Team All Traffic Solutions

Fairfax County Transportation and Mobility Hackathon

ALL TRAFFIC SOLUTIONS

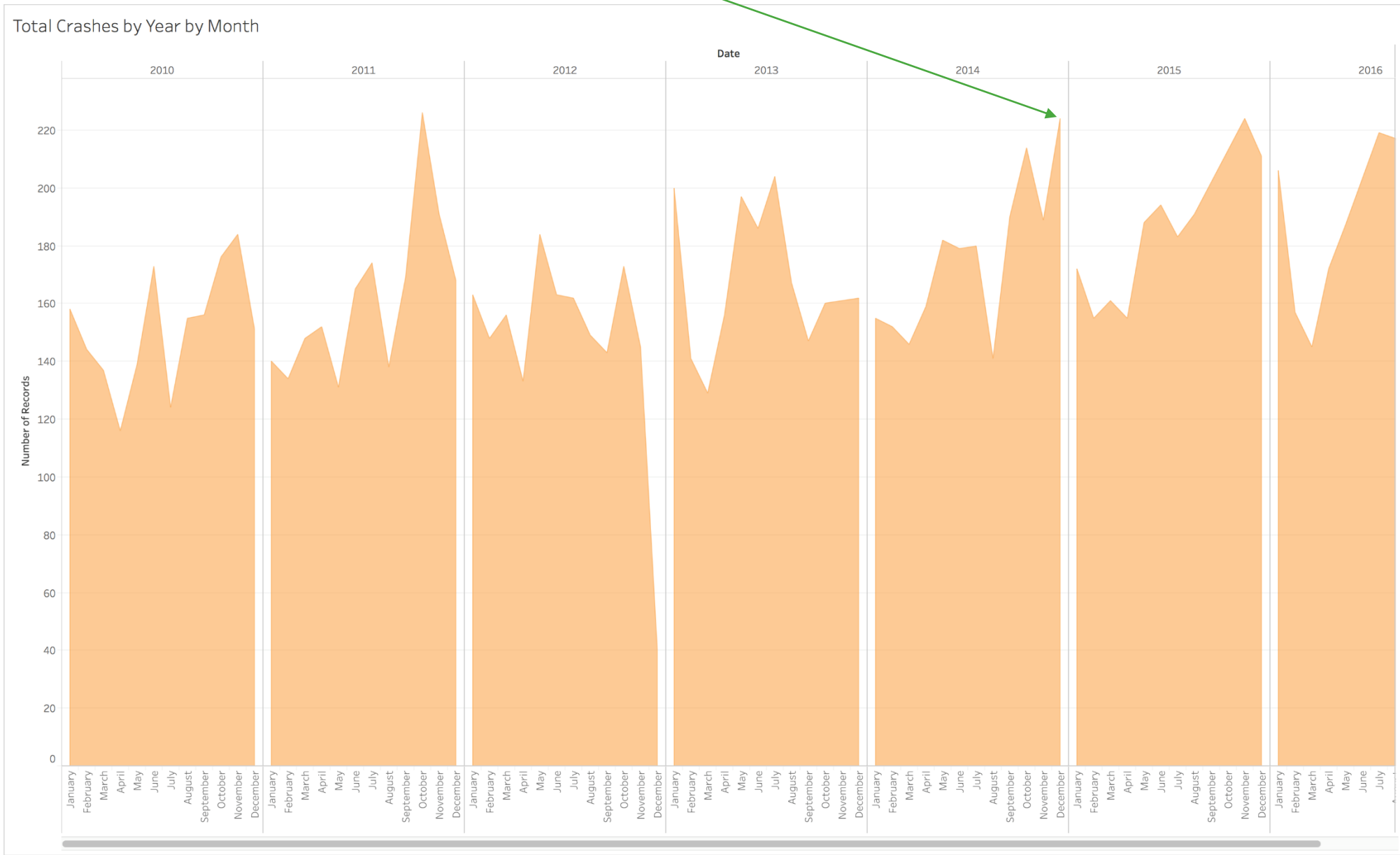
Our History

- All Traffic Solutions is a provider of Cloud Connected IOT traffic devices.
- We provide product and services for
  - Variable Messaging
  - Traffic Calming
  - Virtual Traffic Studies
  - Counting and classifying of live traffic

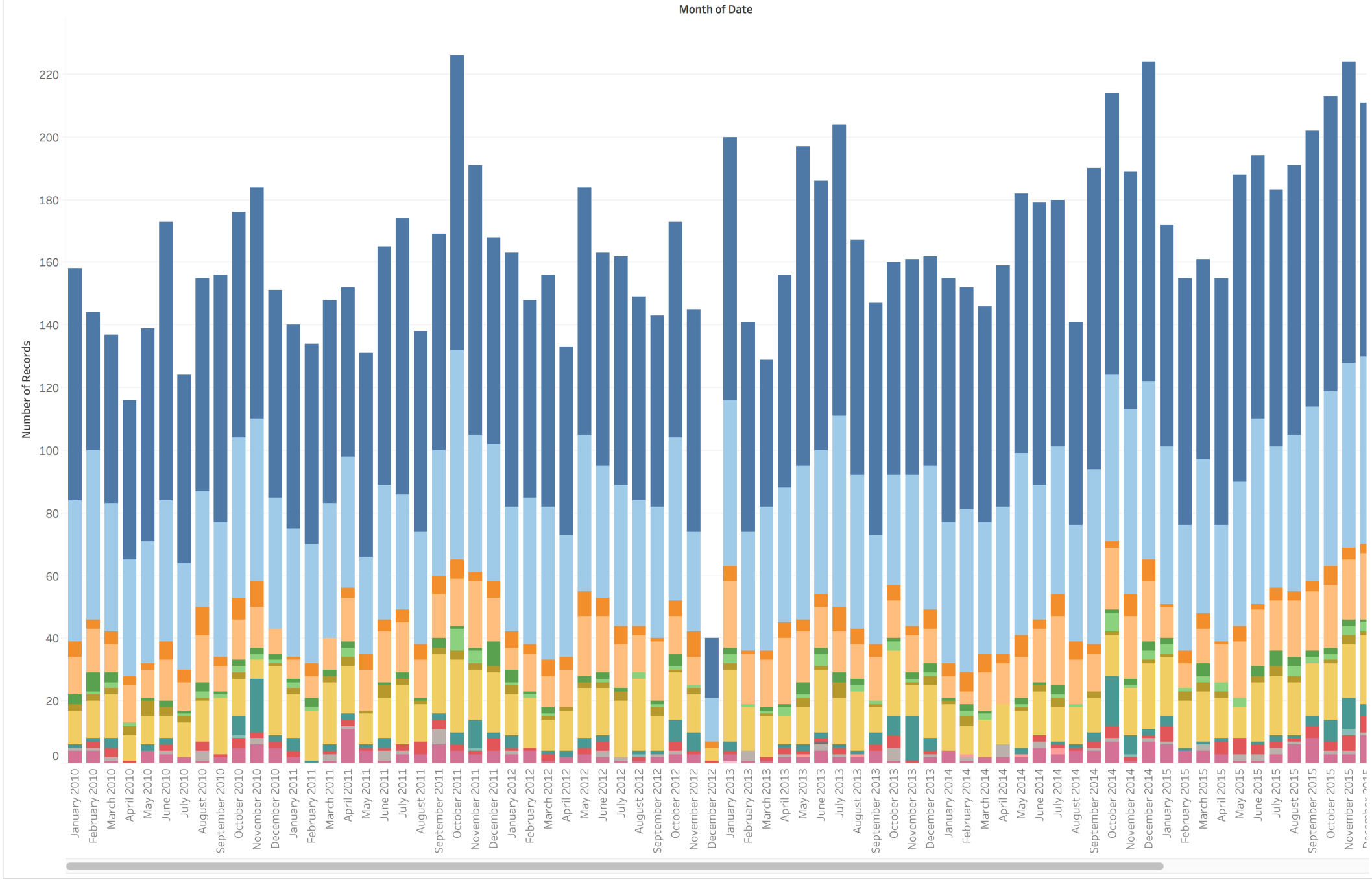
What led us to this Idea

- For years we have been collecting traffic data (not used in hackathon)
- We are always looking for ways to leverage this data to make roads safer and more convenient.
- Open data allowed us to correlate traffic events with many non-traffic related events

Uber 1M riders/ day



Collision Type by Month by Year



Year

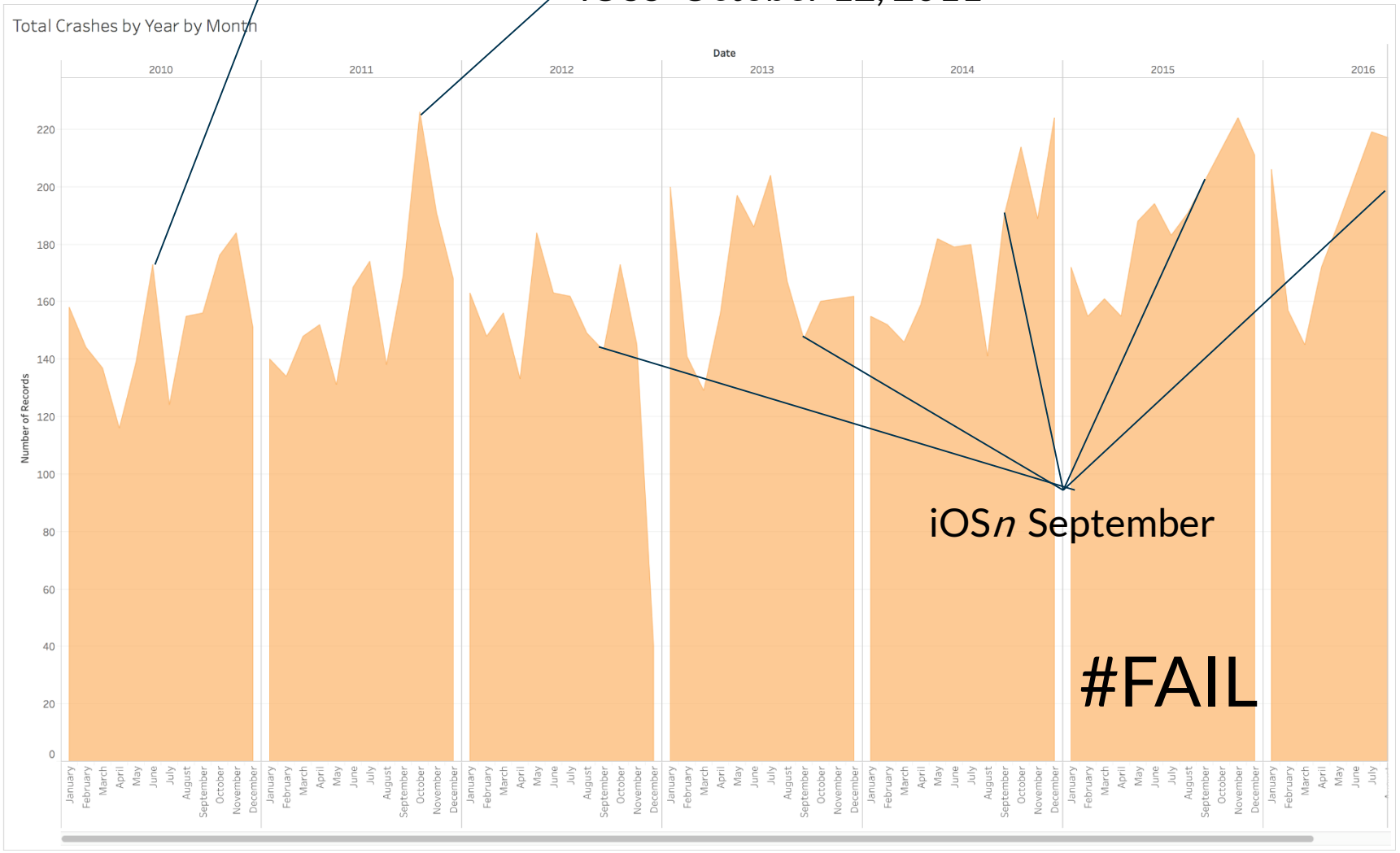
2010 2016

Collision Type

- 1. Rear End
- 2. Angle
- 3. Head On
- 4. Sideswipe - Same ..
- 5. Sideswipe - Oppos..
- 6. Fixed Object in Ro..
- 8. Non-Collision
- 9. Fixed Object - Off ..
- 10. Deer
- 11. Other Animal
- 12. Ped
- 13. Bicyclist
- 14. Motorcyclist
- 15. Backed Into
- 16. Other
- Not Provided

iOS4 June 21, 2010

iOS5 October 12, 2011



iOS*n* September

#FAIL

Rush hour ideas

- Educational Campaigns
- Road Side messages
- Roving Enforcement

The Goal Became Clear

- How do I get to work without dying
- We attempted to devise a way to determine the safest way to work

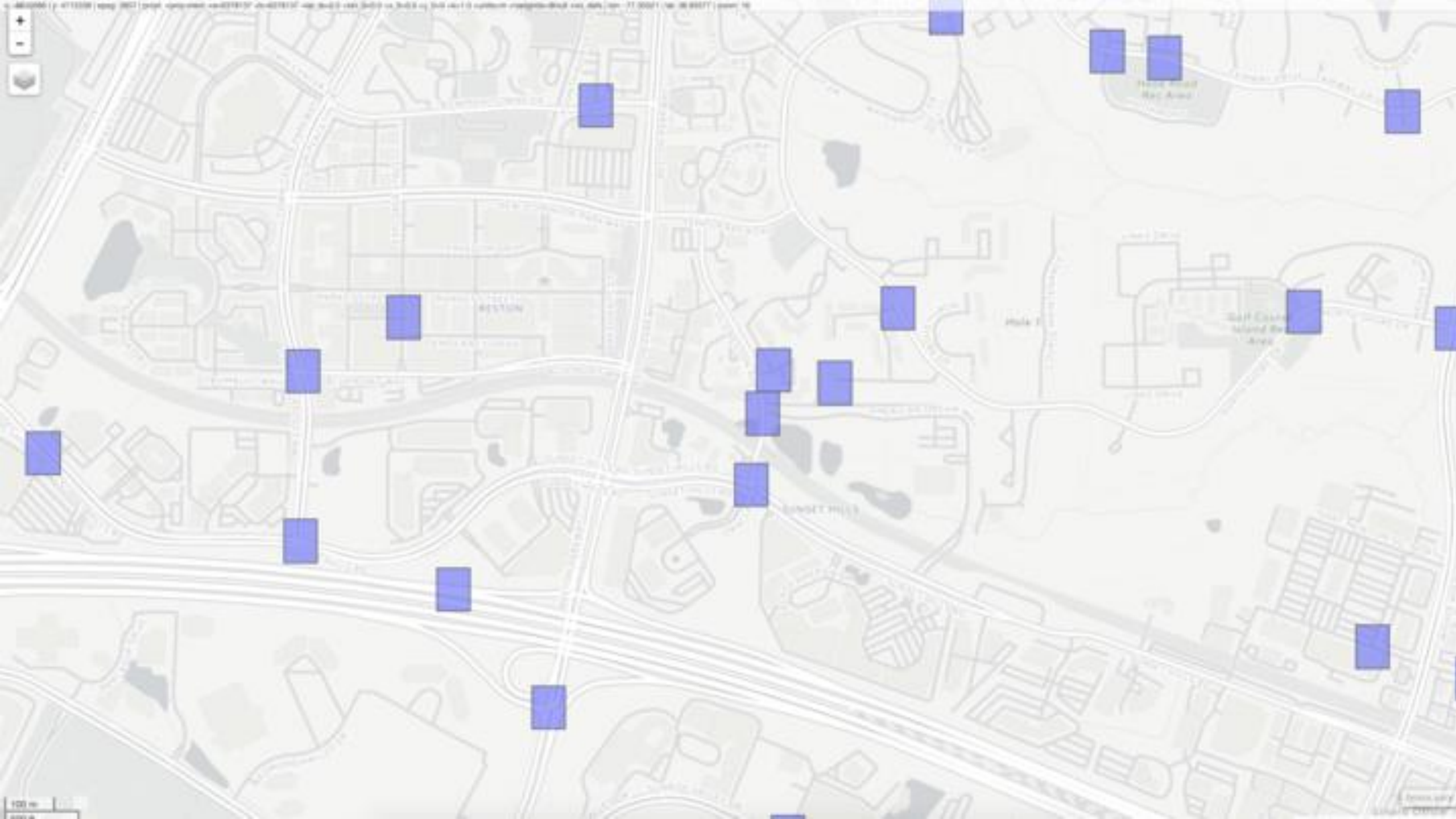
Self Imposed Limits

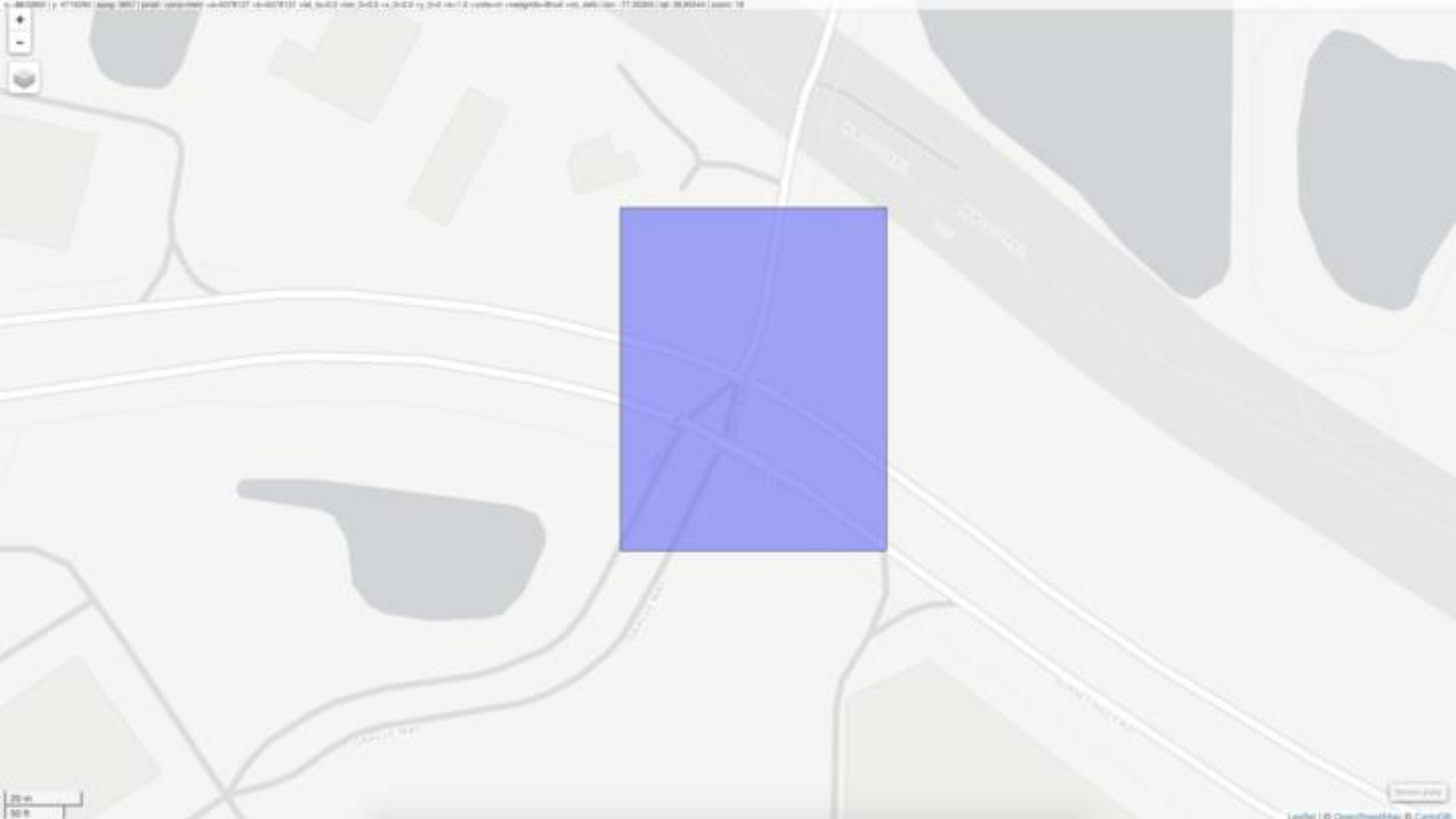
- Intersection based traffic incidents
- Limited ourselves to 20 intersections as a sample set
- Disregarded the many other interesting avenues of discovery were present in the data

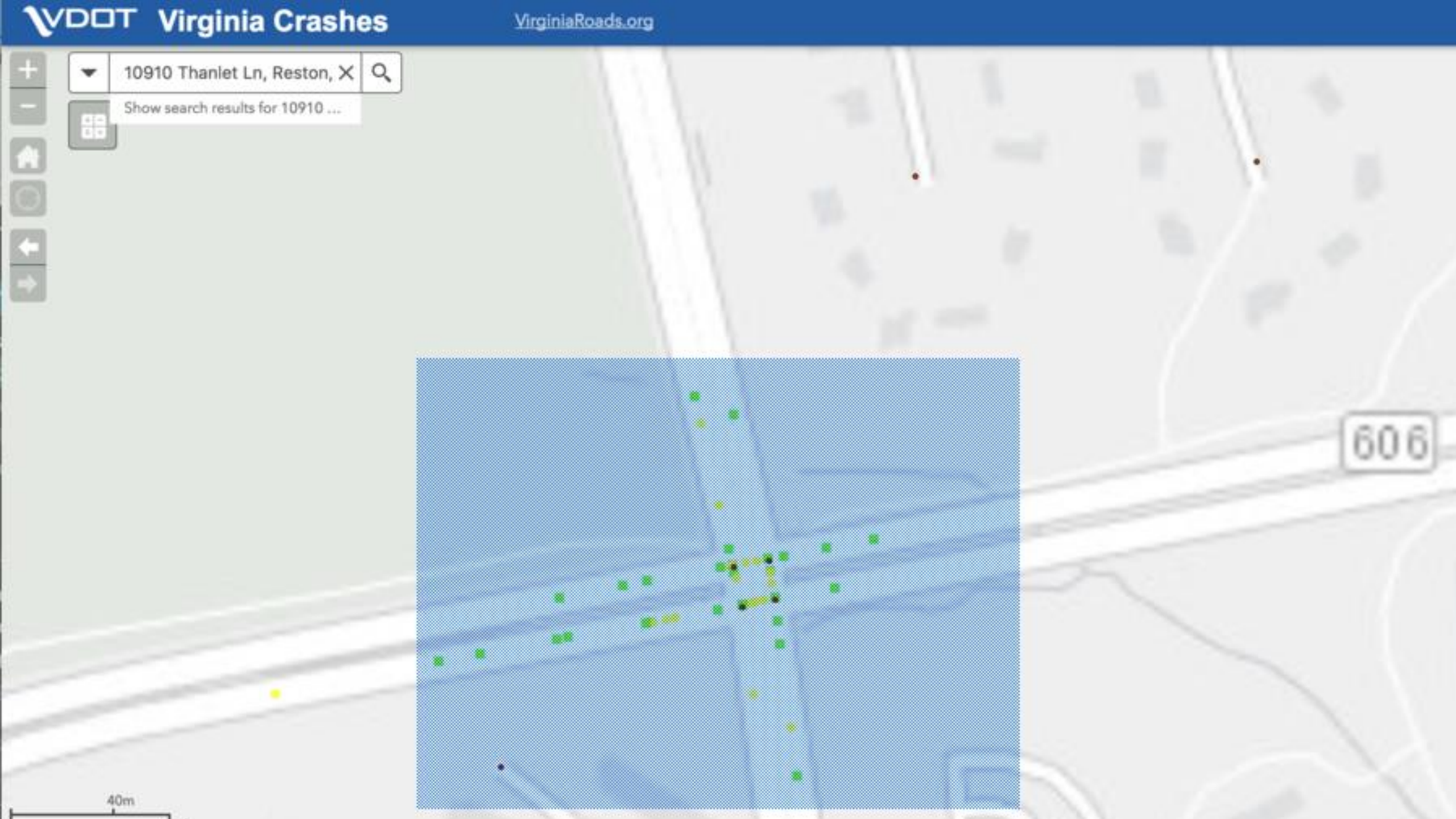
Our Approach

- Using Smarter Roads Data
  - Using Lat/Long of intersections created an overlay with a polygon around each intersection
  - Determined volume of cars in each intersection by an intercept polygon and the ADT of road vector
  - Ran an analysis to determine crashes that occurred in each polygon
- With this data set we were able to determine and rank the intersections based on the crashes per x/cars

Leaflet | © OpenStreetMap © CartoDB

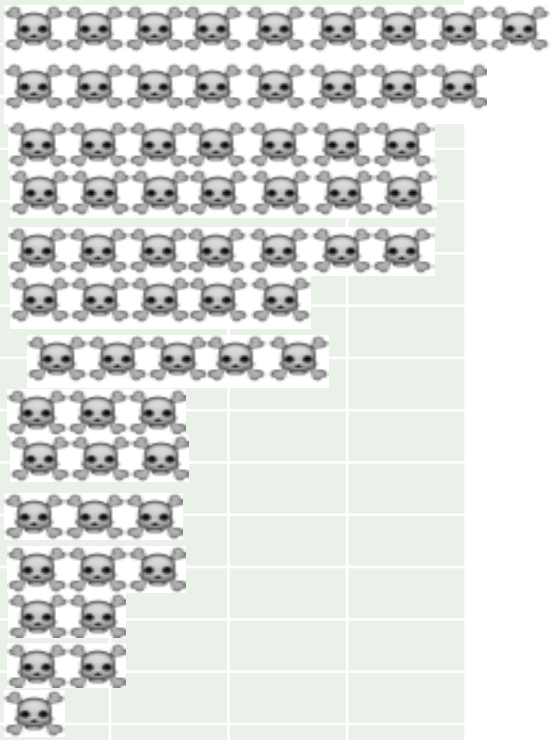





VDOT Virginia Crashes
VirginiaRoads.org
10910 Thanlet Ln, Reston,
Show search results for 10910 ...
606
40m

Birth of the skull index

Rank	Crash per volume	Skull Index
1	0.467801927	9.372911608
2	0.435042689	8.579073231
3	0.678408153	6.871903985
4	0.50352163	6.792126221
5	0.471296246	6.540291628
6	0.384845455	4.999410949
7	0.420041217	4.922292881
8	0.306867923	3.363591509
9	0.259837783	2.796169775
10	0.2463834	2.567957655
11	0.080478299	2.501000063
12	0.10798932	2.186407137
13	0.100042668	2.026658653
14	0.285387	1.340037939
15	0.134351419	0.736907783
16	0.22995784	0.00326452



What did we do

- We created an automated and parametrized process to objectively rank and classify all the intersections in Virginia for safety.
- In the process we were able to create an key bound link between crash data and road data.

So … What now ?

- Now that we have the a join of intersection properties and crash data;
  - We look for identifying properties of risk environments.
  - We can prioritize where to apply resources
  - We can deploy live feedback devices to mitigate risk when it is need
- These insights could lead to
  - How they differ from non-risk intersections of similar layout
  - IFTTT notification to cars via DSRC, traditional messaging, or other
  - Improved guidelines for creating lower risk intersections
  - Time and condition responsive, predictive heat maps

Data Sources Used

- Smarter Roads – Crash Data
- Smarter Roads – Traffic Volume Data
- VA Roads – shape file, csv for Intersections and visualization
- Mike on Traffic Blog
- North Carolina DOT Resource
- https://connect.ncdot.gov/resources/safety/Documents/TEAAS/Chapter%2008%20AADT.pdf

Team

- Brendan Freehart
- Chris Black
- Briton Westerhaus
- Michael Boyle
- Andy Souders
- Kent Fullerton
- Presentation on line at http://hackathon.alltrafficsolutions.com/