APPENDIX

A. Regarding g-force:

Fig. 14 presents the g-force thresholds that have been used for classifying the current reported risky driving behavior in our data set.

Driving Maneuver	Target g-force
Cornering	
Mild Left	0.2 - 0.3 G's
Moderate Left	0.3 - 0.4 G's
Hard Left	0.5 - 0.6 G's
Mild Right	0.2 - 0.3 G's
Moderate Right	0.3 - 0.4 G's
Hard Right	0.5 - 0.6 G's
Braking	
Mild	0.4 - 0.5 G's
Moderate	0.5 - 0.6 G's
Hard	0.6 - 0.7 G's
Acceleration from stationary position	
Mild	0.2 G's
Hard	0.3 - 0.4 G's
Turns	
Mild Left	0.2 - 0.3 G's
Moderate Left	0.4 - 0.5 G's
Hard Left	0.6 - 0.7 G's
Mild Right	0.2 - 0.3 G's
Moderate Right	0.4 - 0.5 G's
Hard Right	0.6 - 0.7 G's

Fig. 14: g-force thresholds. (Source: Comparing g-force Measurement Between a Smartphone App and an In-Vehicle Accelerometer (see [33]).

B. Regarding Road Classifications:

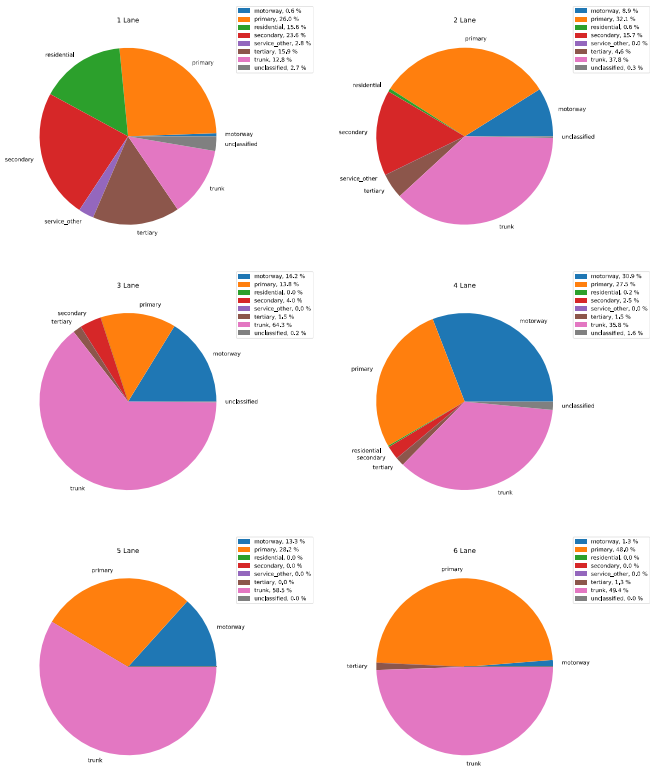

Fig. 15: Road classification distribution by lane types.

Fig. 15 presents an analysis of road classifications based on the number of lanes. It reveals that 1-lane roads predominantly consist of primary, secondary, residential, and tertiary roads, which are commonly associated with road incidents. It is noteworthy that road classes often correspond to specific lane configurations. For instance, motorways, designed for long-distance travel, rarely have only one lane, as they are typically equipped with multiple lanes to facilitate efficient transportation. Moreover, the busiest roads are often the main roads that serve as connecting routes between intersections and other major roads, experiencing high traffic volumes.

C. Day of the week comparison:

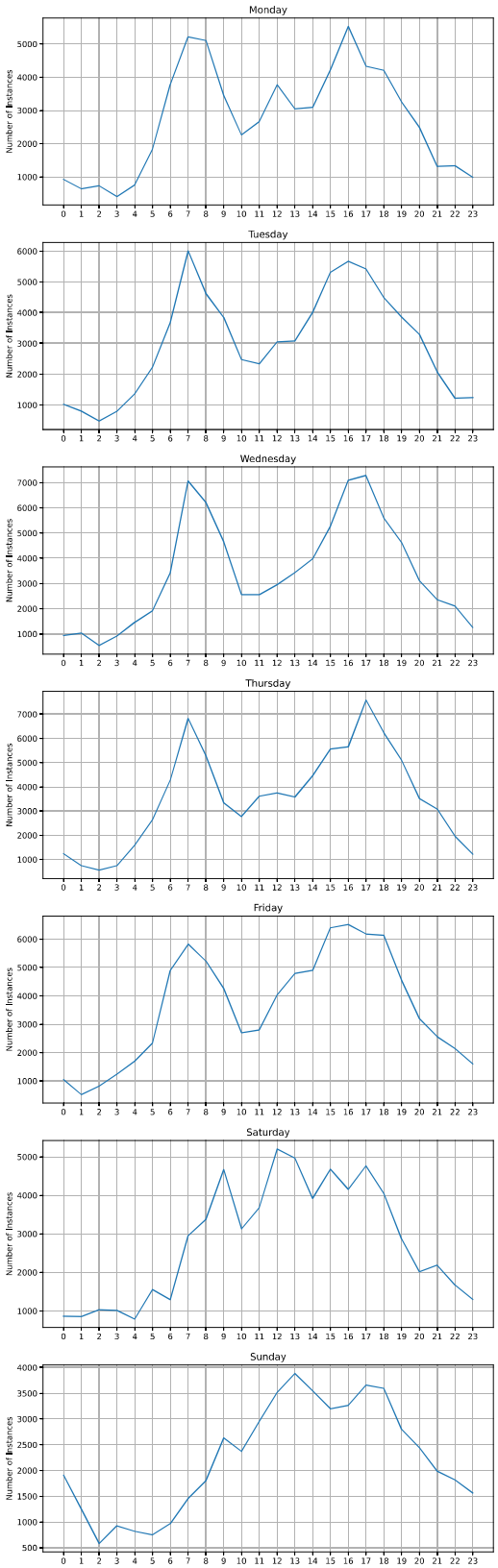

Fig. 16: Weekly profiling of incidents

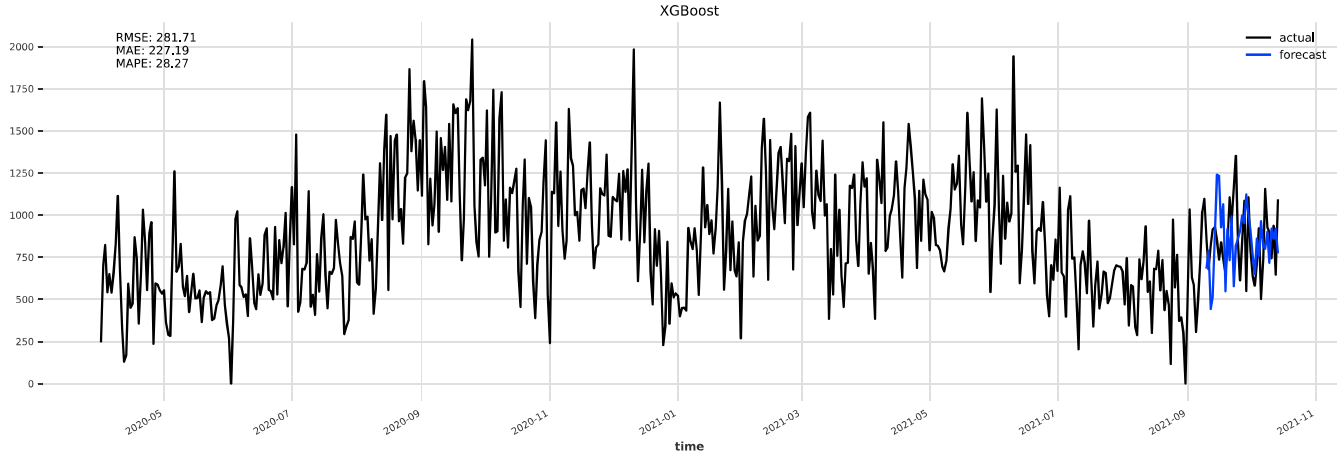

Fig. 17: XGboost prediction results

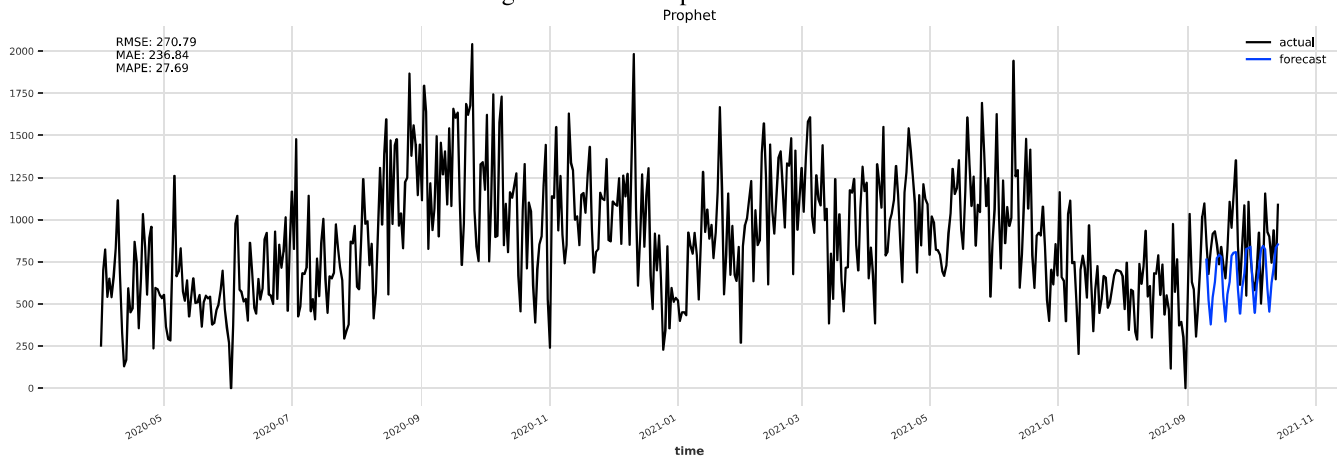

Fig. 18: Prophet prediction results

Fig. 16 shows the trendline of instances of incidents in each day from every hour. Each number corresponds to the time that it occurred in a 24-hour format. The most noticeable pattern that occurs in the weekdays is that the peak of the incidents occur around 7 AM and 5 PM. The reason for this pattern is because on weekdays, people are driving to and from work. The traffic at these times is at its highest and therefore would be likely to have more incidents due to the density of traffic. On Fridays, compared to other weekdays, the peak of the graph during the afternoon is a lot more rounded. The reasoning for this phenomenon is possibly because some workplaces let employees leave earlier than the usual time, e.g. 3PM. This would round the incident instance numbers in the afternoon because the traffic congestion would not be concentrated at a single time.

Comparing the weekends to the weekdays shows that the peaks of the instances are a lot different. There are less people travelling to and from work and this can be observed when comparing the instance peaks. The peaks of the weekends are a lot more rounded and there is no single time where the incidents are concentrated.

D. Worst performing models

The worst performing models are XGboost (see Fig. 17) due to its over-prediction tendency) and Prophet (see Fig. 18) due to its under-prediction performance.