OUTTA MY LANE!
Investigating Bike Lane Obstructions & Tickets in Cambridge

Obstruction Complaint Clustering

High-High Cluster
High-Low Outlier
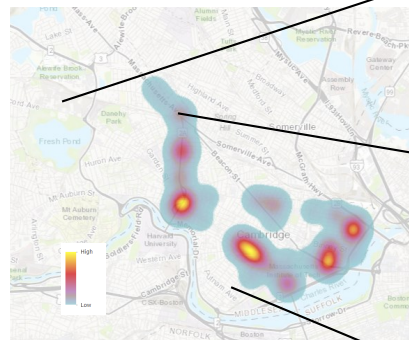Low-High Outlier
Low-Low Cluster

0 0.2 0.4   0.8 Miles
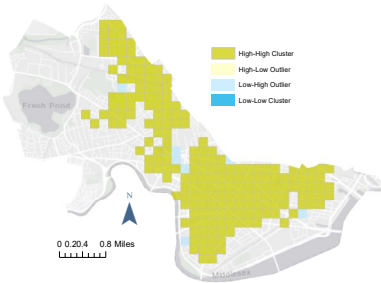
Obstruction Citation Clustering

High-High Cluster
High-Low Outlier
Low-High Outlier
Low-Low Cluster

0 0.2 0.4   0.8 Miles
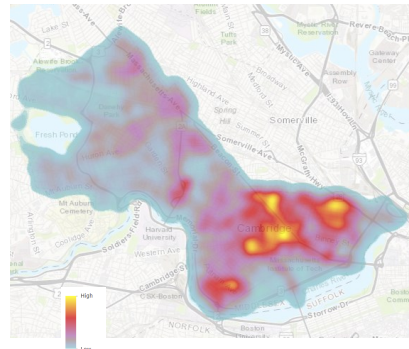
Introduction

Envision Cambridge is the comprehensive plan for the city of Cambridge and outlines a progressive agenda to encourage active transportation modes. The city has been slowly but steadily adding bike lanes for the past few years, improving connectivity and access. However, cycling advocates have expressed concerns about the safety of these lanes, reporting frequent blocks and obstructions by motor vehicles in particular. Blocked lanes pose a significant threat to the safety of cyclists, and are a deterrent to would-be riders. The severity and distribution of these blocks are not well understood, but could provide insight into better regulation and enforcement of bike lanes. This investigation aims to better understand the lay of the land of bike obstructions in Cambridge by analyzing self-reported complaints through the non-emergency 311 system, and citations given to drivers by the Cambridge Police Department.
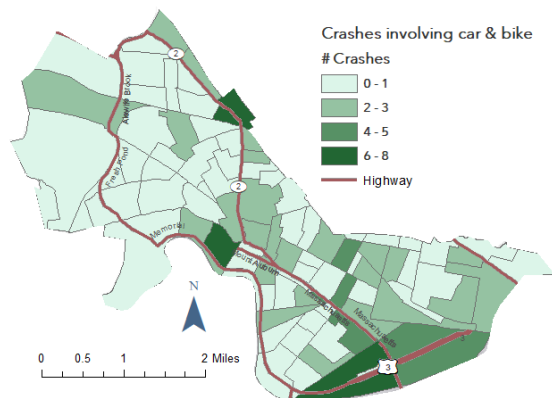
Crashes involving car & bike
Crashes
0 - 1
2 - 3
4 - 5
6 - 8
Highway

0   0.5   1   2 Miles

Table 1. Moving Violations

Charge	
Stop/Fail to Yield	3,000
Improper turn	2,456
Speeding	1,366
Marked lane violation	1,320
Violation of posted si..	885
Bicycle Violation	840
Inspection sticker	719
Crosswalk violation	579
Improper operation	576
Opening door when u..	553
Fail to yield at interse..	519
Unregistered vehicle	449
Blocking bicycle lane	445

Complaint Density

High
Low

Citation Density

High
Low

Methods

Data for the 311 complaints, police citations, and car on bike crashes was downloaded from Cambridge's Open Data portal and then geocoded. Using 2015 ACS estimates, a choropleth map showing the amount of crashes in each census block group was created and then joined to a highways layer downloaded from MassDOT. Spatial Statistics was used to kernel density and then create heatmaps. To better understand where the complaints and citations were concentrated, a cluster and outlier analysis was created using the Anselin Local Moran's I.

Table 2. Complaints to 311

Complaint	
pothole	4,902
Icy or unshoveled sidewalk	2,870
Missed recycling pickup	2,420
Park maintenance request	1,762
Tree pruning request	1,543
Traffic sign complaint	1,515
Missed yard waste pickup	1,452
Graffiti	1,361
Bike lane obstruction	1,342

Results & Further Research

A visual analysis of the distribution of citations indicates high clustering along Mass Ave, near Kendall Square, and near Inman Square. Citations are much more highly concentrated than complaints, with high density extending out as far as Rindge Ave, Alewife, and Cambridgeport. CPD (or a non-police entity created by the city) is not responding adequately to a large number of complaints, particularly in northeast Cambridge, and might consider establishing a more clear, comprehensive system for enforcing bike lane violations. There are a number of limitations to this dataset and analysis that limit its application to policy making. However, future research could build on this by delving further into the relationship between obstructions and physically separated bike lanes, traffic management typologies at those hotspots, and assessing how and why police surveil certain areas more than others.
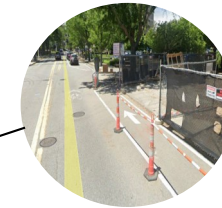
Snapshots from Cambridge's Bike Lanes

Cambridgepark Drive

Industrial, with a lot of ongoing construction. Many complaints, few citations.

Central Square

Commercial– Heavy car, bike, and pedestrian traffic. Many complaints, many citations

Brookline St. & Allston Street

Residential, less through-traffic than densely packed squares. Many complaints, few citations.

Projection & coordinate system: NAD 1983 StatePlane Massachusettes Mainland FIPS 2001; WGS 1984 Web Mercator Auxiliary Sphere

Data Sources: MassGIS, Tufts Geodata, American Factfinder, MassDOT, Cambridge Open Data, ESRI, Conway et al. 2013, Romanow et al. 2012

Images: Google Earth

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