Washington State Fatal Crash

Analysis

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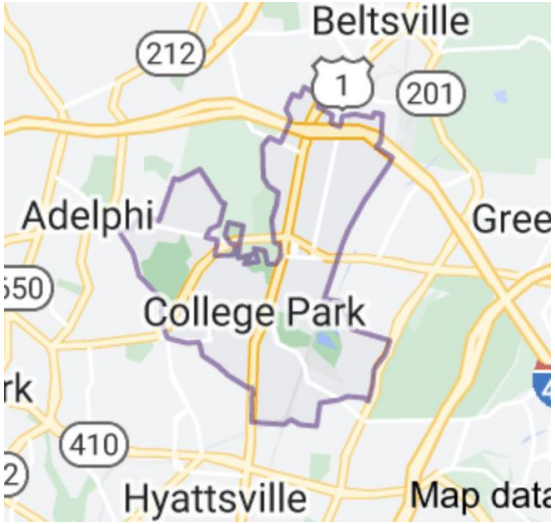
Data Source

The Washington Coded Fatal Crash (CFC) Data from WTSC and their traffic safety partners .

Data includes:

- Location
- Traffic Condition
- Driver Information
- Damage and Rescue

Data Process



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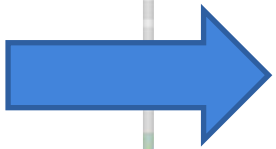
Data Process

- Drive Off Road
- Control/Traction Loss
- Avoid Collision with Vehicle, Pedestrian, Animal
- Parked Vehicle
- Other (Single Driver)

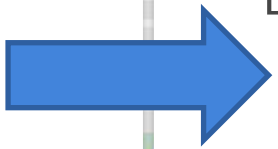


Crash Type Category:

Single Driver

Data Process

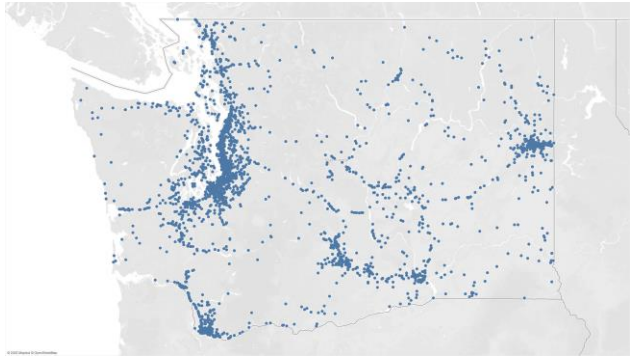
- “Impaired by Alcohol, Drugs, Meds” labeled 5 from 2003–2009
- “Under the Influence of Alcohol, Drugs or Medication” labeled 15 after 2009



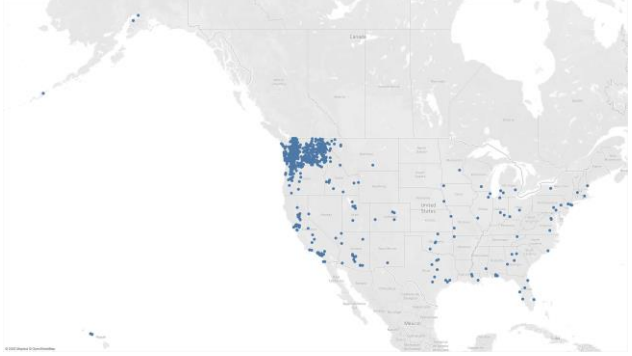
Driver Behavior Factor:

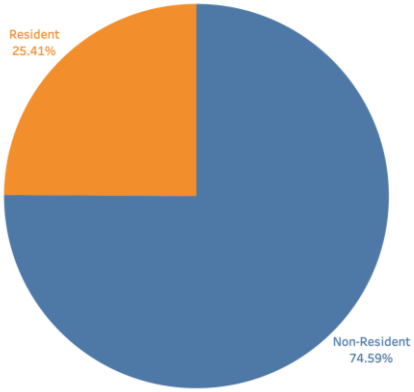
Physical/Mental Condition

Accidents



Drivers' Addresses



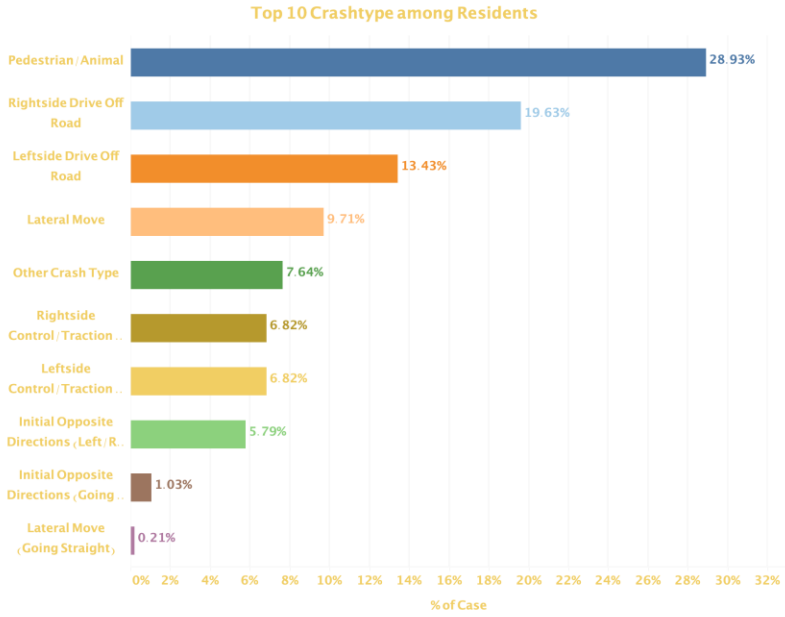


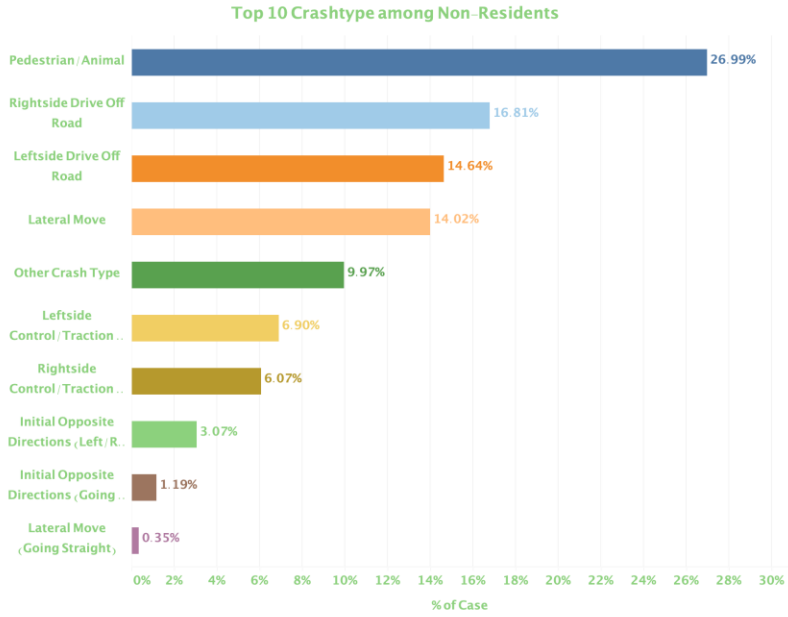
Question

Non-resident drivers shows a much higher percentage in fatal accidents.

WHY?

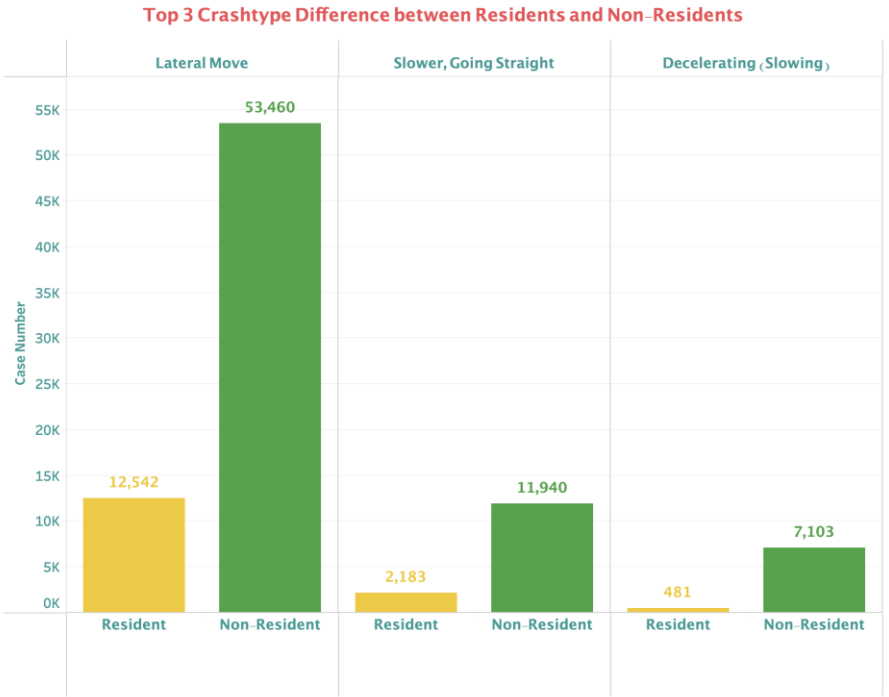
Resident VS. Non-resident





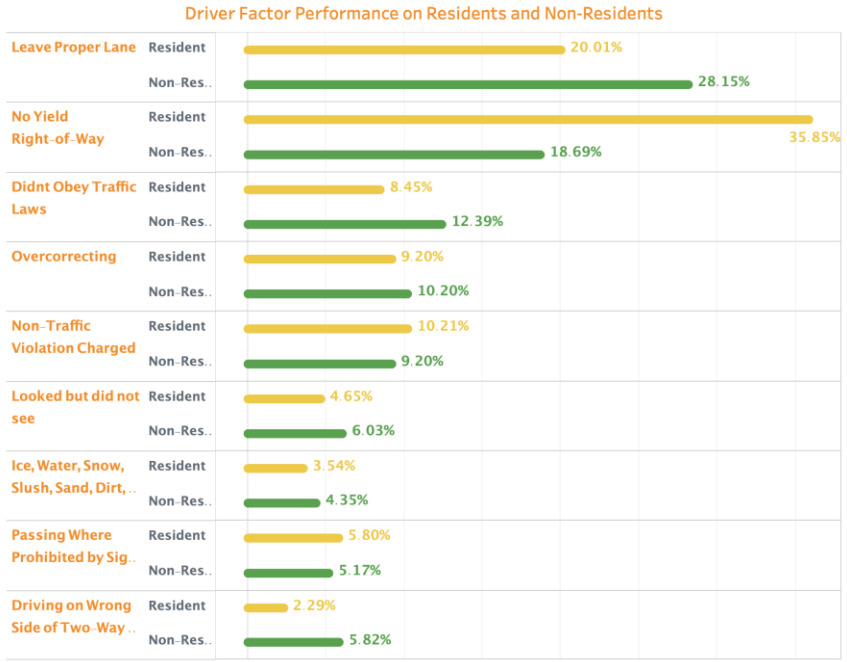
Resident VS. Non-resident

- The chart shows the proportion of fatal accidents by crash categories, in resident and non-resident drivers separately.
- The largest difference of case proportion appears in the crash types Lateral Move (Left/Right), Decelerating (Slowing), and Slower, Going Straight.



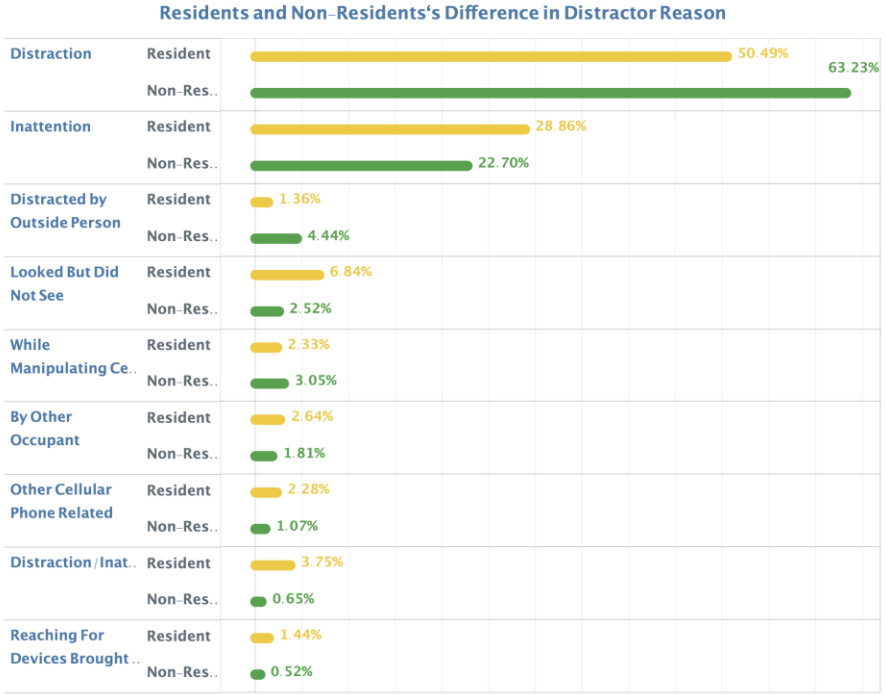
Resident VS. Non-resident

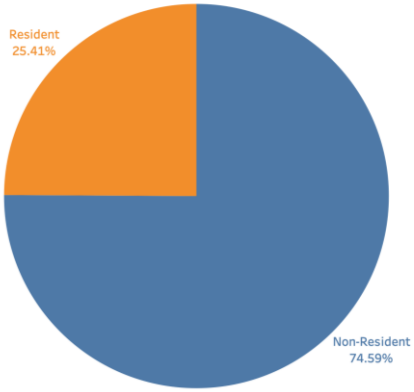
- The chart shows the proportion of fatal accidents by behavior factors, in resident and non-resident drivers separately.
- Compared to resident drivers, non-resident drivers are much more likely to encounter fatal accidents with leave proper lane.



Resident VS. Non-resident

- The chart shows the proportion of fatal accidents by distraction factors, in resident and non-resident drivers separately.
- Compared to resident drivers, non-resident drivers in accidents are more likely to be involved with inattention, looked but did not see, distracted by outside person, talking or listening to phone, and eating or drinking.





Conclusion

Why non-resident drivers shows a much higher percentage in all fatal accidents?

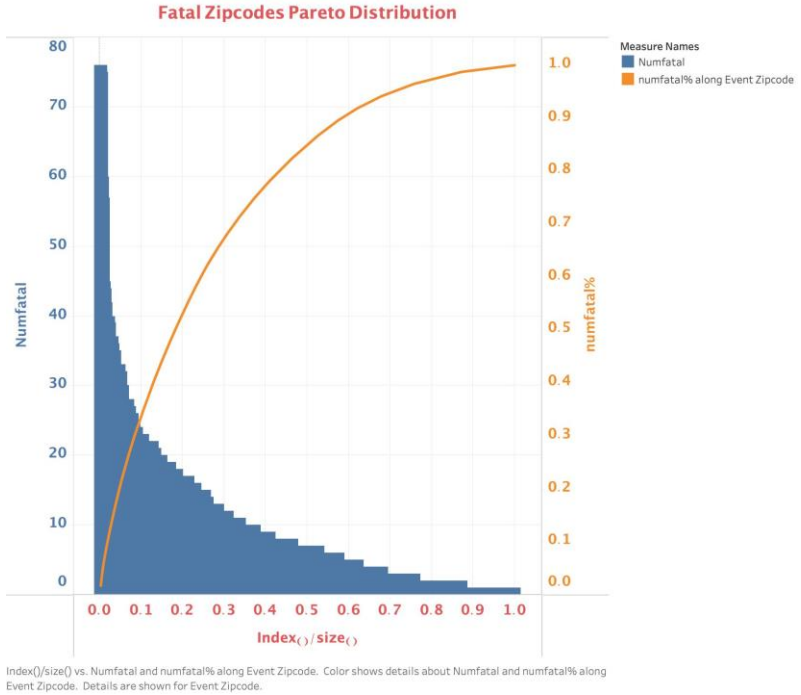
- Unfamiliar with local traffic can lead to frequent lateral move, deceleration and leaving improper lane. This could be the main reason of such high fatal accident percentage.
- Distraction might be another reason for accidents with non-resident drivers.

Question

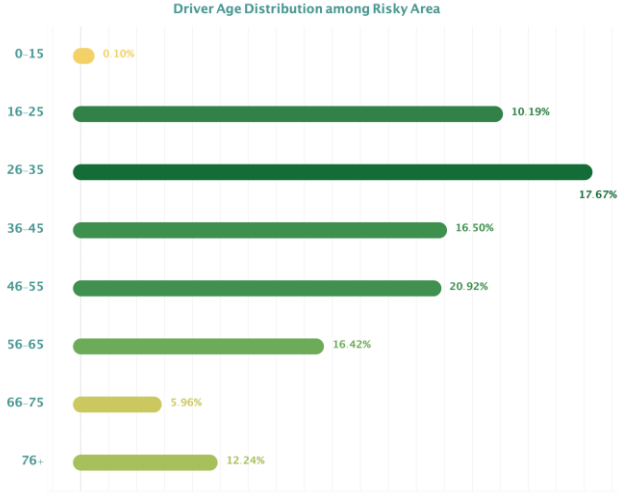
Is there any region that tend to produce higher-risk drivers that are involved in fatal crashes at a higher rate?

Region with high-risk Drivers?

- The distribution of case proportion across zip codes is similar to Pareto distribution.
- Few areas account for most of the risky drivers.

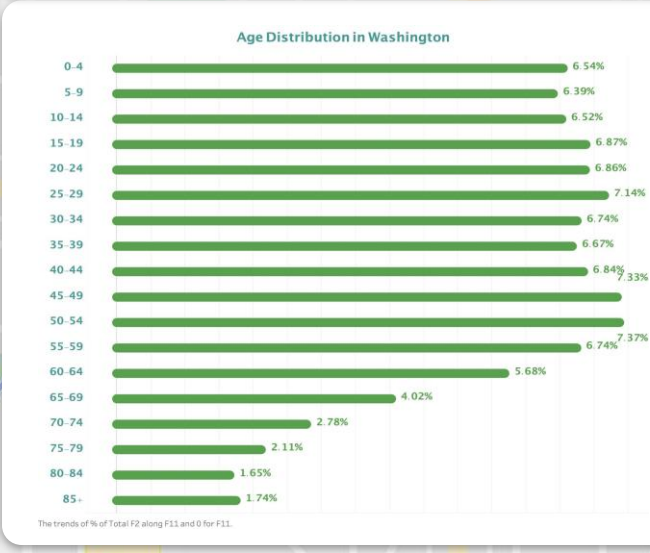


Drivers In High-risk Area

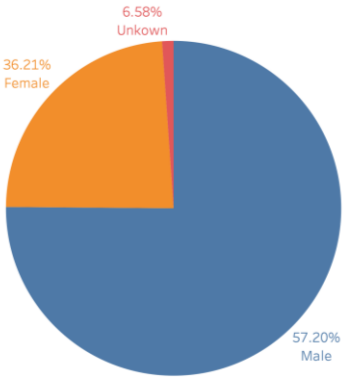


VS.

Washington Population[1]



Drivers In High-risk Area



VS.

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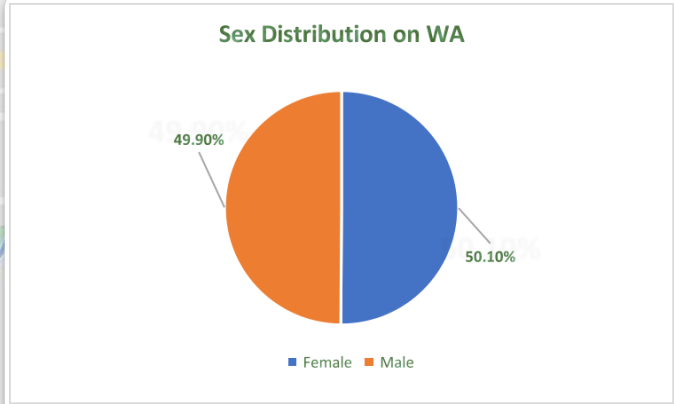
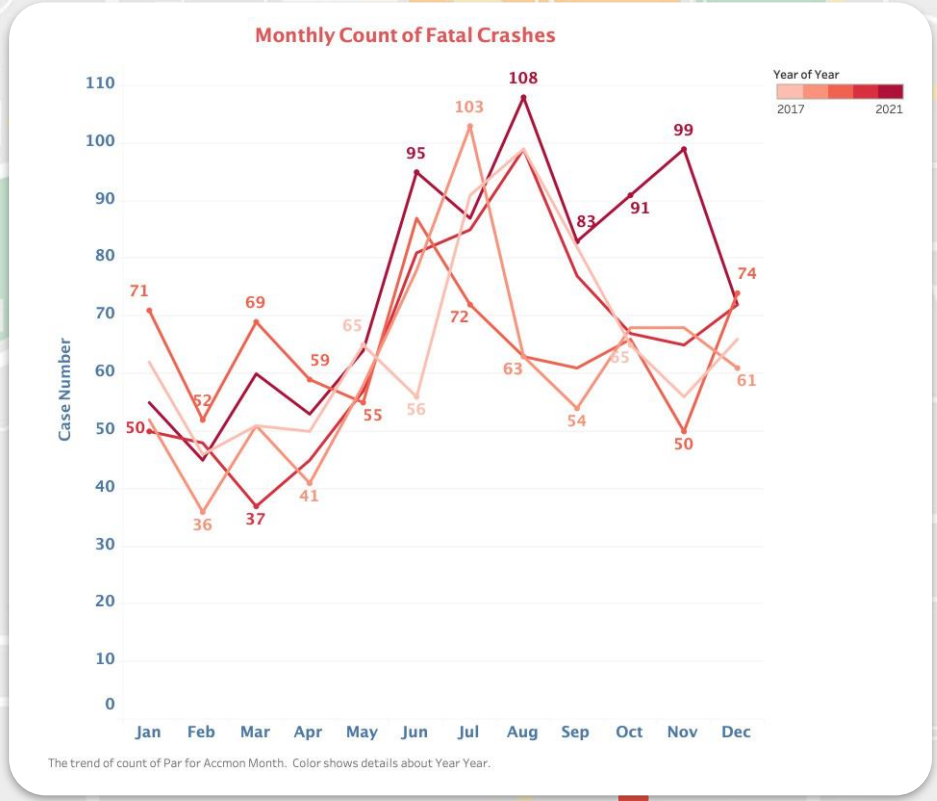
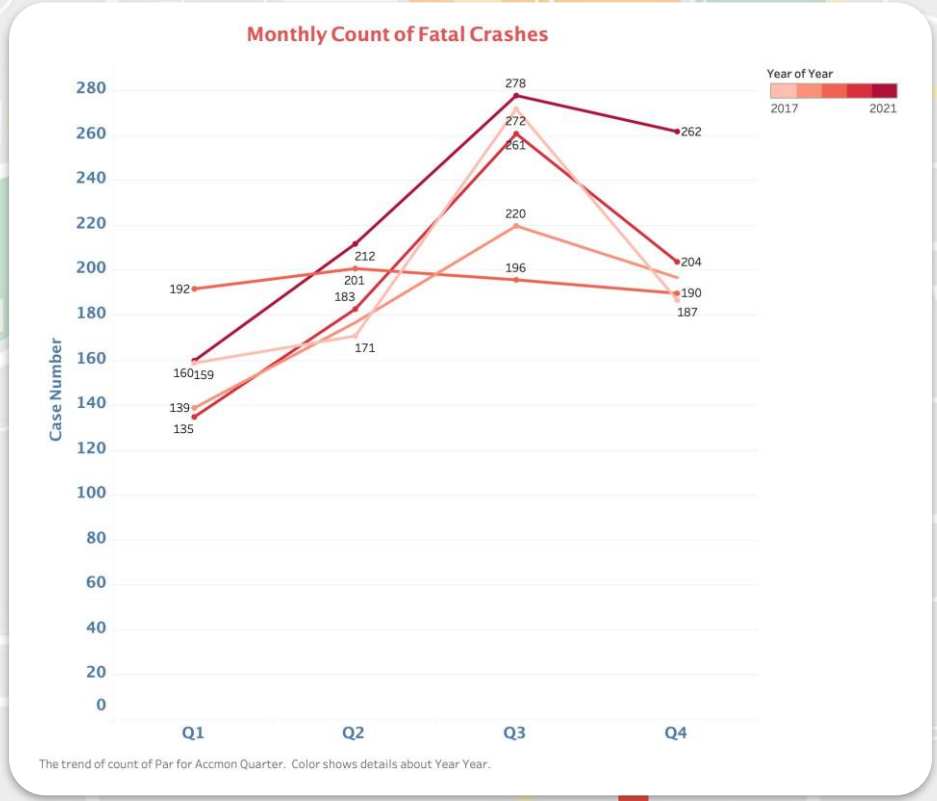




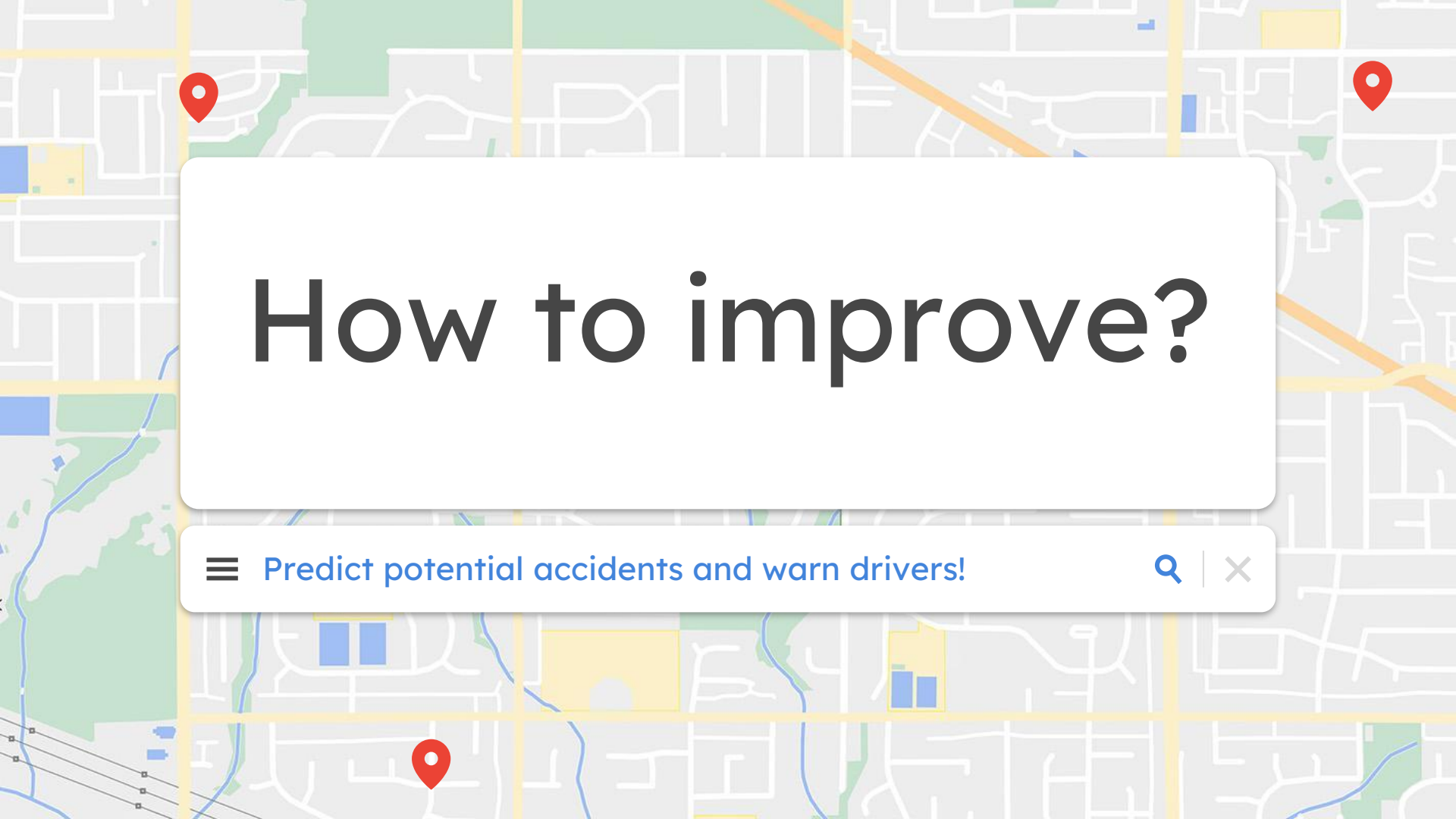
Seasonality

- Seasonality in the number of fatal crashes throughout a year.
- February appears to be the month with fewest number of crashes.
- From 2017 through 2021, the monthly total of fatal crashes peak during July or August.



Conclusion

- The number of monthly fatal accidents is related to temperature. The higher the temperature, the more fatal accidents.
- Increased outdoor activities due to fine weather from June to August may lead to more fatal accidents.


How to improve?
Predict potential accidents and warn drivers!

Prediction

Models

Random Forest,
Decision Tree
and Baseline

Results

Accuracy: 61.2%
F1 score: 0.522

Variables

Target: Crash Category

Independent: Location, Weather Condition, Light Condition, etc.

Training and validation

Scikit Learn Library

References

[1] Population Estimates | Office of Financial Management https://ofm.wa.gov/washington-data-research/population-demographics/population-estimates

[2] https://www.washington-demographics.com/zip_codes_by_population

Thanks!

Q&A