Capstone Project - Car accident severity

APPLIED DATA SCIENCE CAPSTONE BY IBM/COURSERA

Background

- Traffic collisions often result in **injury, disability, death, and property damage** as well as financial costs to both society and the individuals involved

- Traffic collision affect the national economy as the **cost of road injuries** are estimated to account for **1.0% to 2.0% of the gross national product** (GNP) of every country each year.

- In 2013, 54 million people worldwide sustained injuries from traffic collisions. This resulted in **1.4 million deaths in 2013, up from 1.1 million deaths in 1990**. About 68,000 of these occurred in **children less than five years old.**

Data

- The data was collected by the Seattle Police Department and share by Coursera for this work.

- Dataset is publicly available at http://data-seattlecitygis.opendata.arcgis.com/datasets/5b5c745e0f1f48e7a53acec63a0022ab_0
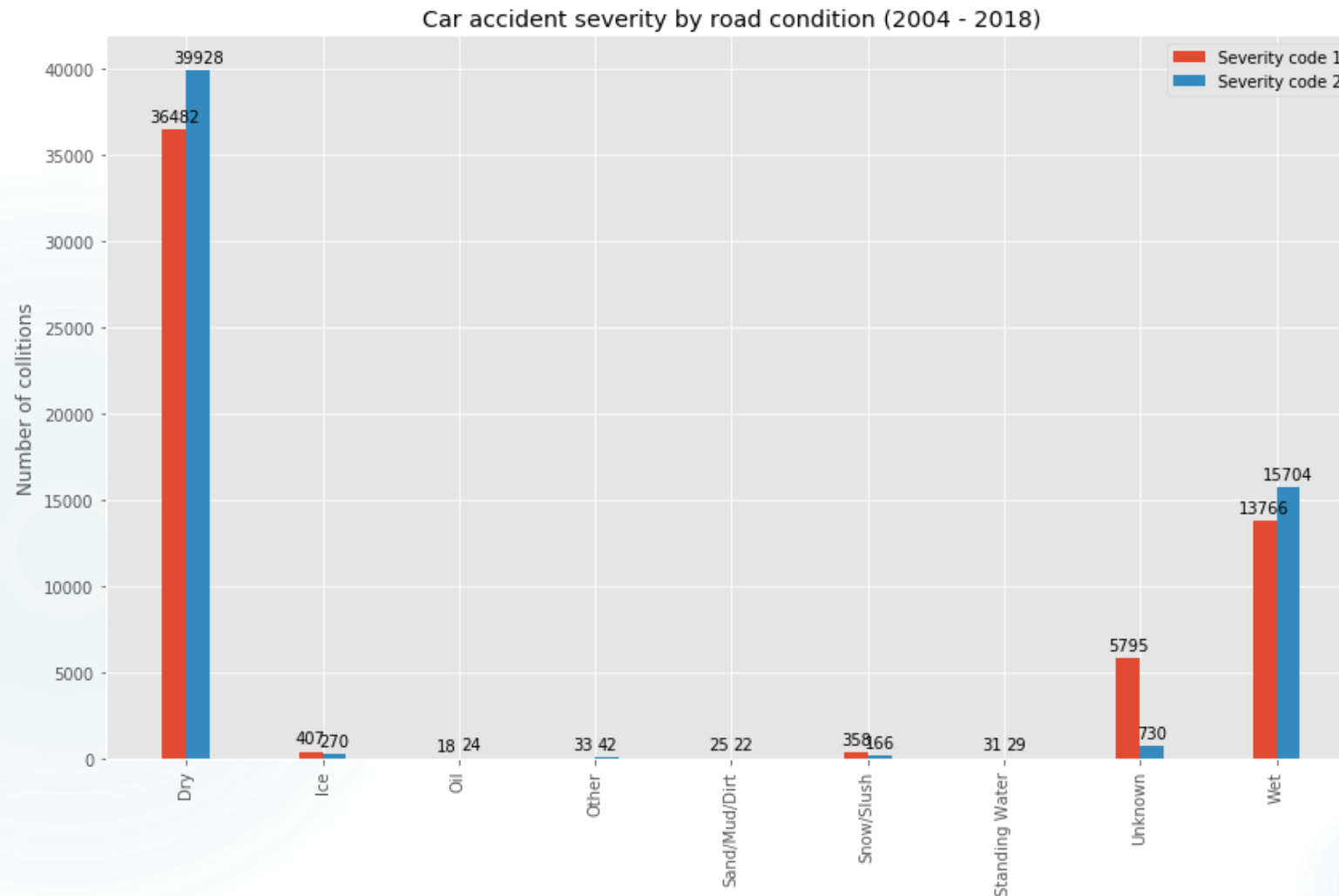-
It includes 221.144 accident records in the state of Seattle, from 2004 to the date it was issued, in which 37 attributes or variables are recorded and a codification of the type of accident is assigned among 84 available codes.
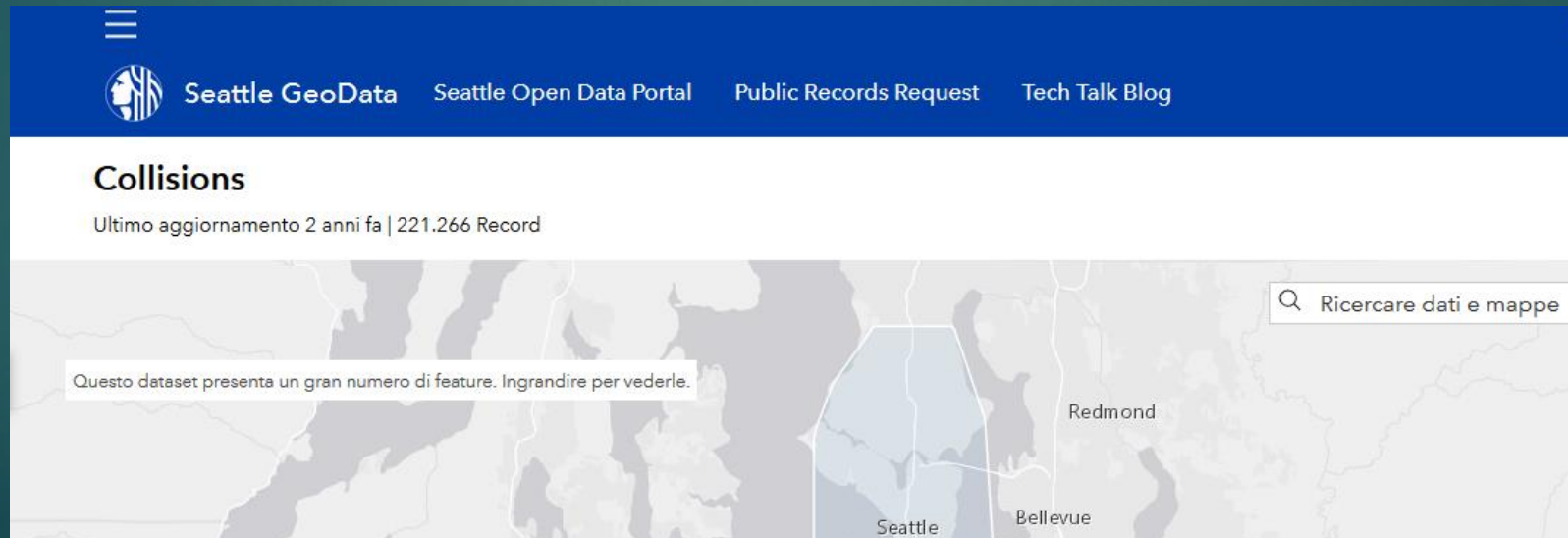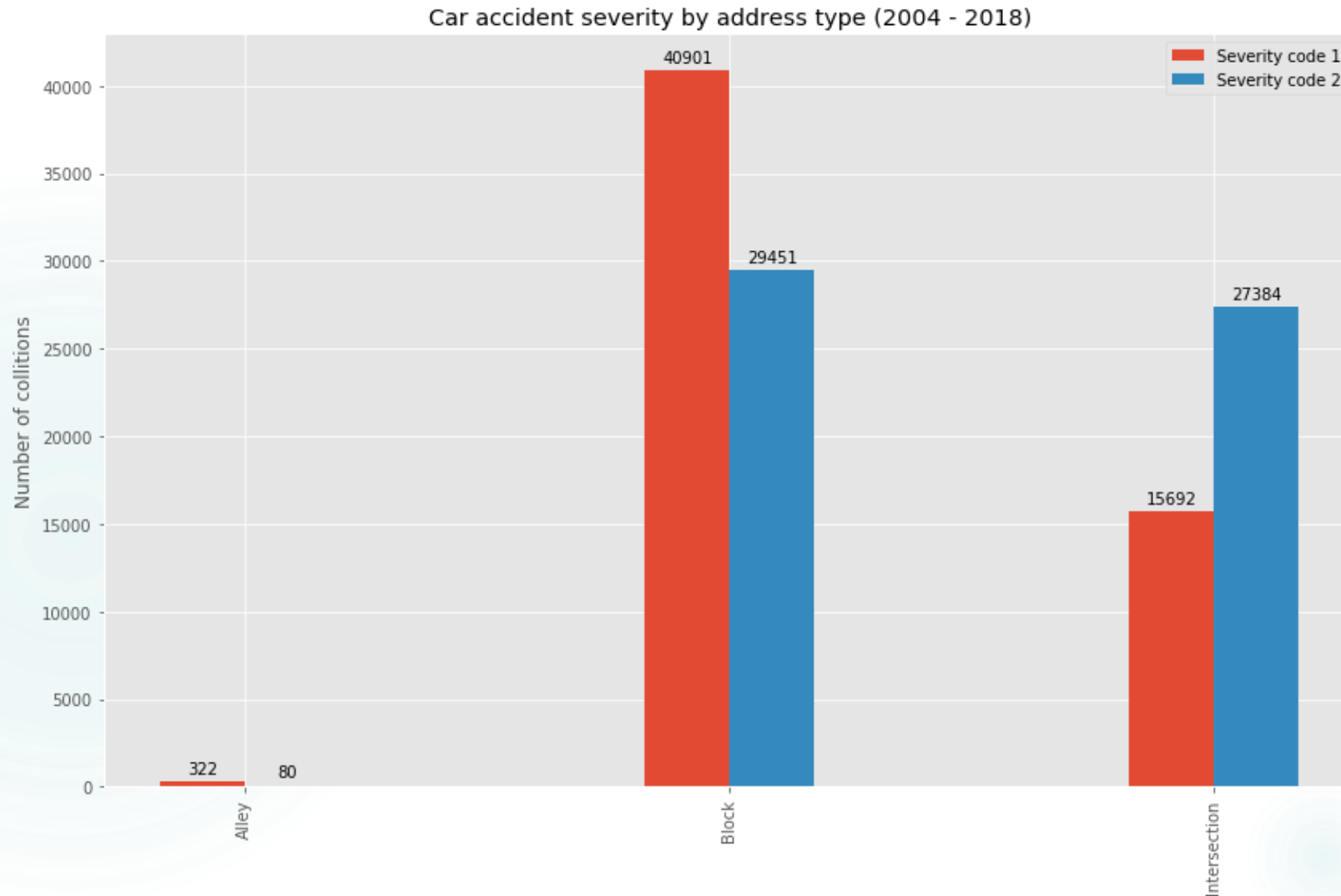
# Light condition is not significantly impacting on accident severity:
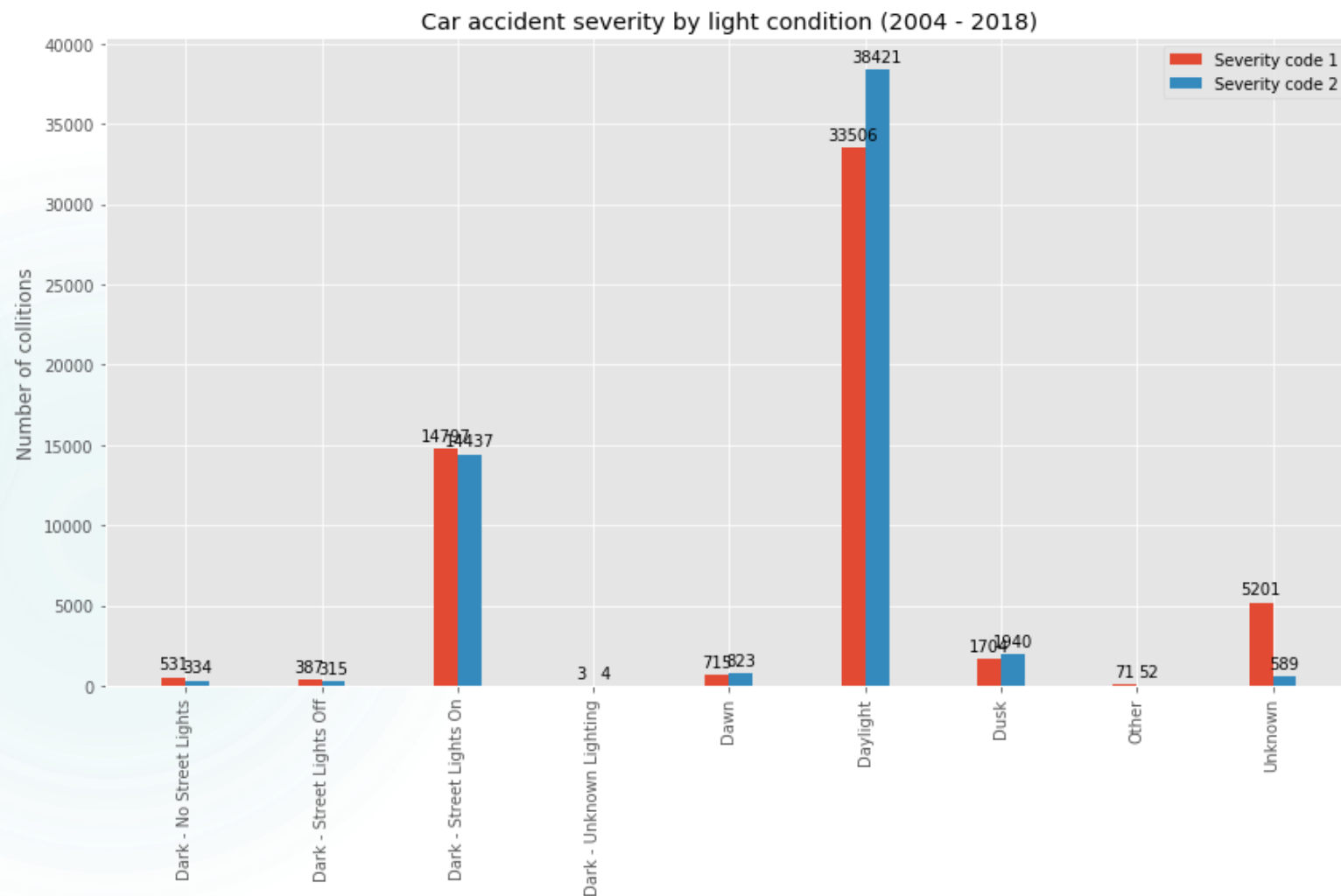
Car accident severity by light condition (2004 - 2018)

Road condition is not significantly impacting on accident severity:

Car accident severity by road condition (2004 - 2018)

Collitions in intersections are typically more severe than ones in blocks:

Car accident severity by address type (2004 - 2018)

Collitions in intersections are typically more severe than ones in blocks:

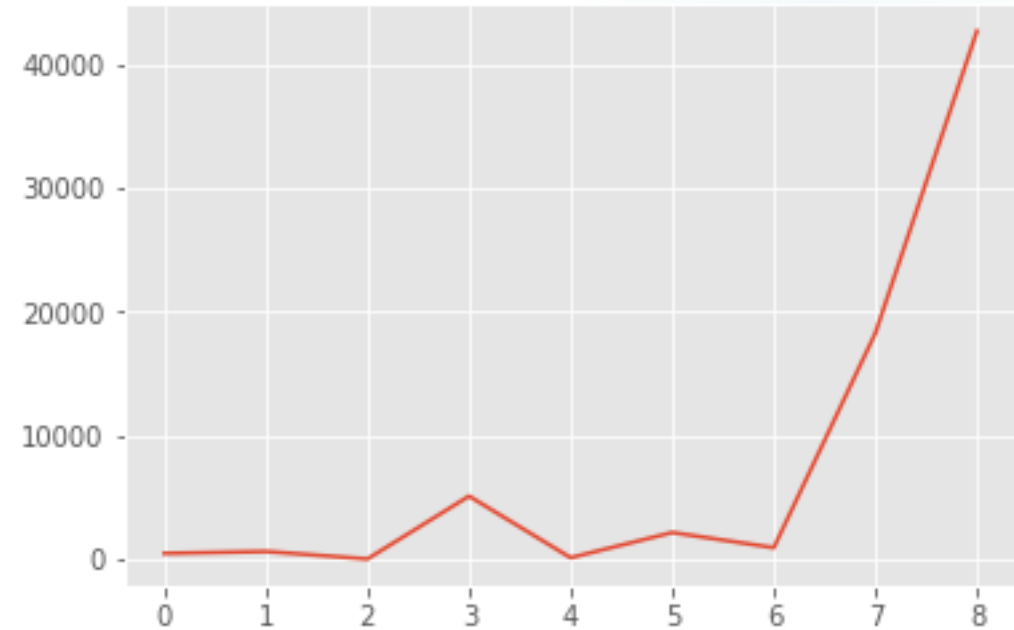

Car accident severity by address type (2004 - 2018)
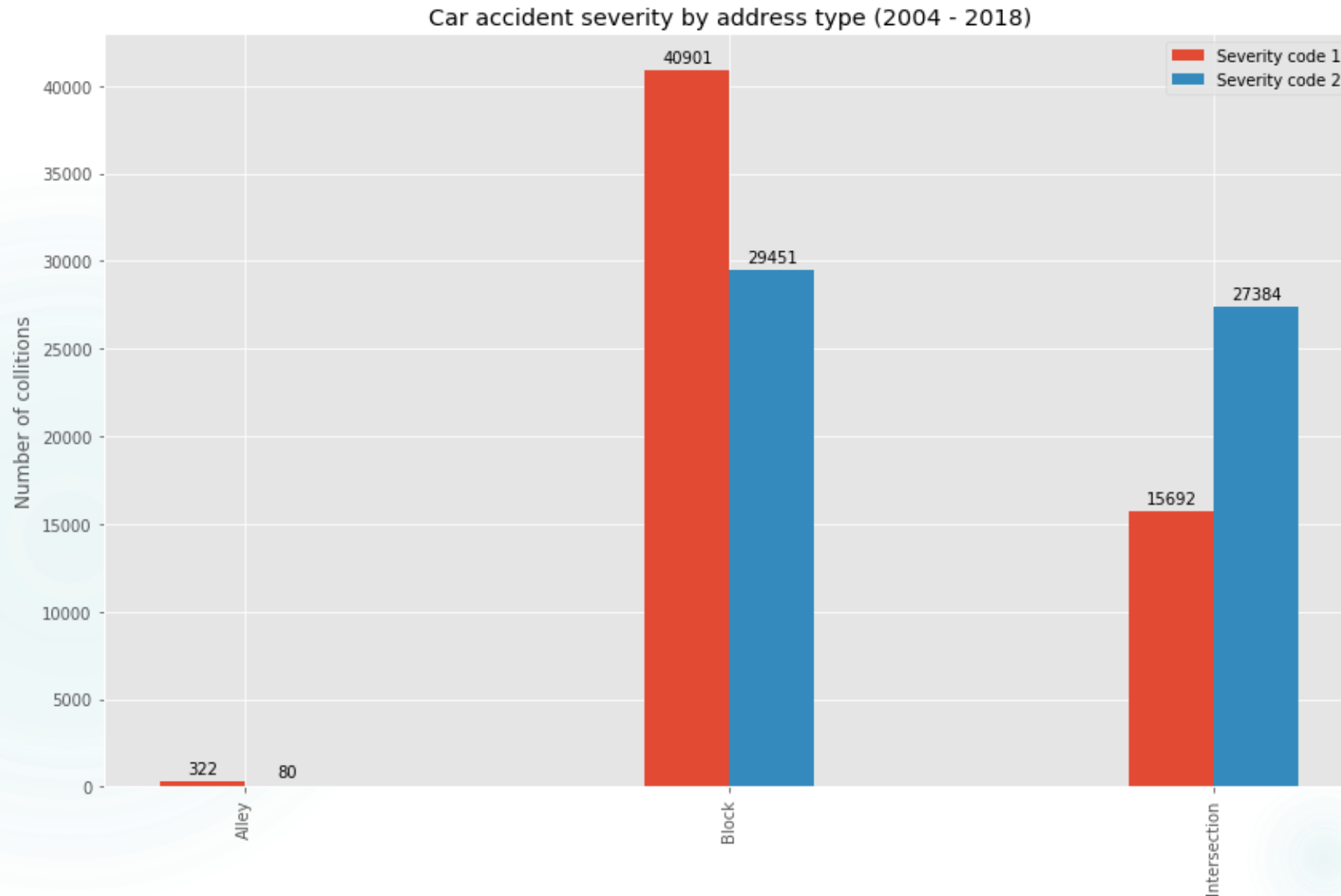
Collitions in intersections are typically more severe than ones in blocks:

Intersections
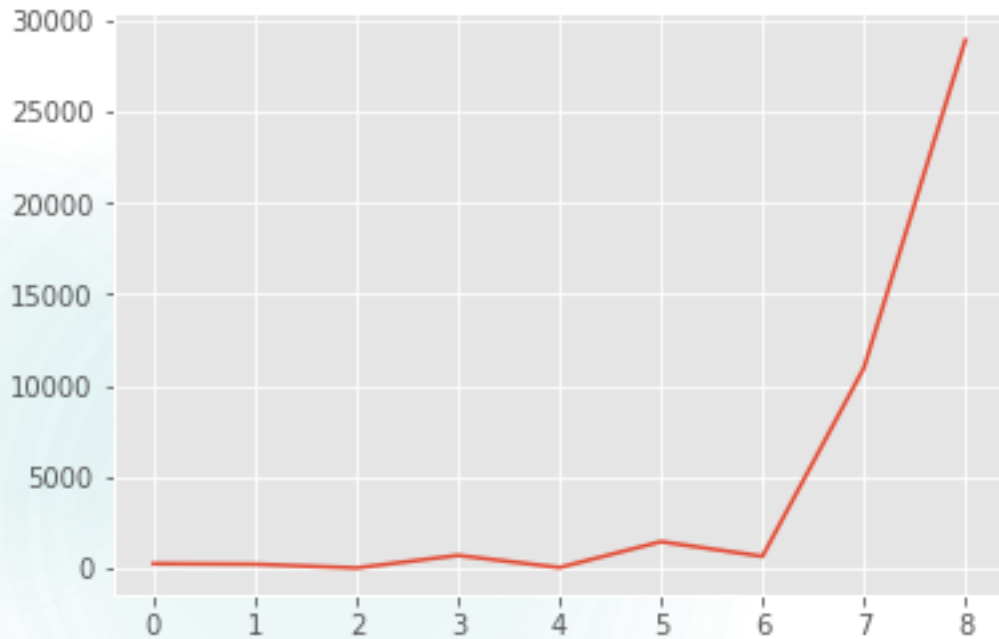
Blocks

Optimal visibility

Optimal visibility

Analysis

	SVM	Decision tree	KNN (k=8)	Logistic regression
Avg F1-score	0.5940	0.5946	0.4989	0.5938
Jaccard score	0.6000	0.6012	0.5481	0.6010
Log loss	n/a	n/a	n/a	0.6626

Results and discussion

- Based on analysis, road condition and light condition are not significantly affecting car accident severity.

- More severe accidents usually happen in intersections.

- A 1985 study by K. Rumar, using British and American crash reports as data, suggested 57% of crashes were due solely to driver factors

- Analysis on Seattle Police Department data seems does not conflict with above study results: even though we focused on accident severity (while above study was regarding accident causes without inspecting severity), we could observe road and light condition factors are not affecting our target in a significant way.

- In contrast, we clearly see accidents occurred in intersections are usually more serious than ones happened in any other place.

Conclusion

Some possible actions to reduce accident severity in intersections might be to introduce roundabouts (they are getting more and more polular in many countries), though in current dataset is generically reporting intersection without specifying intersection type (i.e. roundabout, etc).