PEDESTRIAN SAFETY IN PITTSBURGH

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Introduction

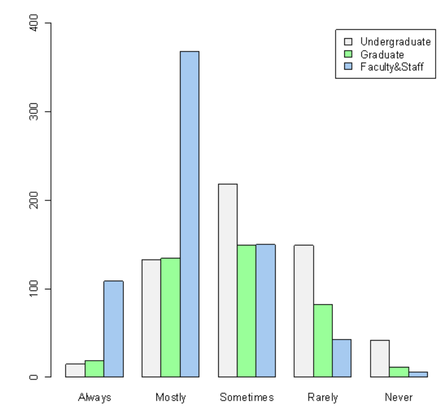
Every year there are numerous pedestrian incidents. Between 2002 - 2005, there were 23 pedestrian fatalities in Pittsburgh. Using FARS, a 1997-2006 incident report and a CMU survey, we are interested in finding factors that contribute to pedestrian incidents and those that affect the perception of danger.

Objective

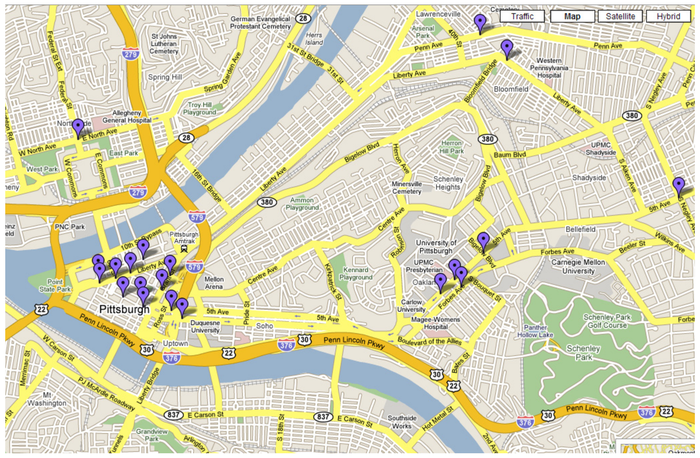
- Discover factors that relate to the frequency of injuries and fatalities in pedestrian-vehicle incidents.
- Understand risk perceptions in the CMU community.

Methods

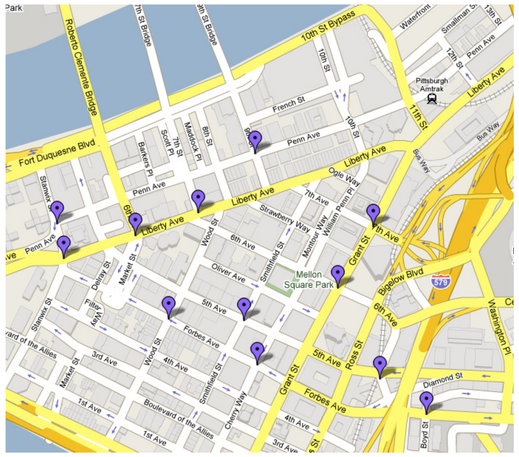
- Create two-way tables and perform proportions tests.
- Modeling of CMU survey data and 1997-2006 incident report
- Principal Component Analysis



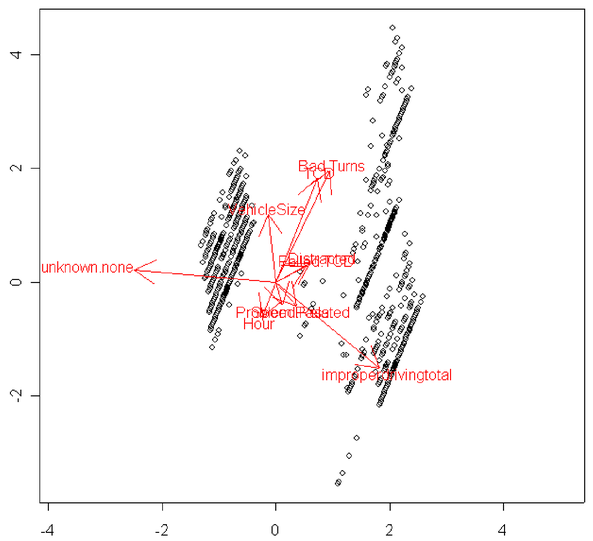
Barplot of compliance to "Don't Walk" signal.



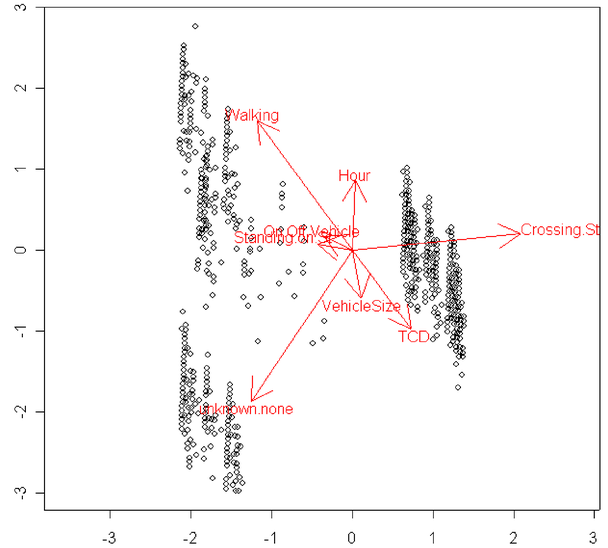
Twenty intersections with the most pedestrian incidents.



The intersections in downtown Pittsburgh.



Principal Component Analysis on driver actions.



Principal Component Analysis on pedestrian actions.

Multinomial Regression Model on Behaviorial Response to "Don't Walk" Signal

$$\log\left(\frac{p_{\text{Always Obey}}}{p_{\text{Never Obey}}}\right) = -1.07 + 3.96\text{Graduate} + 1.48\text{Employee}$$

$$\log\left(\frac{p_{\text{Often Obey}}}{p_{\text{Never Obey}}}\right) = 1.17 + 2.94\text{Graduate} + 1.24\text{Employee}$$

$$\log\left(\frac{p_{\text{Sometimes Obey}}}{p_{\text{Never Obey}}}\right) = 3.22 + 1.54\text{Graduate} + .85\text{Employee}$$

$$\log\left(\frac{p_{\text{Always Obey}}}{p_{\text{Never Obey}}}\right) = 1.29 + .68\text{Graduate} + .35\text{Employee}$$

Logistic Regression Model on Pedestrian Incident Outcome

$$\log\left(\frac{p_{\text{Death}}}{1-p_{\text{Death}}}\right) = -17.47 + 0.29\text{Intersection} - 0.78\text{TCDLight} - 0.70\text{TCDSign} + 13.34\text{PA1} + 13.4\text{PA2} + 13.79\text{PA3} - 0.09\text{PA4} - 0.24\text{PA5} + 14.08\text{PA6} + 12.89\text{PA7} - 0.02\text{PA8} + 14.47\text{PA 9}$$

$$\log\left(\frac{p_{\text{Death}}}{1-p_{\text{Death}}}\right) = -3.95 + 0.27\text{Intersection} - 0.83\text{TCDLight} - 0.75\text{TCDSign}$$

Results

- A CMU survey participant's perception of risk correlates with the frequency of crossing the intersection.
- Professional status and method of transportation around campus have a significant effect on one's decision to violate traffic signals.

Caveats

- Information on cost is needed to adequately assess risk of pedestrian incidents.
- Without traffic flow data, risk cannot be assessed. We cannot say that the twenty intersections with the most incidents are risky because we do not have information on traffic flow.

Acknowledgements

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