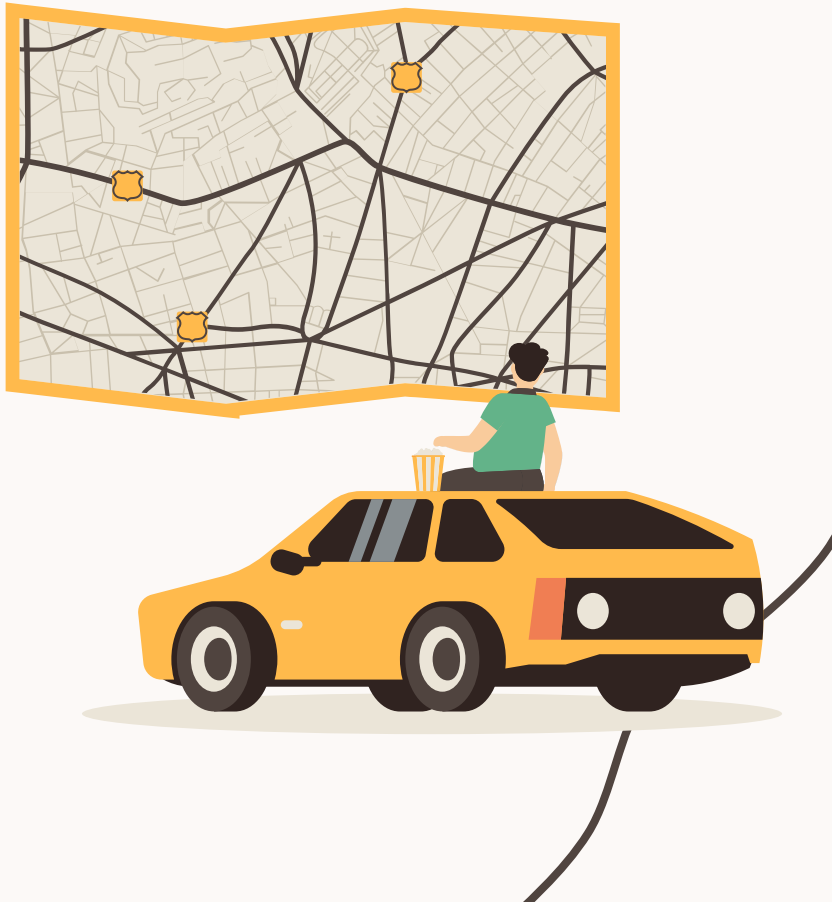
Info Challenge 2023: Team 23058

Iris Yu, Ethan Taggart, Christopher Way, Anna Lavrentieva

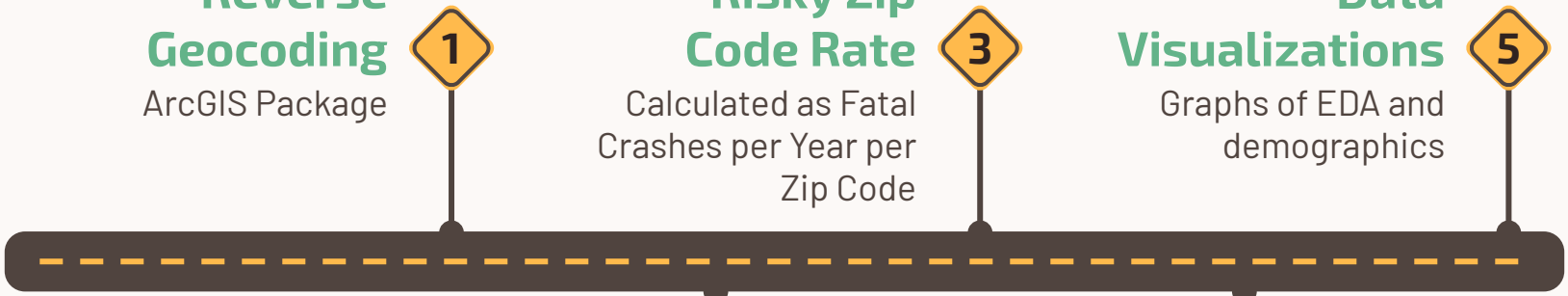
Level 4: Washington Fatal Crash Files

Problem Statement:

What kind of drivers are involved in the fatal crashes in Washington and where do they come from?



Data Processing and Exploration



1 Reverse Geocoding

ArcGIS Package

2 Determining Communities

Zip Code, and later define community with city boundaries

3 Risky Zip Code Rate

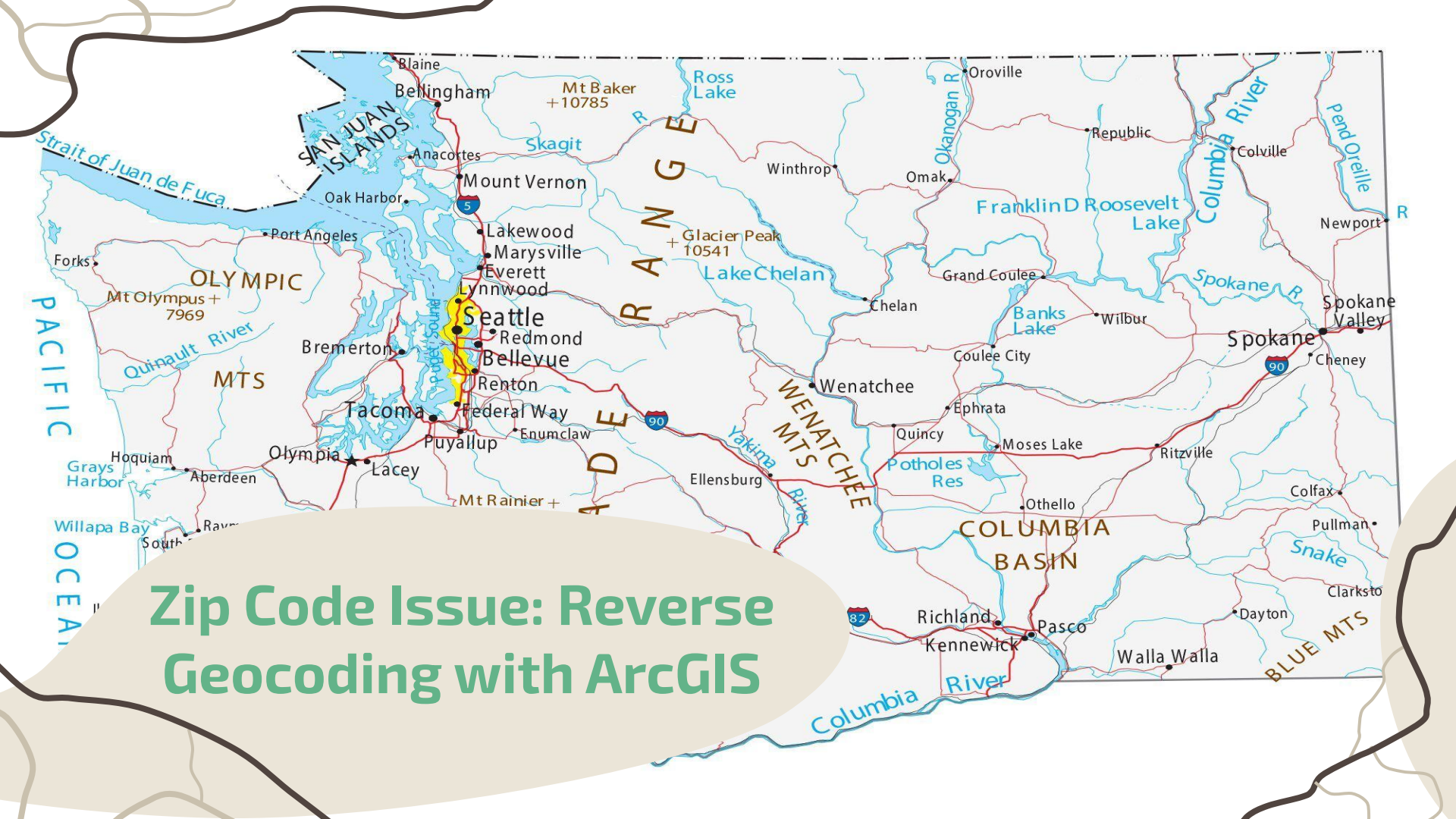
Calculated as Fatal Crashes per Year per Zip Code

4 Exploratory Data Analysis

Who are these risky drivers?

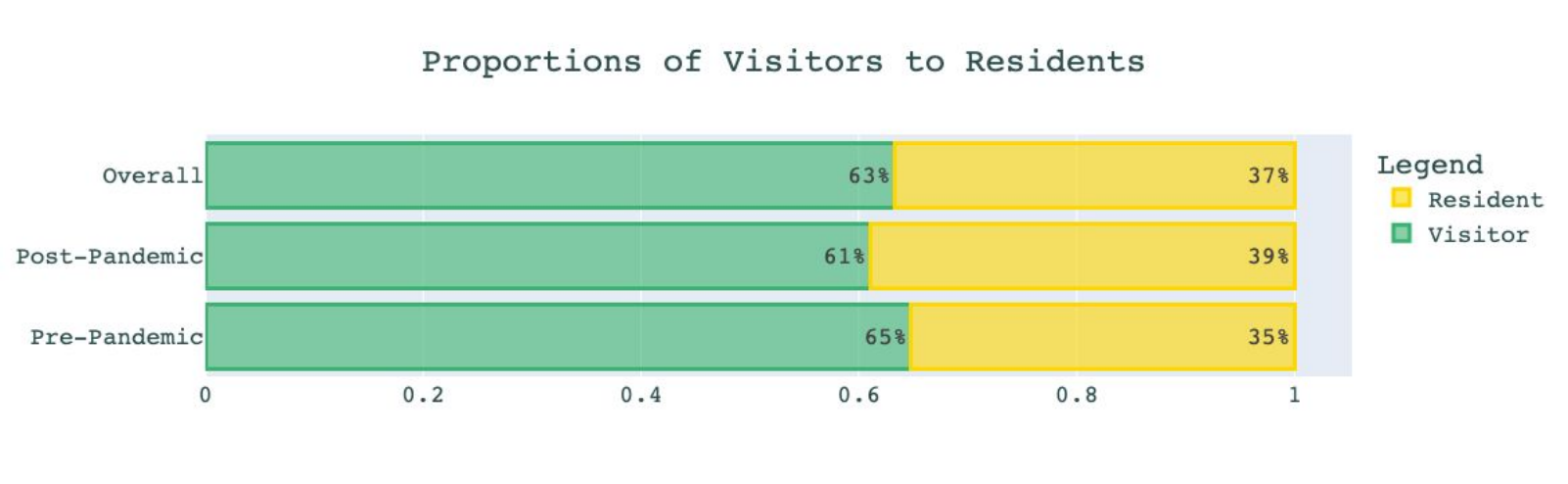
5 Data Visualizations

Graphs of EDA and demographics

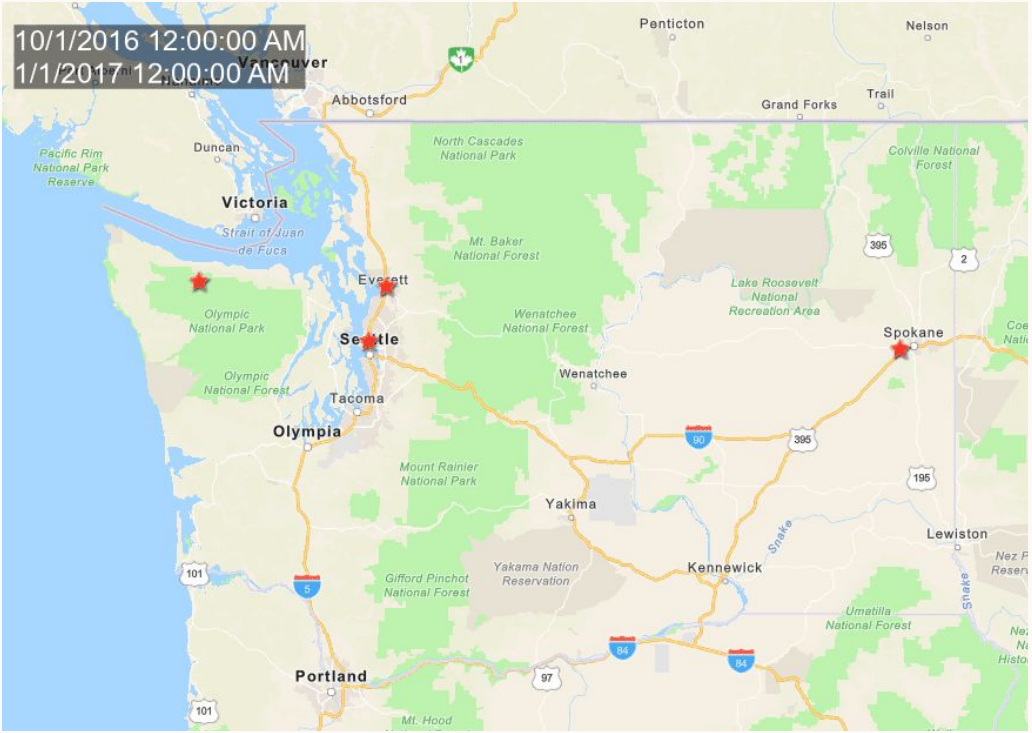


Zip Code Issue: Reverse Geocoding with ArcGIS

Who are involved in these crashes?



Crashes over Time



Driver Behaviors and Road Conditions

Distraction

Drinking

Highway Exchanges

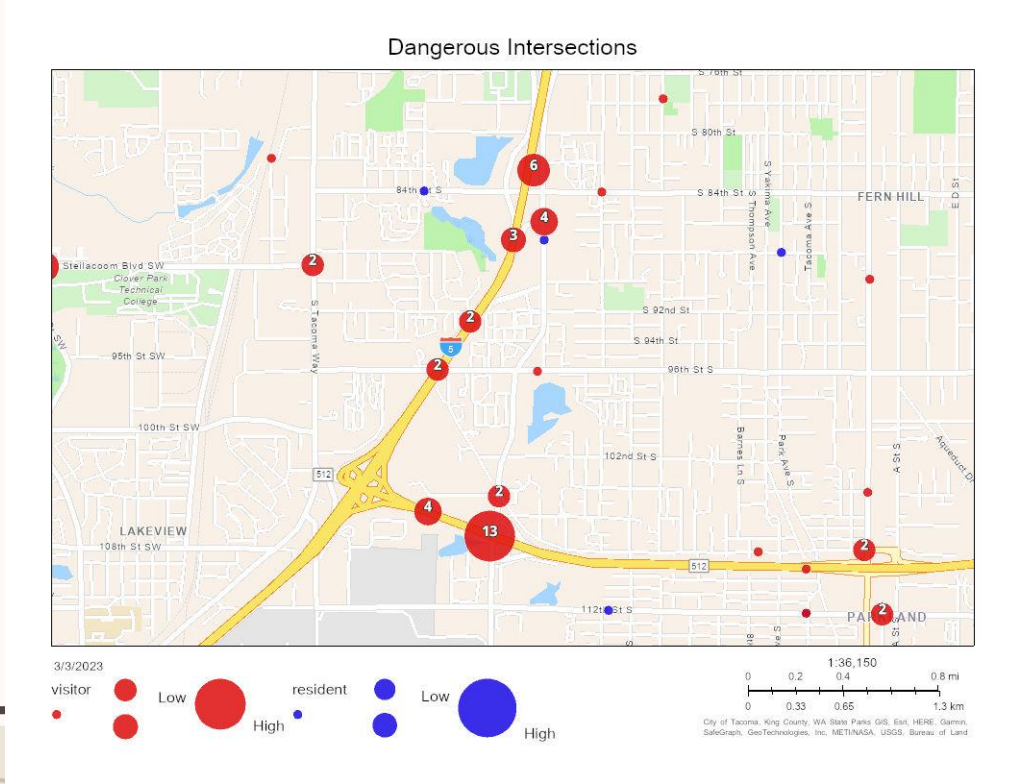
High-Speed Roads

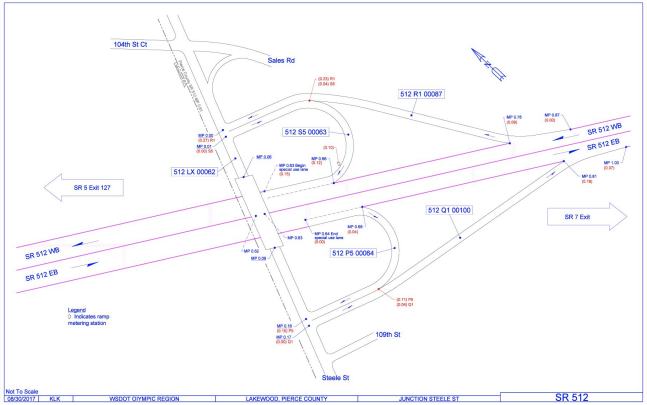
Chi-Squared Tests for Homogeneity Between Visitors and Residents

Driver Behavior	p-value	Crash Type	p-value
Drunk Driver Involved	.98	Traffic Flow	**2.7 *10^-18**
Drowsy Involved	.99	Road Class	**4*10^-68**
Distractions Involved	.99	Urban Rural	**1.1*10^-23**
Alcohol Impaired	.98	Intersections	**1.2*10^-9**

Bold indicates significance at α=0.05

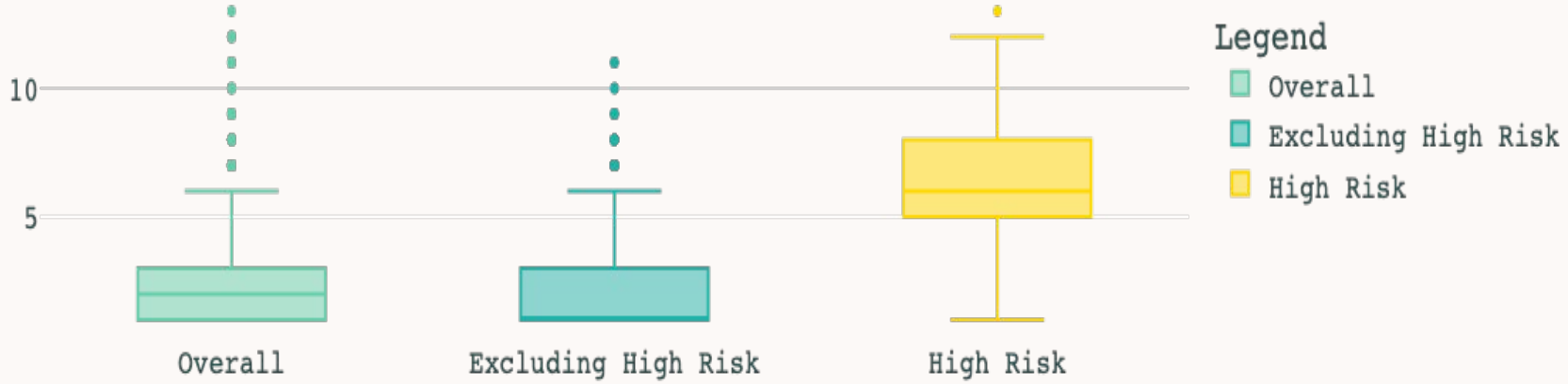
Deadly Interchange: Can *YOU* navigate this?



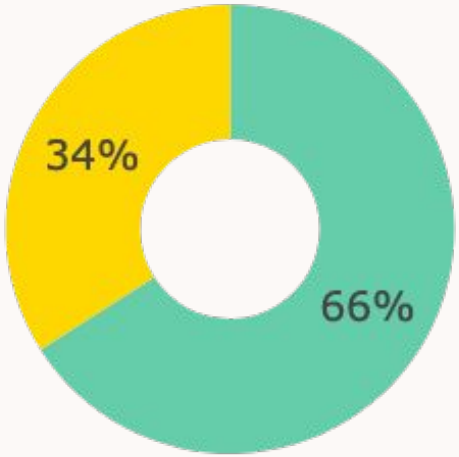


Interchange Diagram from Washington State Department of Transportation

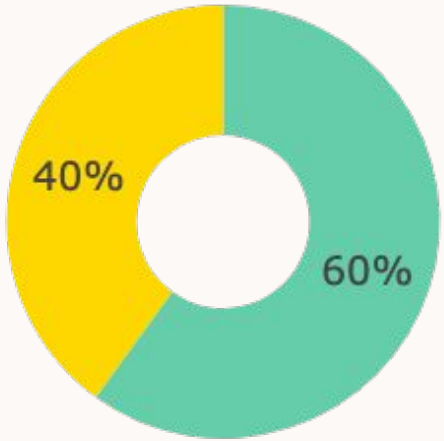
Determining Risky Zip-Codes



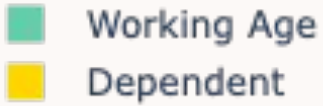
Demographics of High Risk Zip Codes



Top 17* Risky Zip Codes



Washington State



Policy Recommendations

- Emphasize increased caution when driving in areas of high population density.
- In future infrastructure design, make sure that roads are not confusing for both locals and visitors.
- De-emphasize the use of cars in high-density areas. Traffic increases the risk of accidents happening. Possible solutions could be more pedestrian zones, bicycle lanes, and public transportation.

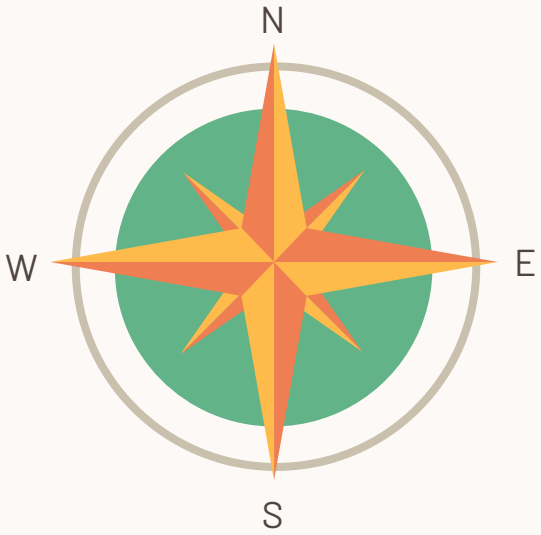
If we had more time: Next Steps

Predictive Analysis

Use autoregression and time-series forecasting to anticipate fatal crash sites

Other Exploratory Data Analysis

Other factors we were curious about: car type (larger cars), temporal data (night vs. day, weekends), and current enforcement trends



THANKS!

Do you have any questions?

Acknowledgements:
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