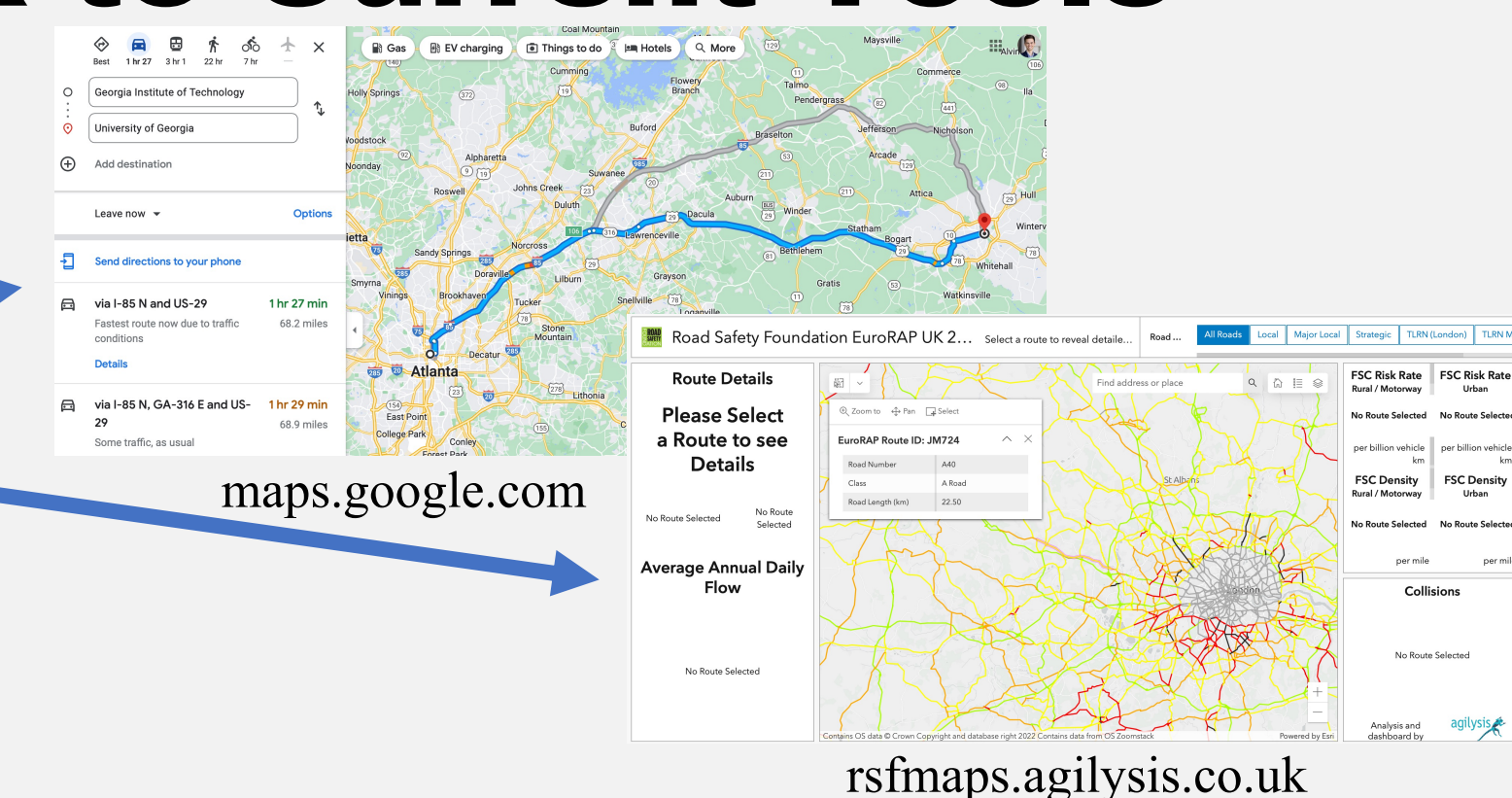
Final Application



- Dynamic route planning
- Route accident statistics
- Color-coded segments
- Log-odds of accidents

Benchmark to Current Tools

- Current tools do either
 - Route planning
 - Accident propensity
- We do both



Internal Tests

- Running time evaluated
- Multiple efficiency features implemented
- UI thoroughly tested
- 50 routes tested w/o error

User Tests

17
Users Surveyed

85%
Net Promoter Score