

Data Analysis with Python



**National Highway Traffic
Safety Administration
Survey Data**

NHTSA Survey Data



Reports serious
crashes in the 51
states of US in 2016



Dataset includes:

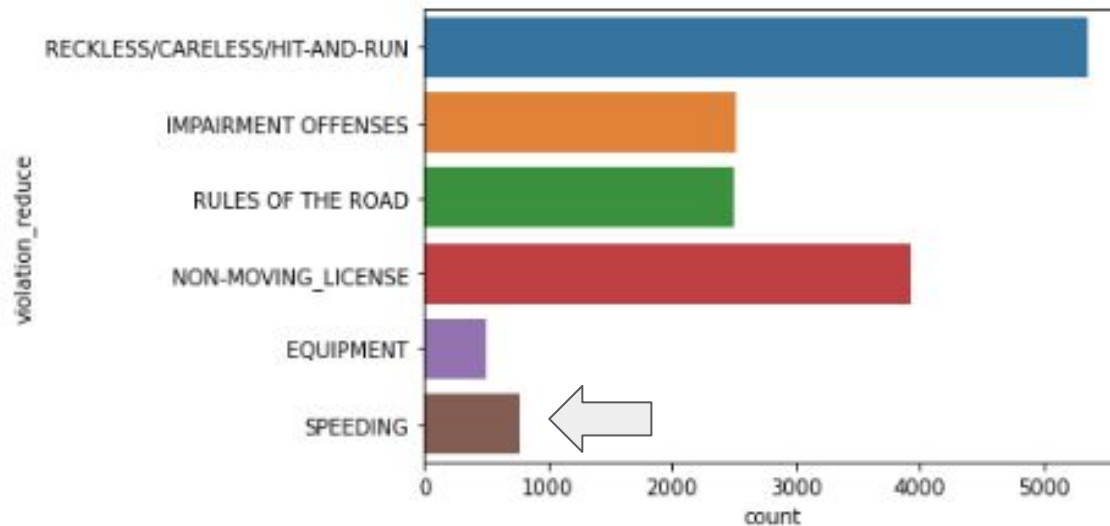
1. No. of vehicles involved in a crash
2. Day and time of crash
3. Alcohol and Drug influence
4. Number of fatality
5. Violation etc.

Goal 1:

Fatality rates with respect to violations. Distribution of violations based on location of accident, atmospheric conditions, and lighting.

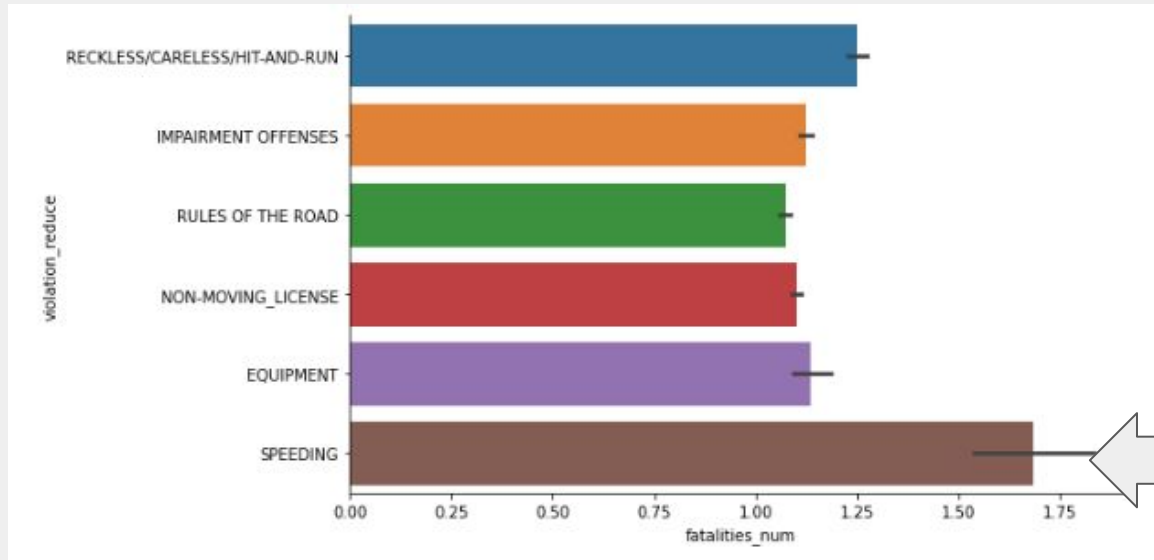


Distribution of Violation



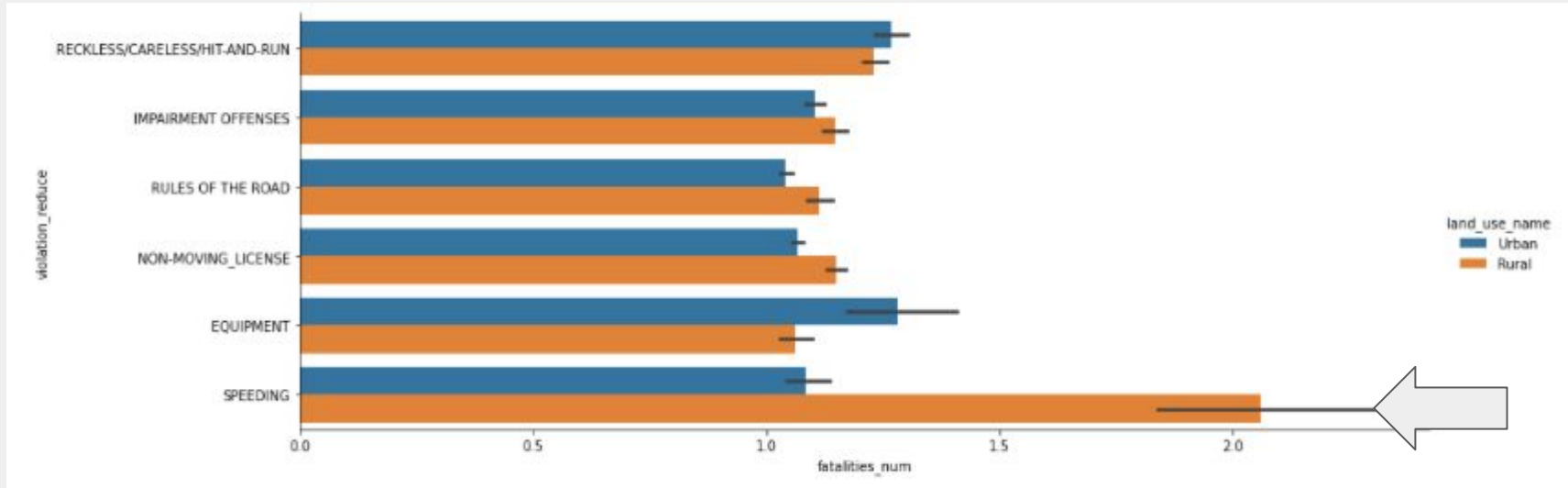
- Highest count: reckless/careless/hit-and-run
- Lowest count: Speeding

Graph of Avg Fatality Number by Violation



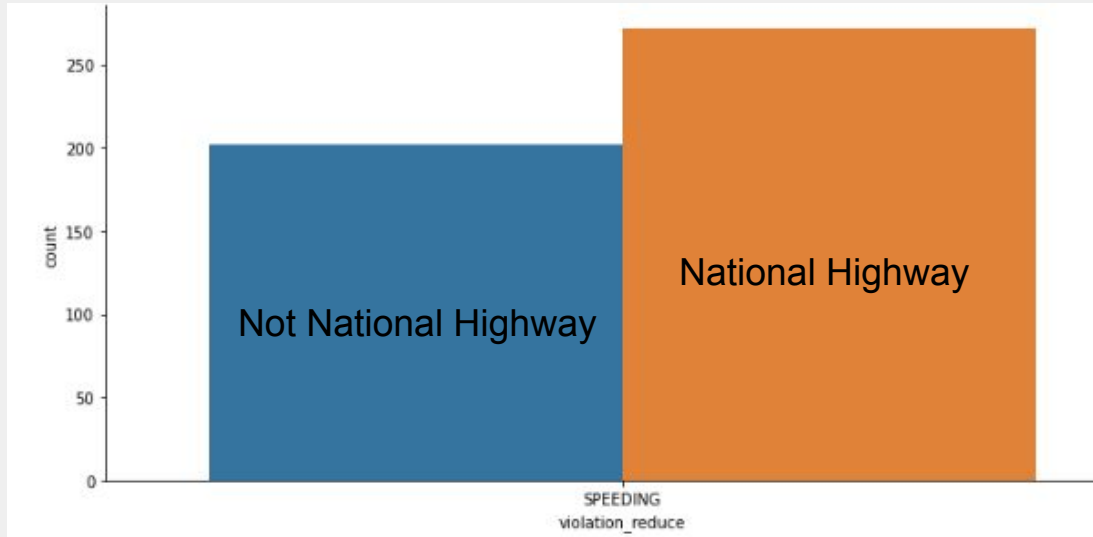
- Speeding has way higher average fatality number compare to other violations

Graph of Avg Fatality Number by Land Use & Violations



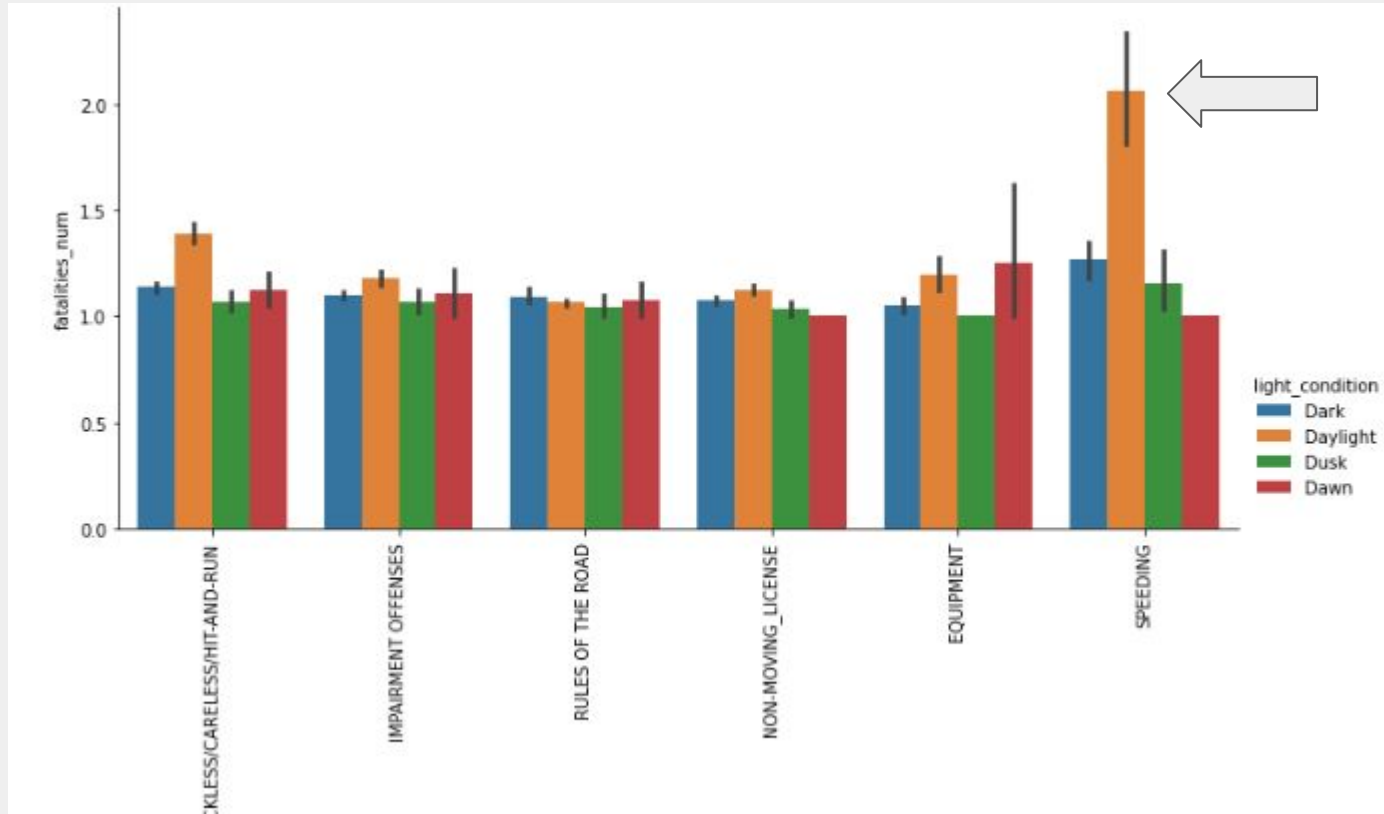
- Blue -> Urban; Orange -> Rural
- Average fatality number due to speeding in **rural area** is way higher than that of urban area

Graph showing if national highway system not due to speeding



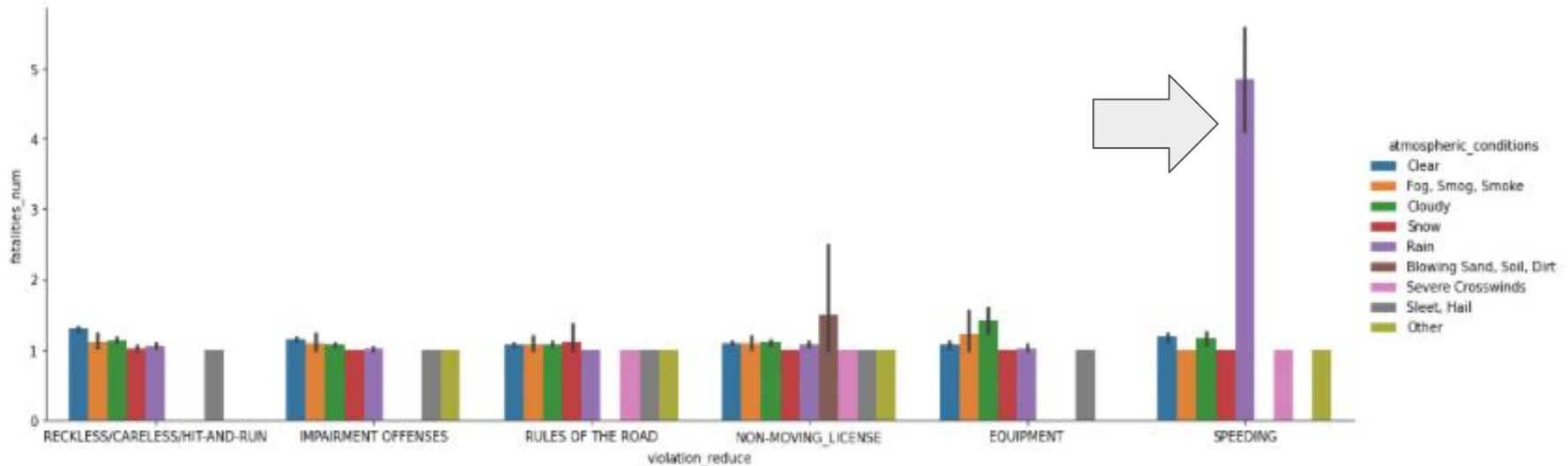
- More accidents occur in rural national highways, than that of non-national highways due to speeding

Graph of Violations & fatality number by light condition



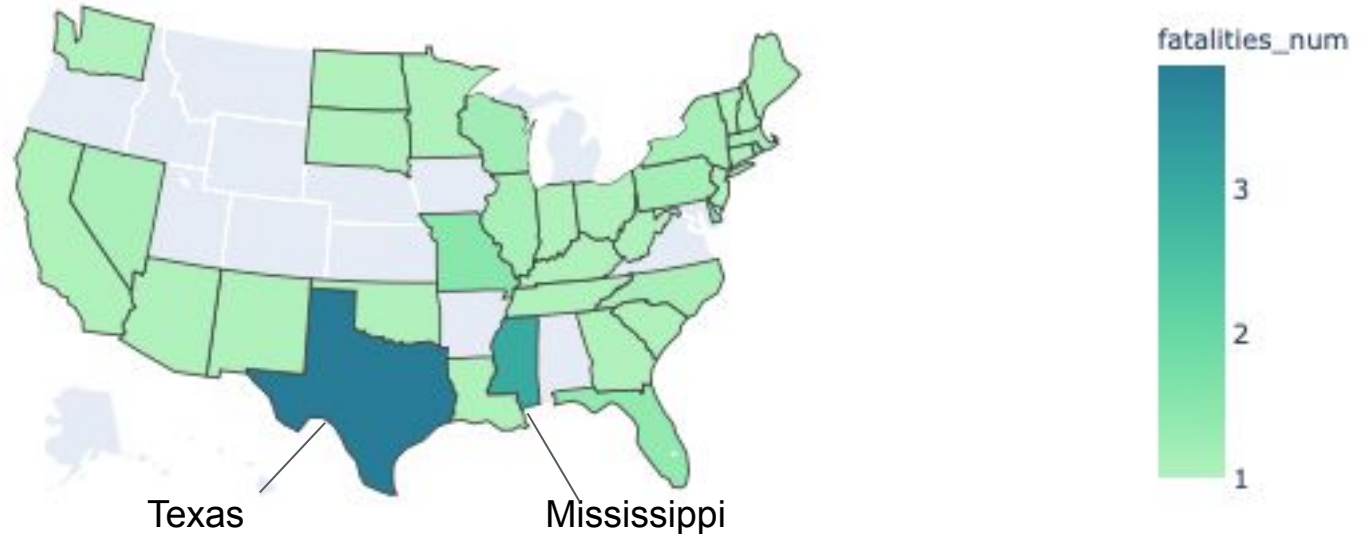
- Average fatality number due to speeding in **daylight** is way higher than in other light conditions

Graph of Violations & Avg Fatality Number by Atmospheric Condition



- Average fatality number due to speeding in **rainy days** is higher than in other atmospheric condition

Average fatality number caused by speeding in different states



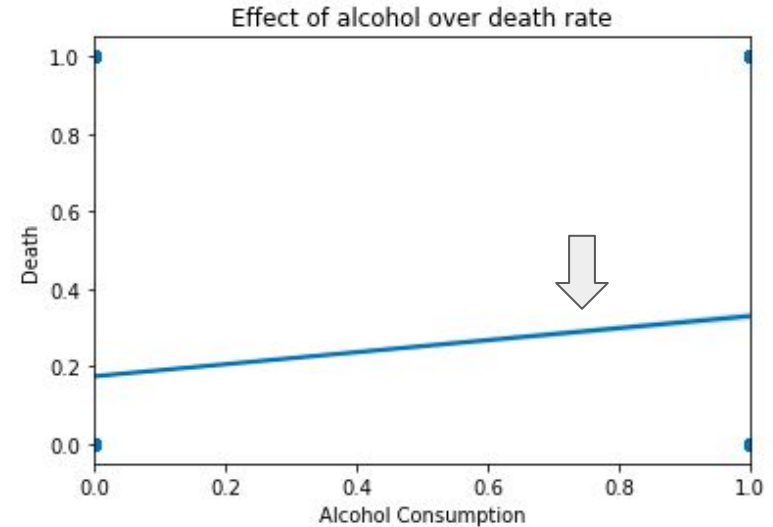
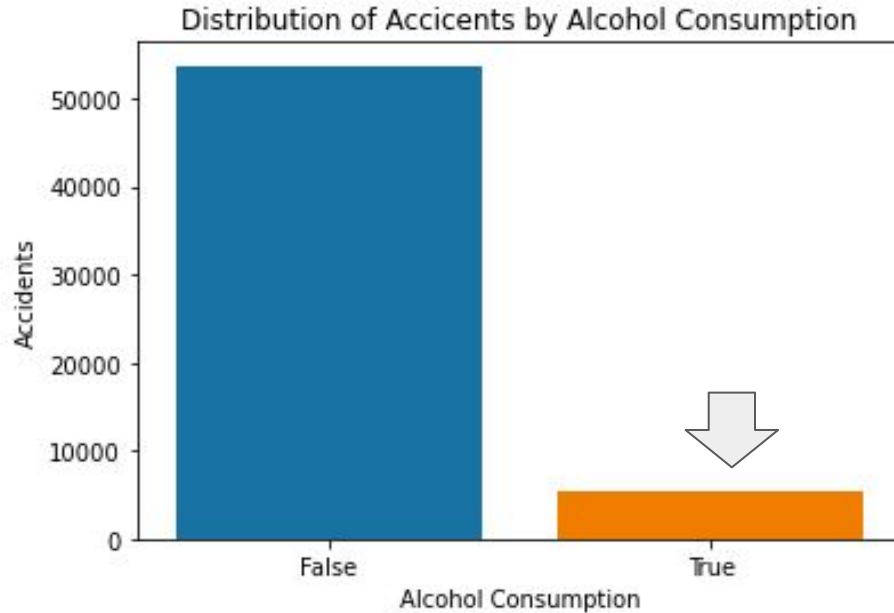
- Strictly enforcement all cars to install weather-proof tires
- Install more speed tracking meters in rural area on national highway system



Goal 2:

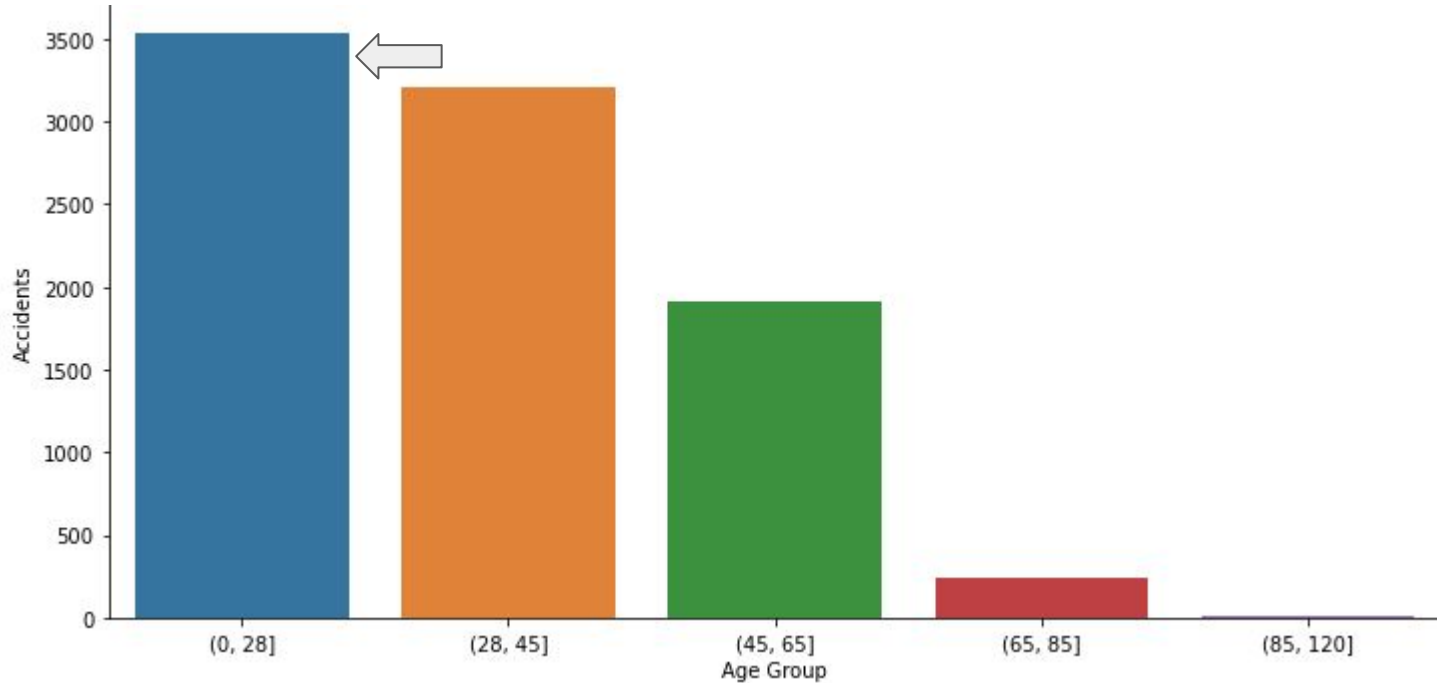
Distribution of drug or alcohol
influenced accidents base on
age and time

Distribution of Accidents By Alcohol Consumption



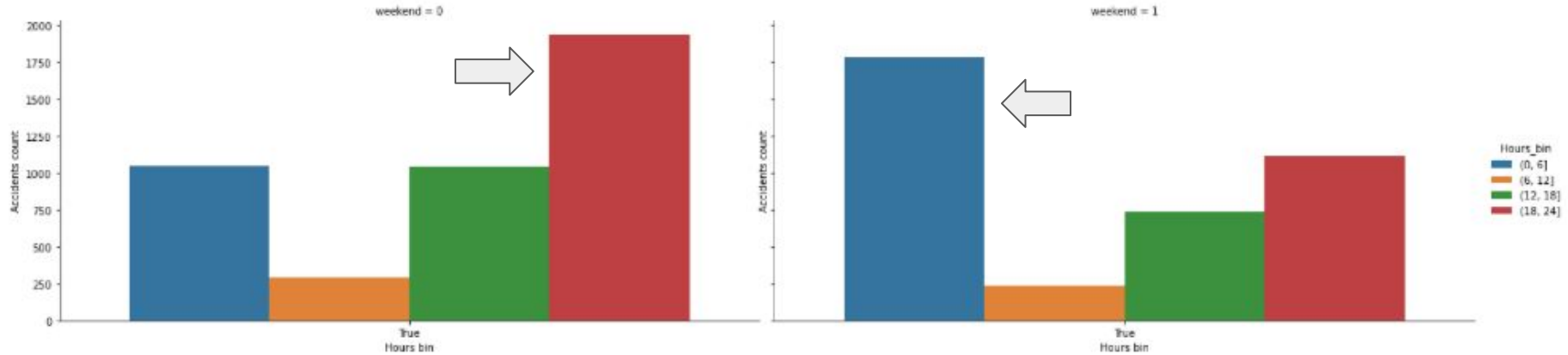
- Death rate of an accident increases as the alcohol consumption increases.

Distribution of age and alcohol-influenced accidents



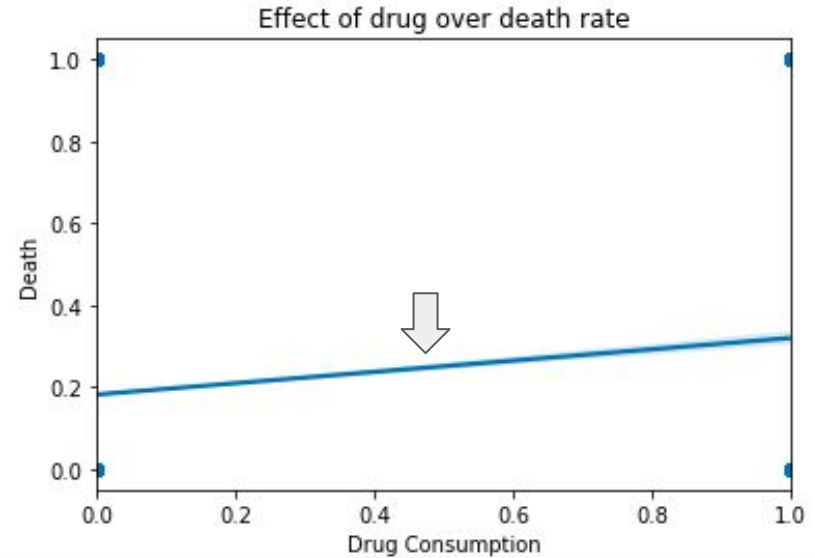
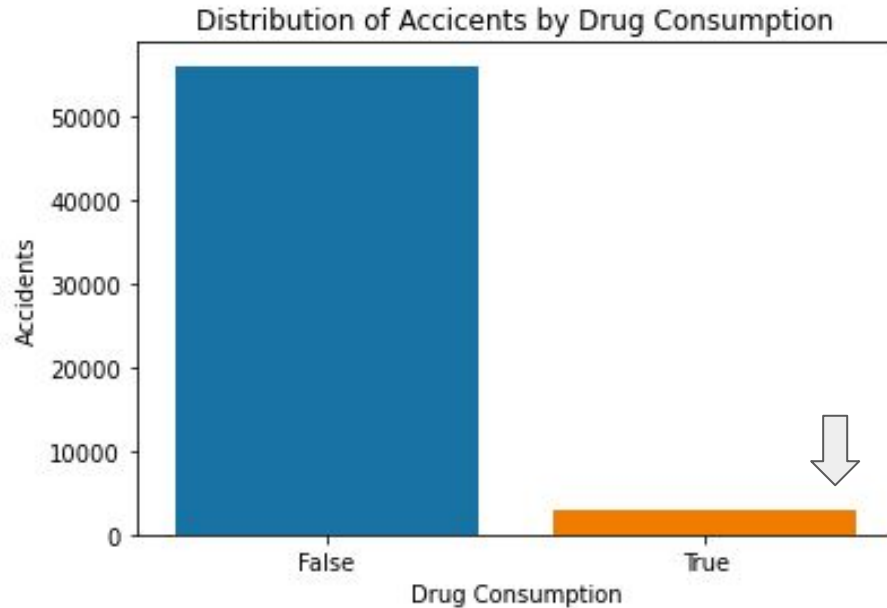
- More alcohol-influenced accidents for drivers between 0 to 28 years old.

Distribution of alcohol influenced accidents by hours and weekend



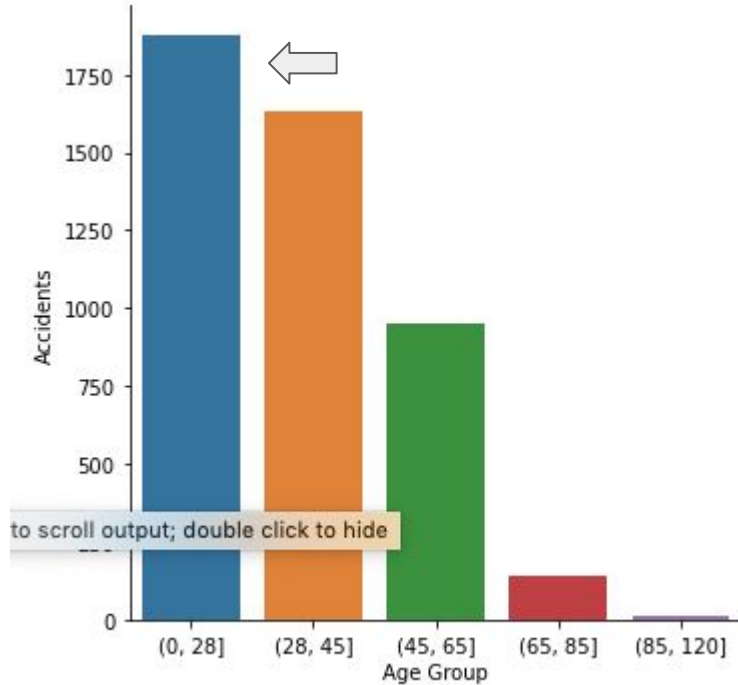
- More alcohol influenced accidents happened between 6pm and midnight on weekdays; as well as between midnight to 6am on weekends.

Distribution of Accidents By Drug Consumption



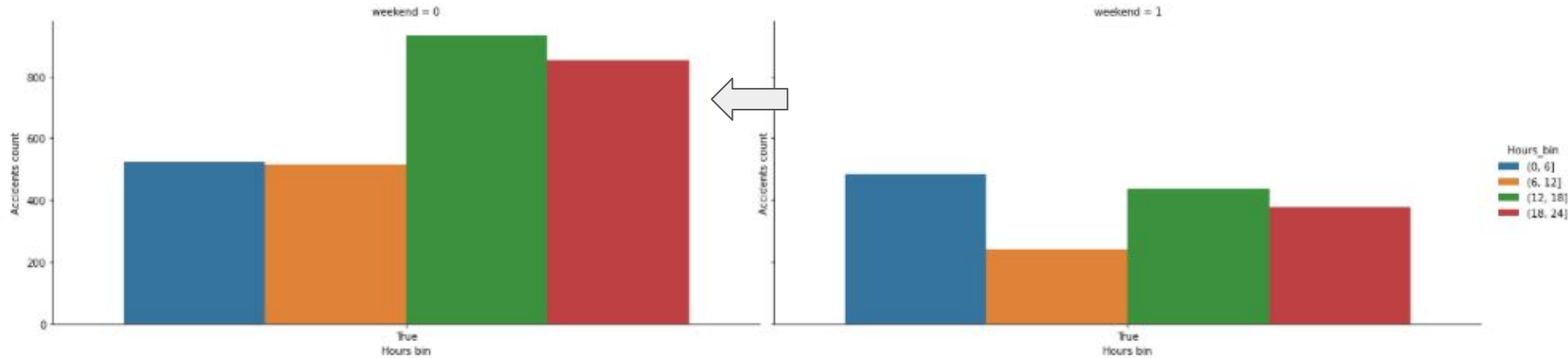
- Death rate of an accident increases as the drug consumption increases.

Distribution of age and Drug-influenced accidents



- More drug-influenced accidents for drivers between 0 to 28 years old.

Distribution of drug influenced accidents by hours and weekend



- More drug influenced accidents on weekdays compare to weekends

Recommendation:

1. Increase the penalty of alcohol/ drug involvement accident
2. More police patrols around drug and/or alcohol influenced accident times

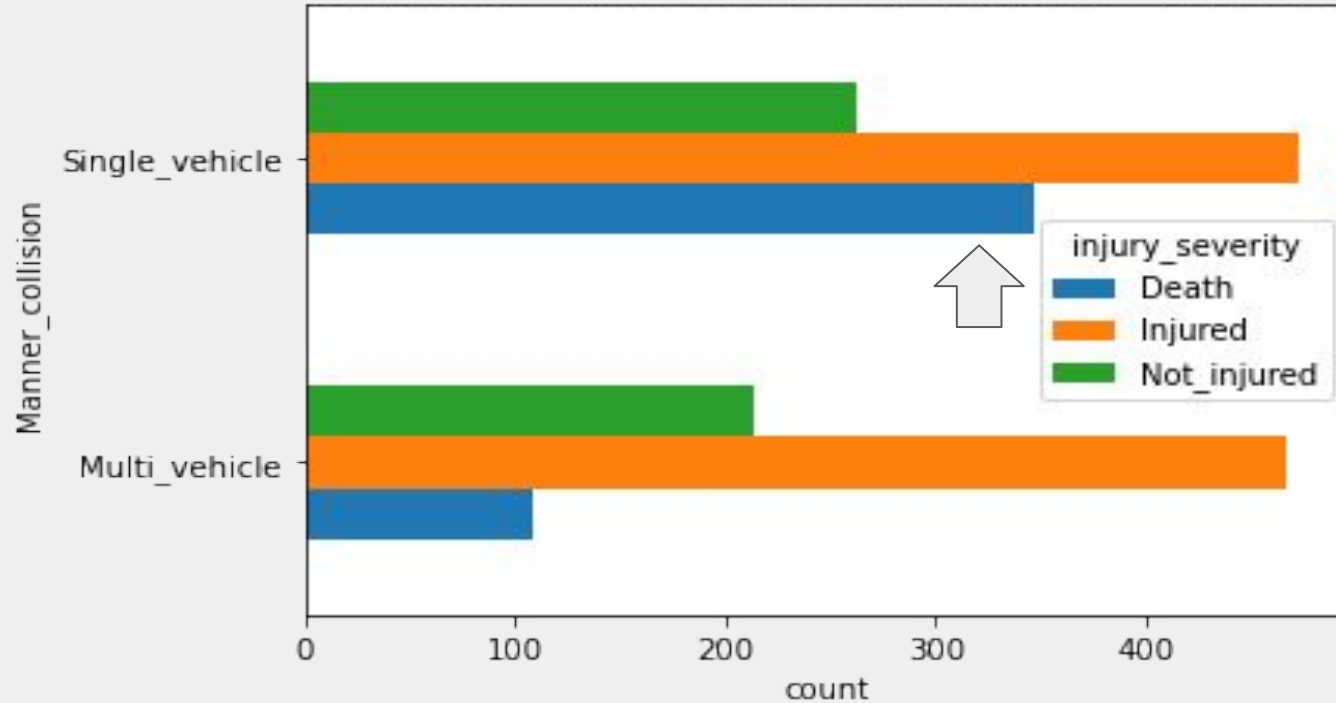


Goal 3:

Distribution of injury severity with respect to manner of collision and the importance of safety measures to prevent death

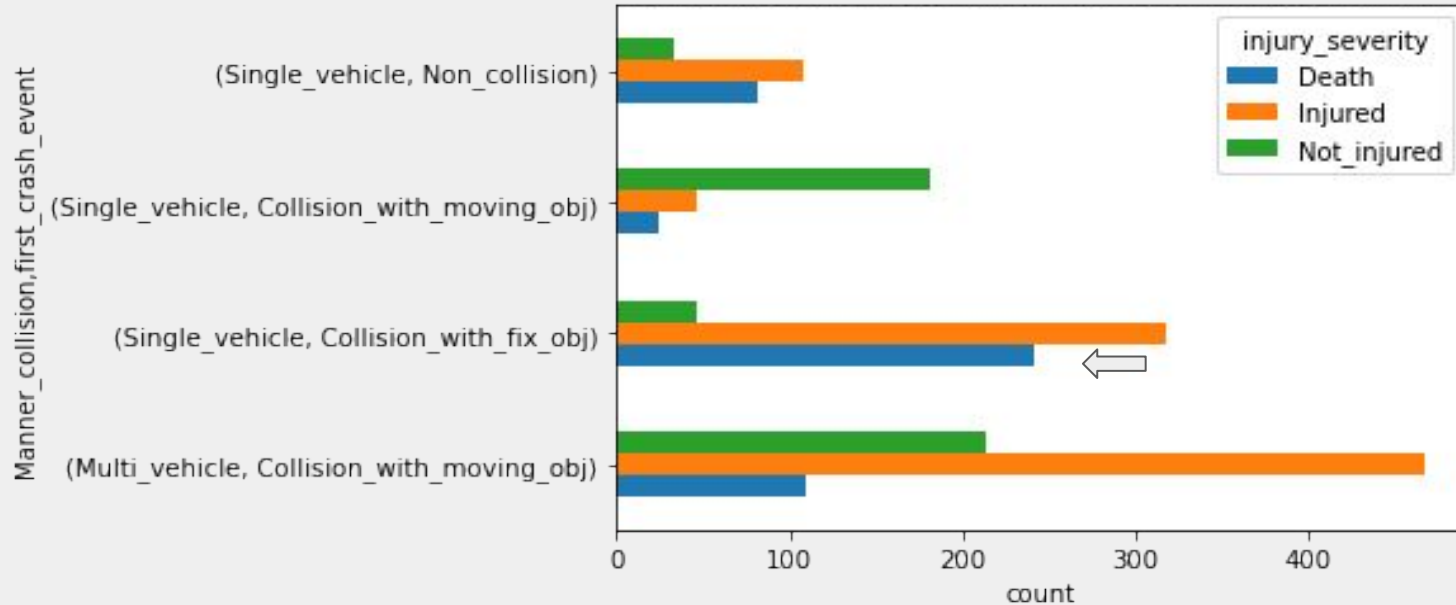


Distribution of injury severity on different manner of collision

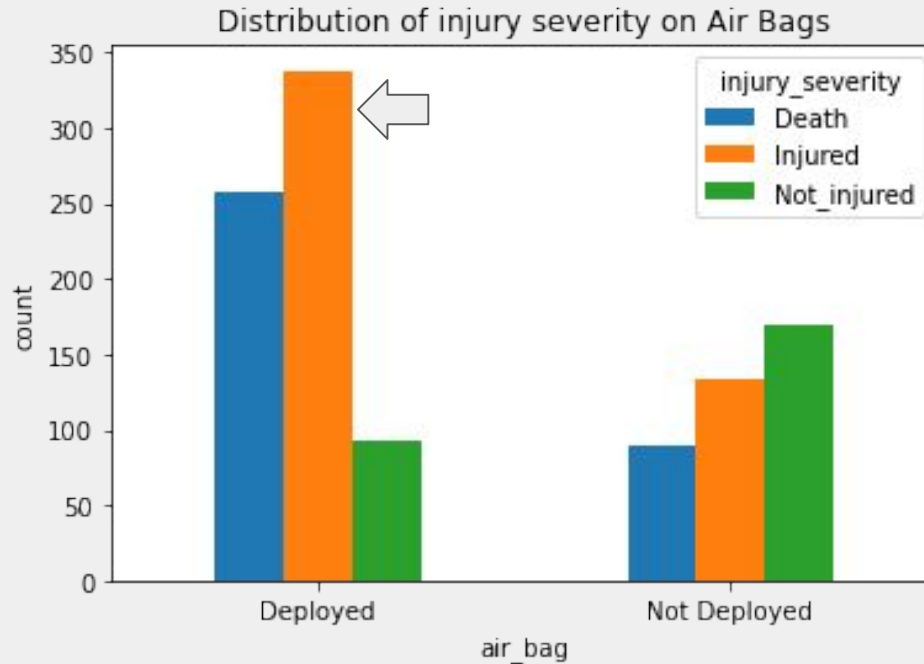


Accidents involving single vehicle collisions have higher death counts

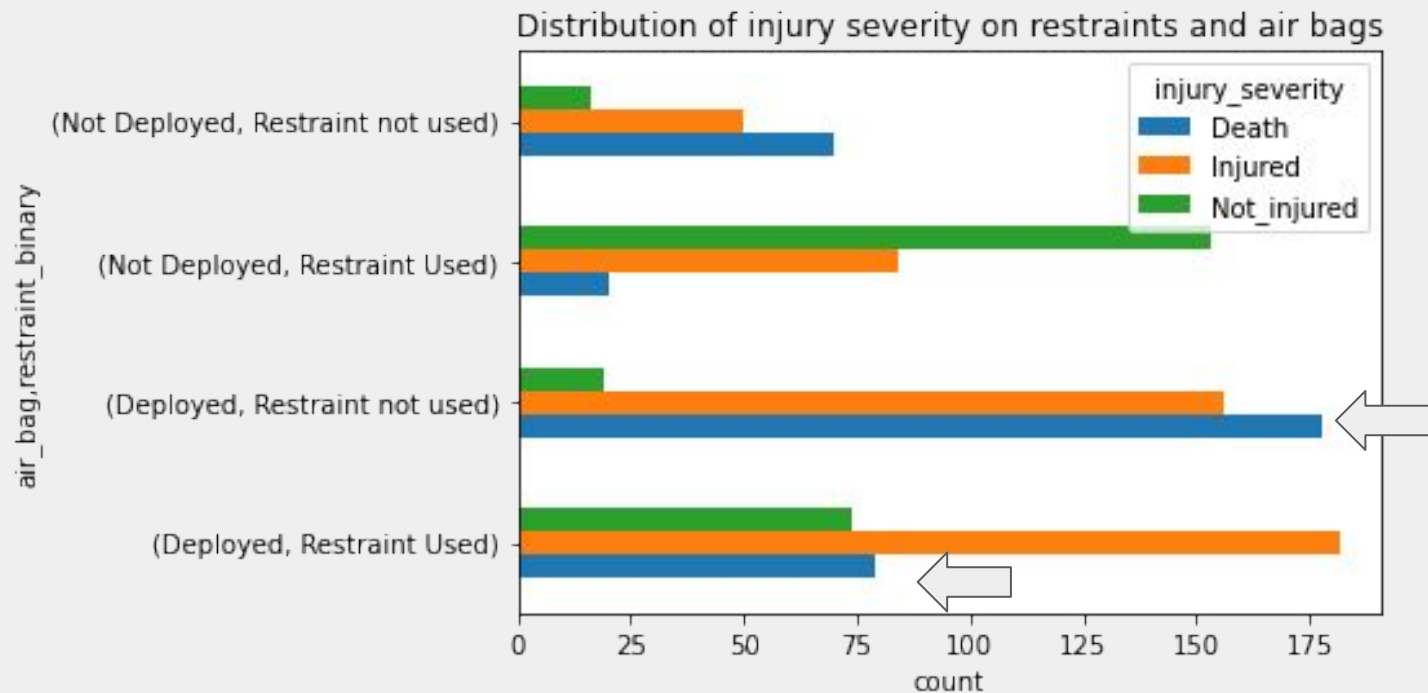
Distribution of injury severity on different manner of collision and the crash events



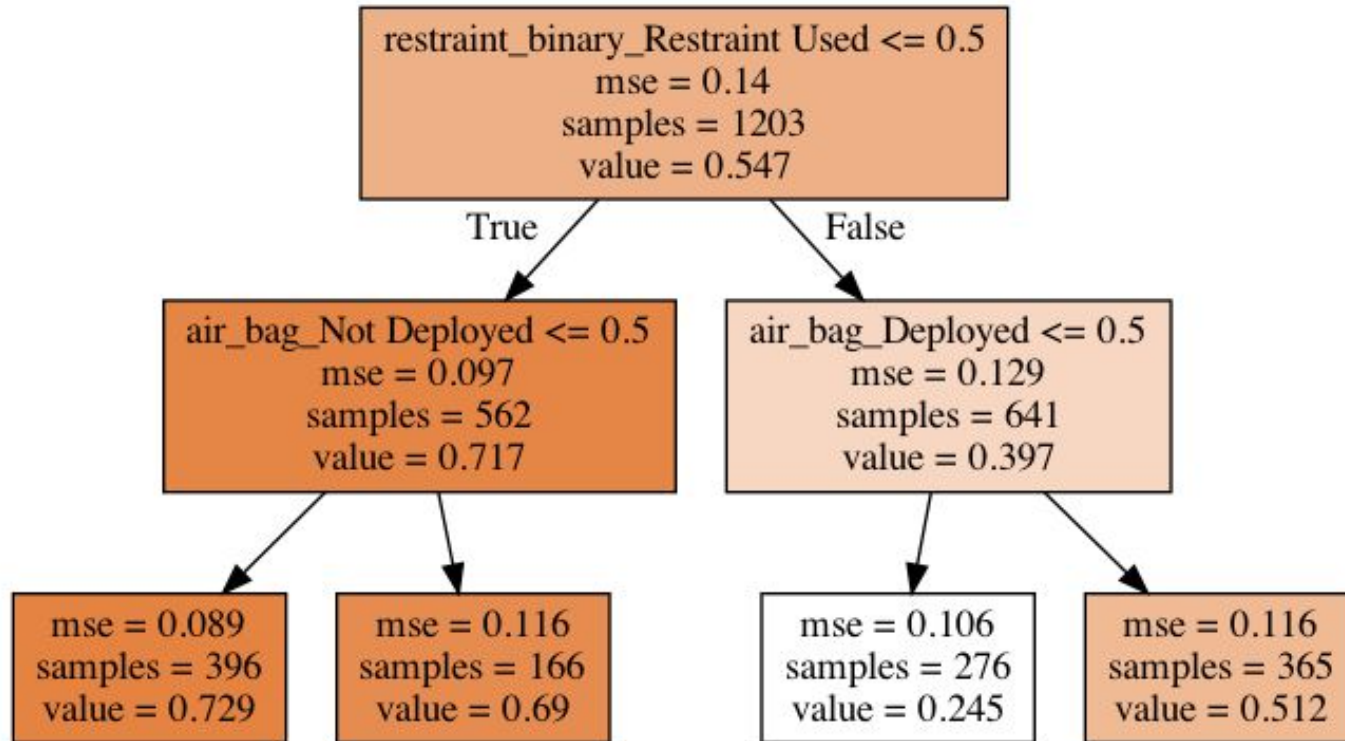
Accidents that involve single vehicle and collision with fix object have the highest death counts



Death and injury counts were still higher in accidents which air bag was deployed compare to that of not deployed.



By comparing the death count between restraints used and not used, we can see that restraints do play a big role in preventing death in accidents.



Recommendation:

1. Increase fine for not using constraints.
2. Install cameras in areas of death pockets to possibly catch people who did not use constraints.

Recommendations to the Management:

1. Since Texas and Mississippi are states that cause the highest average fatality number by speeding, it is suggested that the state government to strictly enforcement all cars to install weather-proof tires and install more speed meters in in rural area on national highway system.
1. Increase the penalty of alcohol/ drug involvement accident, like revoking driving license for a year once found out alcohol/drug is involved. More police patrols around the above frequent drug and/or alcohol influenced accident times to spot for weird driving pattern cars on the road.
1. Increase fine for not using restraints. In Texas, California and Illinois, where there are highest death count due to lack of restraints used during accidents, the state government should install cameras in areas of death pockets to possibly catch people who did not use restraints.