Gentry Atkinson

CS7311

**Proposal:** Traffic density studies on the German Autobahn in the early nineties found a direct and non-linear causal relationship between traffic density and the rate of traffic accidents. Specifically, low-density free-flowing traffic caused very few accidents and high-density slow-moving traffic caused very few accidents. But between the two there exists a peak around which individual drivers are incentivized to change lanes frequently in order to maintain speed. I would like to apply these results to Austin’s Bluetooth traffic sensors in order to create a system that can detect periods of increased danger in real time.

**Hypothesis:** Roadside Bluetooth detectors can recognize periods of increased danger for drivers.

**Procedures:**

1. We can first assume that a constant percentage of vehicles will be detected by the sensors. I will calculate a traffic density based on the number of vehicles detected per time period and then map those densities to traffic incidents.
2. Another mapping can be created by comparing the rate of flow at a specific period on a road to that road’s average speed and then comparing those values to traffic incidents. If we find a similar distribution we have validated the assumption we made in step 1.
3. I can now create a data set composed of points containing data on a roads average speed, speed at a specific point in time, and whether an accident was reported on that road shortly after.
4. I will then train and test a classifier to fit that data set.

**Conclusions:**

1. A high performing classifier will indicate that there is a strong correlation between travel speeds and incident rates and that this correlation can be mapped in real time.
2. A low performing classifier will that a weak correlation exists, that an improper classifying algorithm was chosen, or that the classifier was poorly tuned.

**Actions:** A positive result in this study will indicate that this technique could be used by cities in the future to warn drivers of periods of increased danger and to better stage emergency personal to be able to respond to traffic incidents.