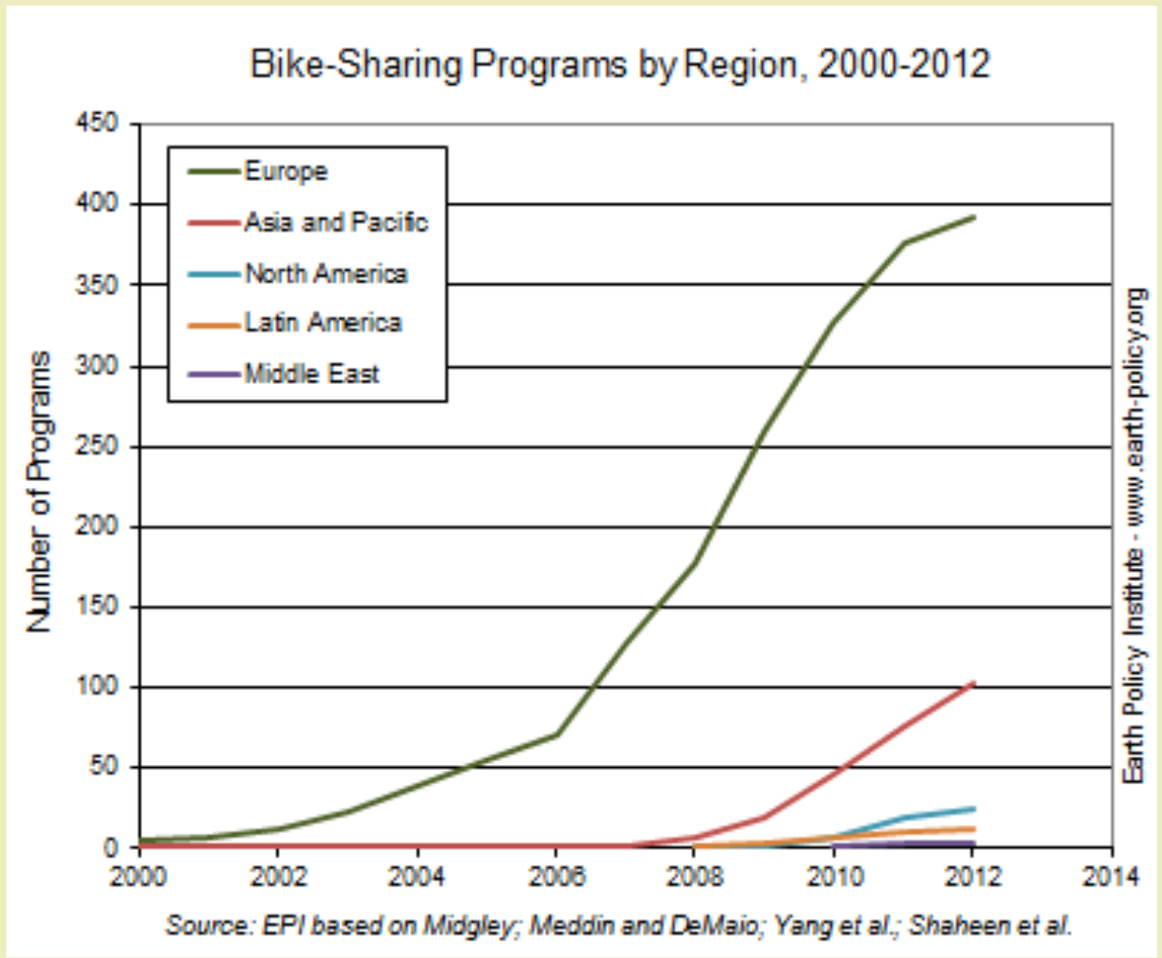
Where should I start a new bike-sharing station?

Motivation

- Massive growth in past decade



Deliverables

- aimed at greater Boston area city managers, Hubway CEO
- web app
  - input: location under consideration for a new Hubway station (longitude, latitude)
  - output: predicted average number of rides per day from 2011 to 2013 for that location
- list of next-best station locations

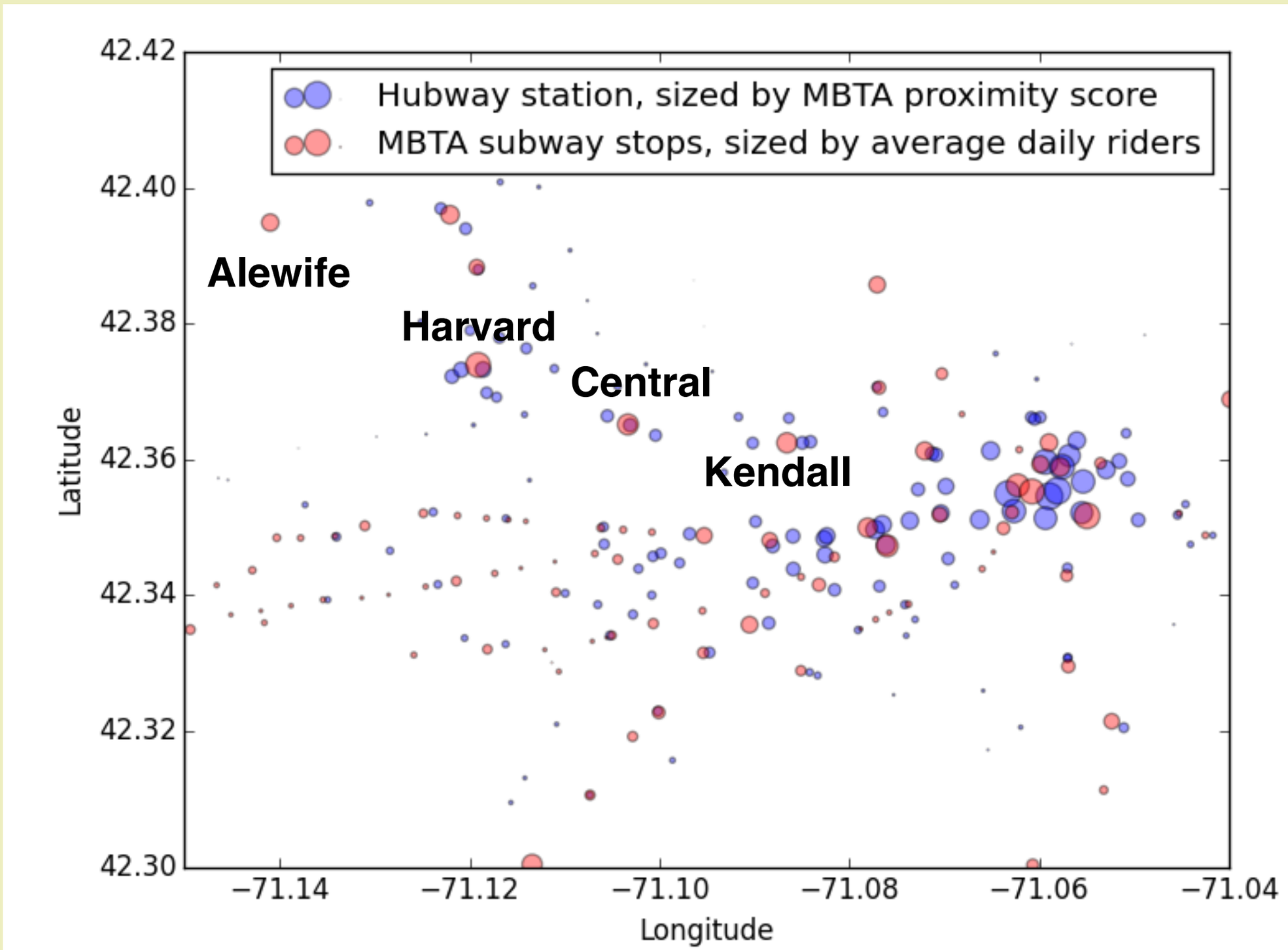
Data

Hubway Data

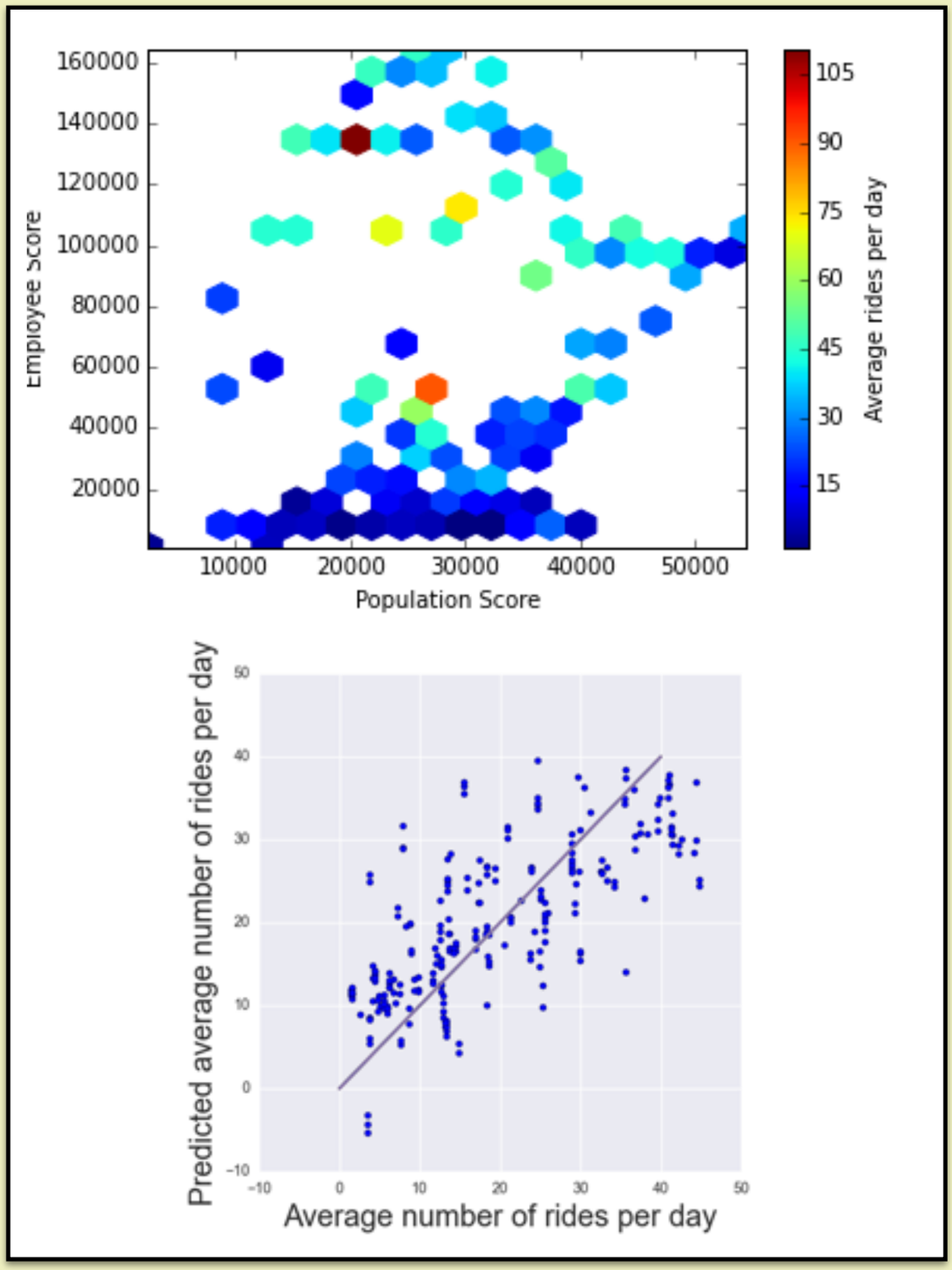
- July 2011 through November 2013
- Timestamp, start & end station, and duration for each trip
- ~140 stations

Ancillary Data

- US Census: population size from 2010, employee size from 2012 by zip code
- MBTA rider data
- Location of recreational sites?
- Bike lane data?


Hubway station, sized by MBTA proximity score
MBTA subway stops, sized by average daily riders
Alewife
Harvard
Central
Kendall
42.42
42.40
42.38
42.36
42.34
42.32
42.30
Latitude
−71.14
−71.12
−71.10
−71.08
−71.06
−71.04
Longitude

Algorithmic Approach

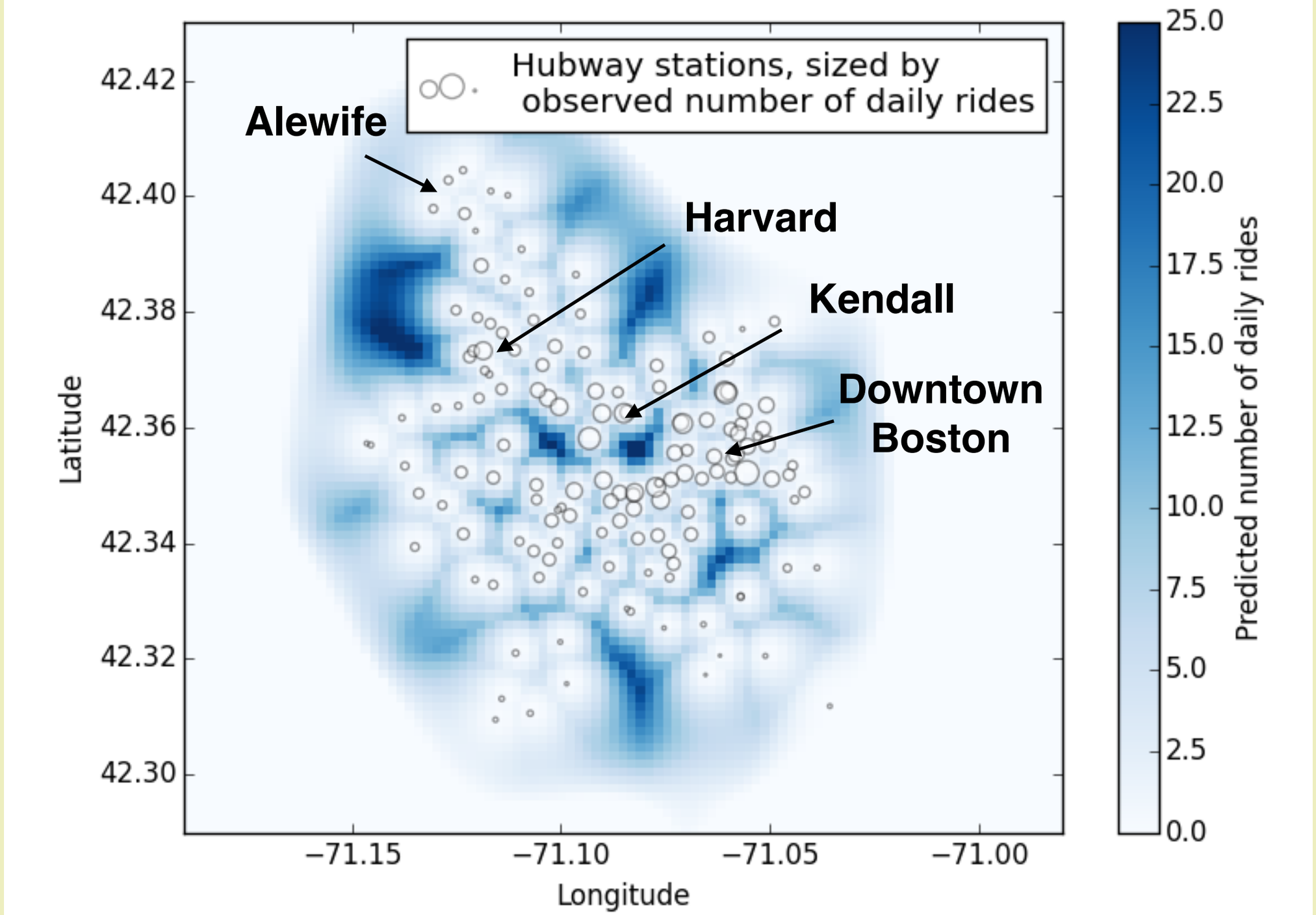


Features

- Average population size within 0.5 miles of lat/long
- Average employee size within 0.5 miles of lat/long
- Average proximity to T stop
- *Proximity to bus stop?*
- *Proximity to tourist destination?*

Machine Learning approach

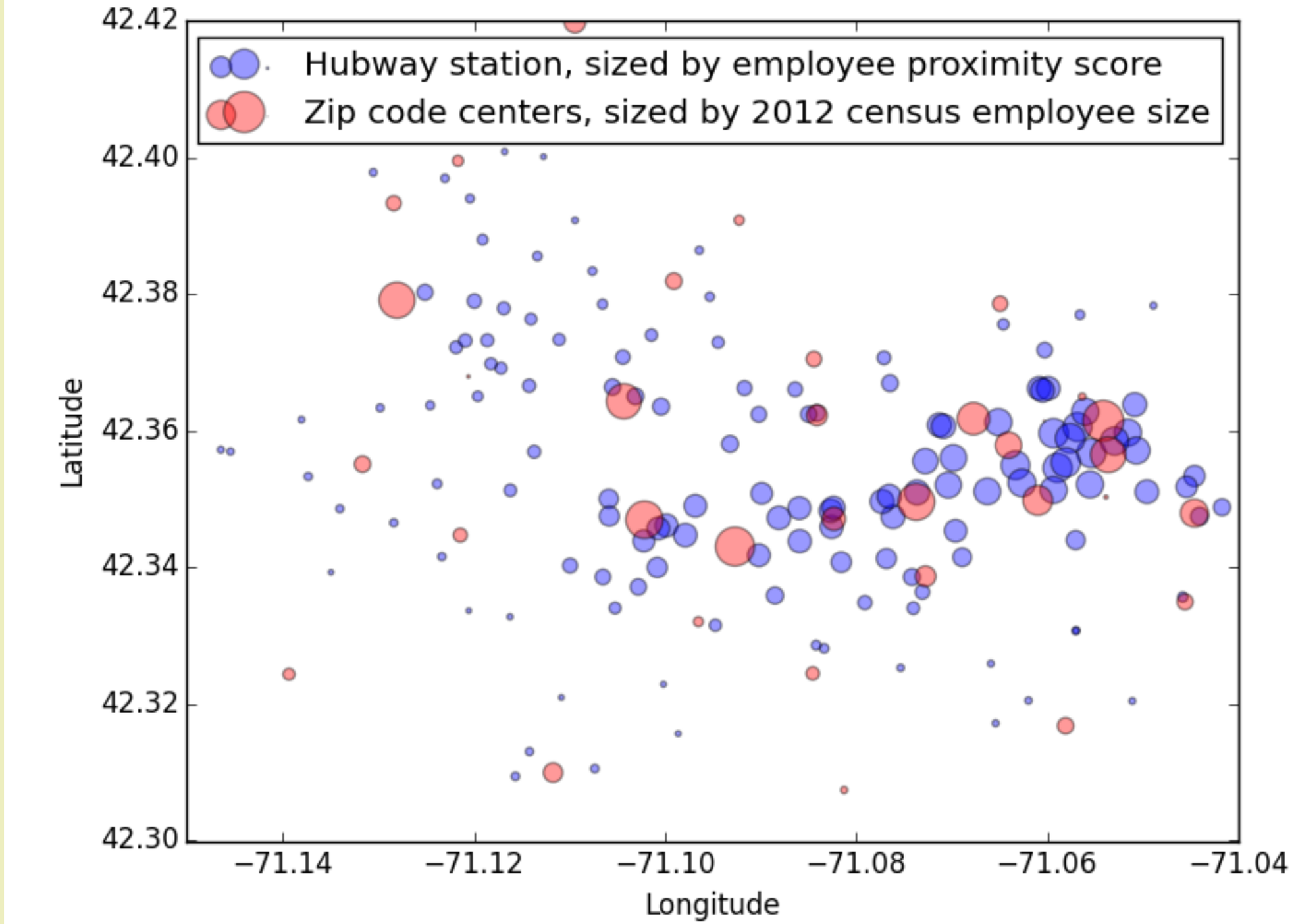
- Use linear regression to predict growth trend of a single Hubway station
- Validate using 5-fold cross-validation

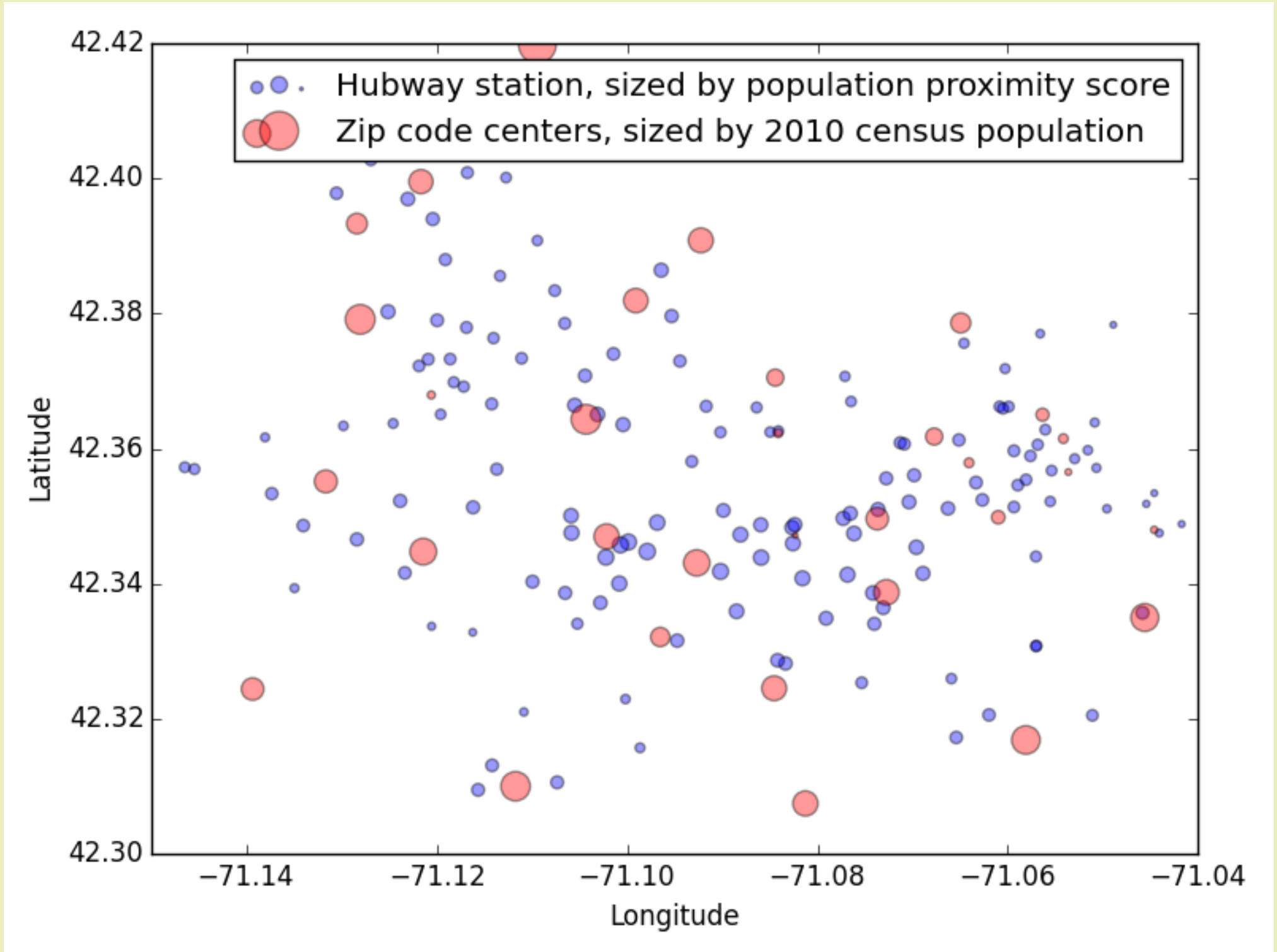

Hubway stations, sized by
observed number of daily rides
Alewife
Harvard
Kendall
Downtown
Boston
42.42
42.40
42.38
42.36
42.34
42.32
42.30
Latitude
−71.15
−71.10
−71.05
−71.00
Longitude
25.0
22.5
20.0
17.5
15.0
12.5
10.0
7.5
5.0
2.5
0.0
Predicted number of daily rides

About Me

- PhD, Astronomy, University of Arizona
- Postdoc at Harvard-Smithsonian Center for Astrophysics
- Postdoc at Cornell University
- Research topic: understanding how galaxies evolve by studying gravitationally lensed galaxies

Cool picture demoing gravitational lensing using a wine glass, my iphone, and a piece of junk mail.


Hubway station, sized by employee proximity score
Zip code centers, sized by 2012 census employee size
42.42
42.40
42.38
42.36
42.34
42.32
42.30
Latitude
−71.14
−71.12
−71.10
−71.08
−71.06
−71.04
Longitude


Hubway station, sized by population proximity score
Zip code centers, sized by 2010 census population
42.42
42.40
42.38
42.36
42.34
42.32
42.30
Latitude
−71.14
−71.12
−71.10
−71.08
−71.06
−71.04
Longitude