Predicting Aggressive Driving

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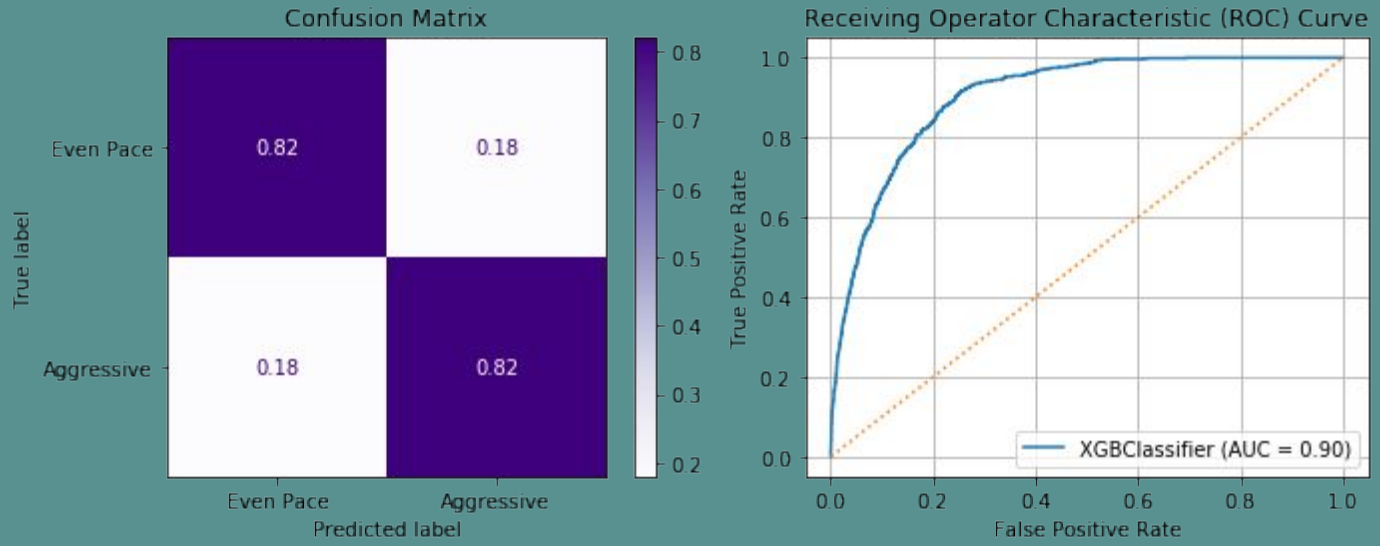
Traffic, Driving Style and Road Surface Condition

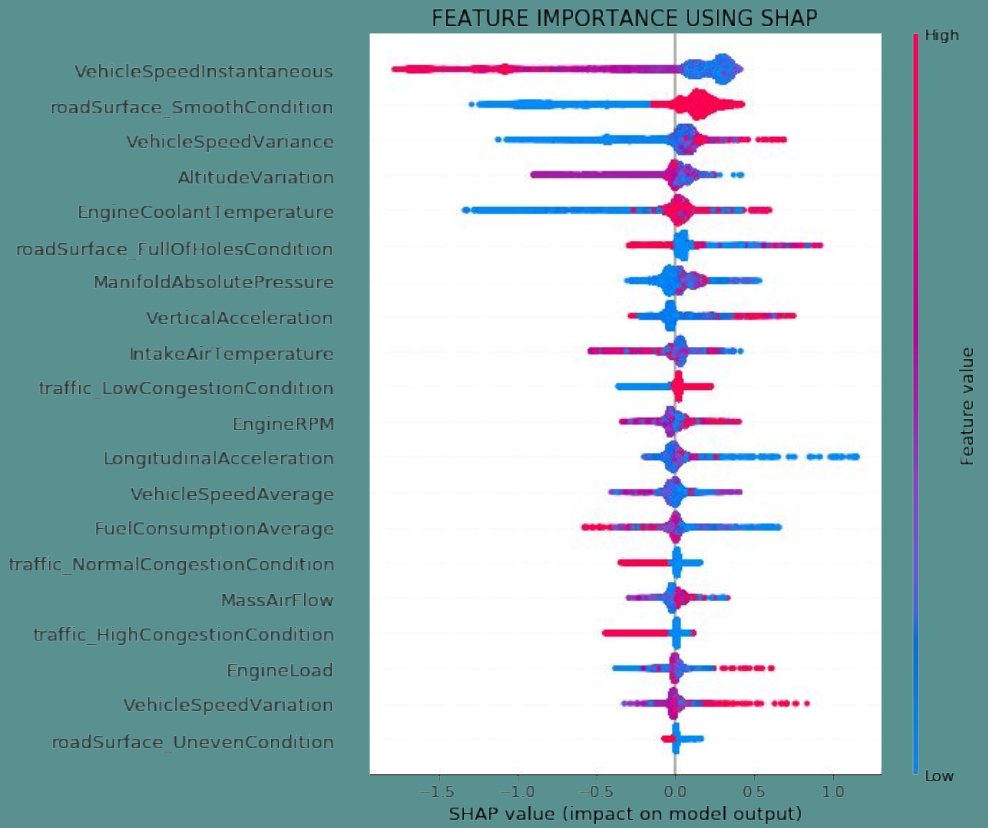
- Collected Data from Over 24,000 Car Parameters
- Analyzed 20 Unique Features.
- Imbalanced Dataset (92% Even Paced, 8% Aggressive)

MODEL

- Created a model using XGBoost.
- Model was able to predict Aggressive driving 82% of the time.

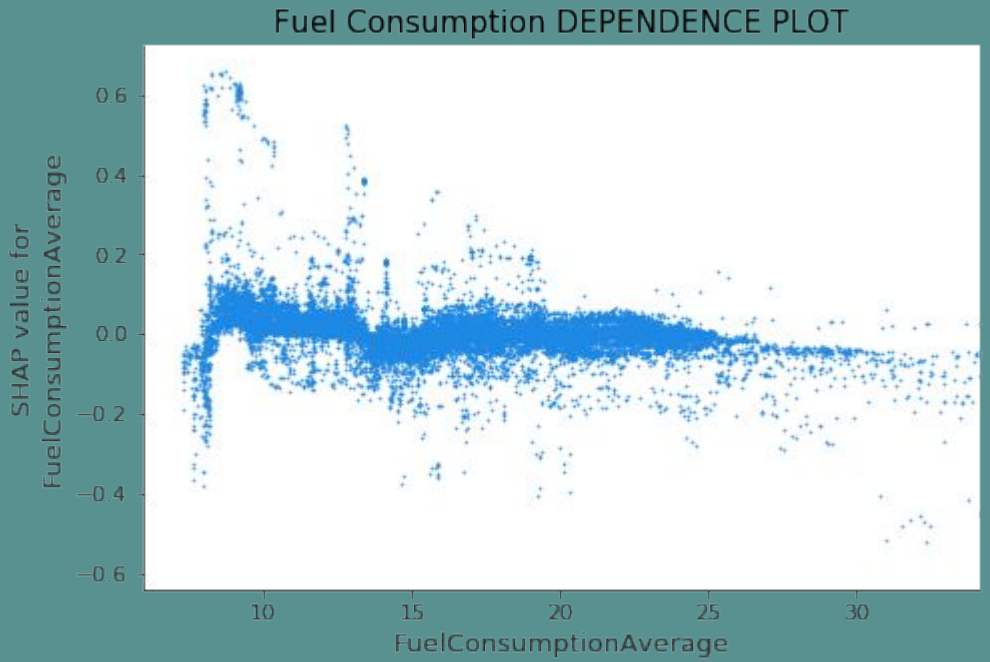


IMPORTANT FEATURES USING SHAP



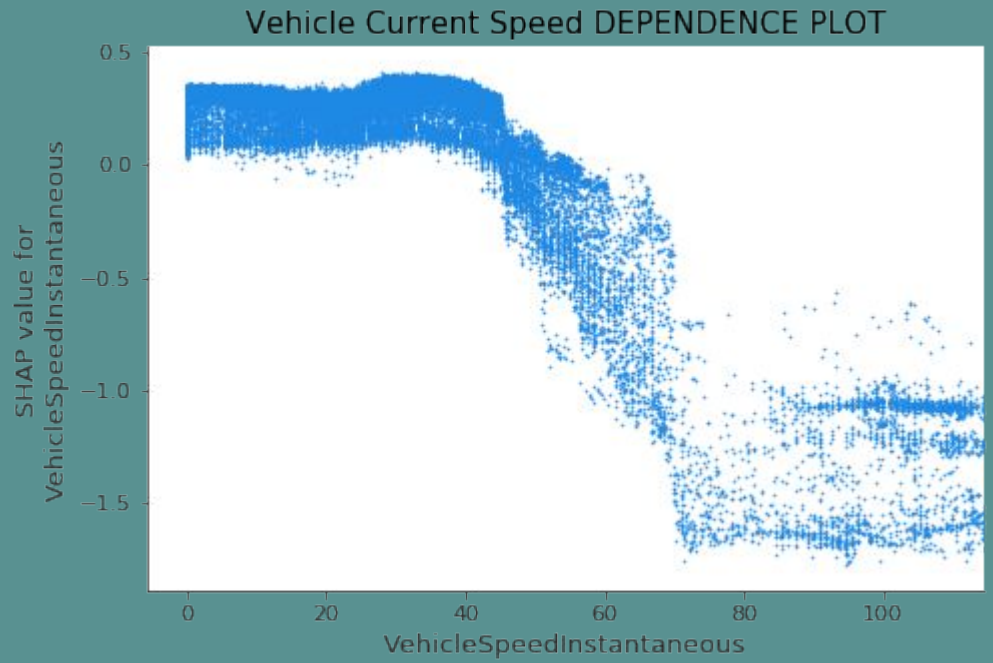
FUEL CONSUMPTION DEPENDENCE PLOT

When the Average Fuel Consumption is low the predicted probability is higher while when the fuel consumption is high the predicted probability is lower.



VEHICLE SPEED DEPENDENCE PLOT

Speeds over 60 Mph negatively impacts the model because it becomes hard to tell if the driver is aggressive or not. That would be the threshold for the model predictions strength but after 60 mph this feature becomes irrelevant.



CONCLUSION

Engine Load - Percentage of the portion of engine power used during a given time. Higher percentages will be predicted as aggressive driving.

Average Fuel Consumption - Distance traveled and amount of fuel consumed. The lower fuel consumption will be predicted as aggressive driving.

Engine RPM- Revolutions per min. Higher RPMs will be predicted as aggressive driving.

Future Work

Add the following parameters to the data set

- Age and Gender.
- Average Steering Wheel Jerk and Braking Reaction Force.
- Different car types.

Thank You