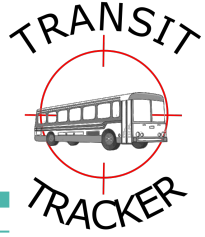


Student Project Final Presentation

TRANSIT TRACKERS: Visualization of Transit and Socioeconomics in Seattle

Dylan Shea, Parastoo Jabbari, Ty Jorgenson, Liam Han

Background

Urban planner or student interested in Seattle public transit

Goal:

Want to make maps for a presentation
based on a custom analysis of how well the public transit matches the socioeconomic and transit trends

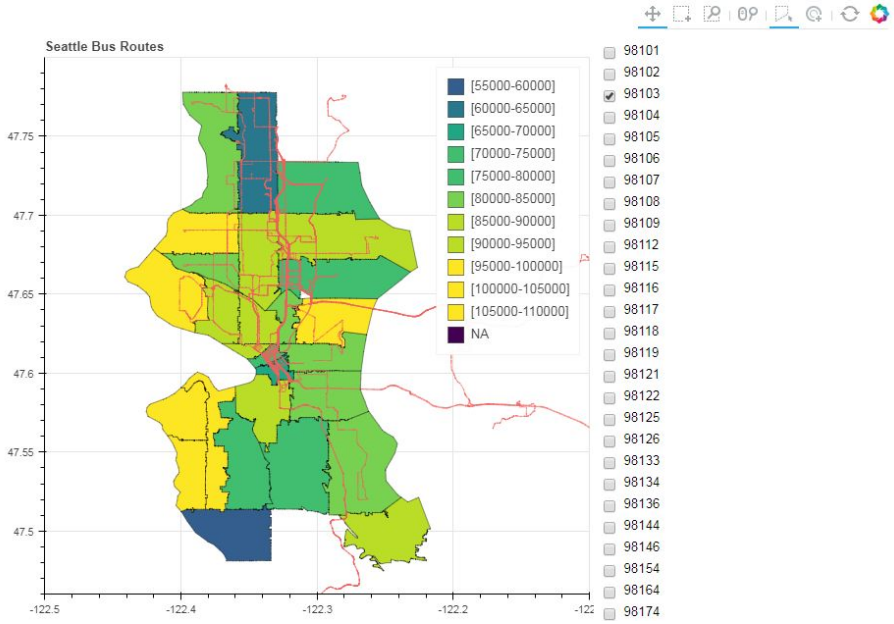
Need:

Customizable and interactive maps that you can save

Transit Tracker

An interactive HTML mapping interface that allows you to visualize by zipcode:

- Public buses routes
- Transit trends
- Income level
- Socioeconomic factors
    - e.g., age, education



Data

Two major data resources

- PSRC household travel survey, publically available
  - Obtained and processed data to get transit trends and socioeconomic factors by zip code
- KCM public transit data, publically available
  - Obtained bus routes shapefile in King County
  - Created shapefiles accordingly for Seattle
- Data.gov
  - Obtained zip codes shapefiles for nation and extracted Seattle zip codes

Limitation of the data

- High processing time due to large datasets
- Very few observations for some of zip codes
- Shapefiles with different coordinate systems
- Shapefiles of larger regions than we needed

Use Cases

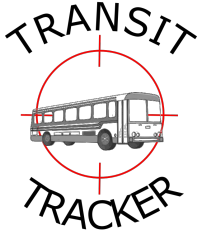
Point-and-Click interactive map on a webpage

- User clicks on a zip code location, and the software groups the data associated
- Displays bus routes that serve that zip code
- Displays PSRC trips trends for that zip code
- Generate socioeconomic and demographic analysis based on zip code

Report Summary

- A file will be auto-created with the results of the analysis
    - This will include maps, and plots in a reader-friendly format that can be saved as PNG file

Interactive Map Components



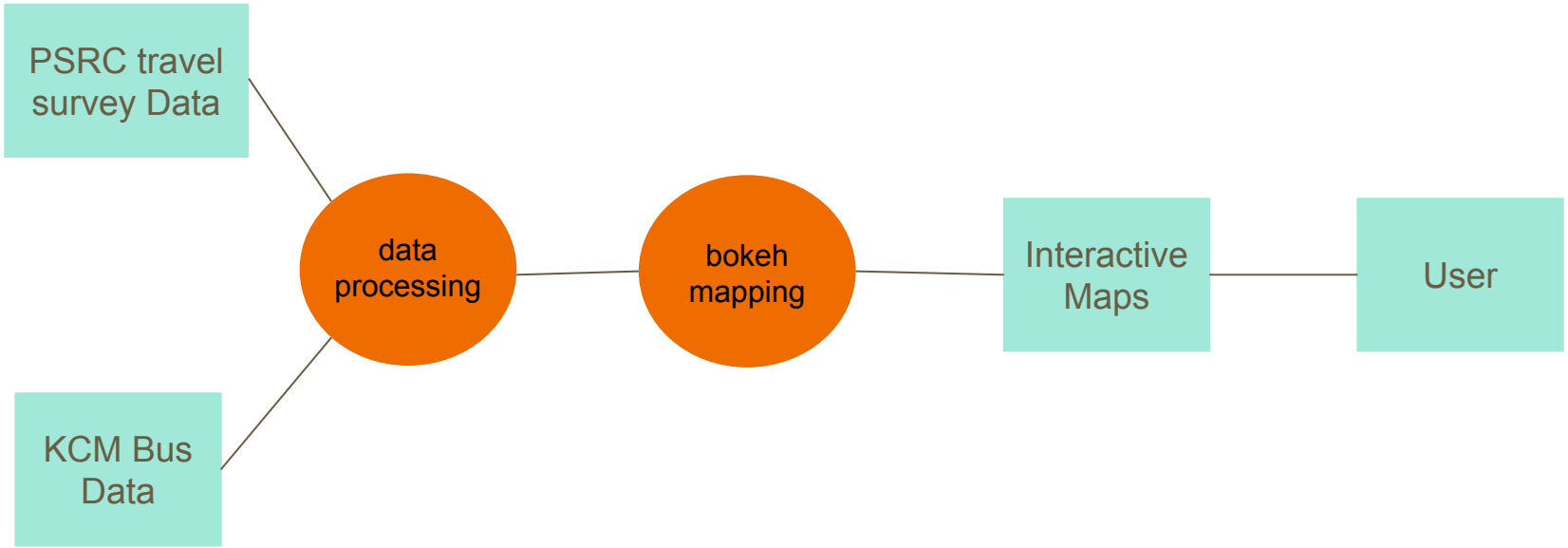
Map of
Bus Routes

Transit
Destination Map

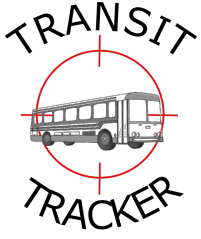
Chloropleth
Maps of Income
Level

Chart based
Visualization of
Socioeconomic
Factors

Transit Trackers Design



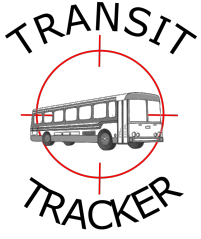
Visualization Package



Bokeh

- Many features and widgets
- Provides you output in various medium like html, notebook and server
- It is not as good of a tool for mapping shapefiles as it is for plotting charts or maps using existing base maps
- Some of the tools has been eliminated from new versions, and hard to find the substitutes

Demo

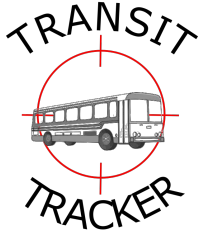


Repo Structure

```
uwseds-transit-trackers/
        README.md
        LICENSE
        .gitignore
        TransitTrackers/
            __init__.py
            transit_tracker.py
            js_utils.py
            tests_js_utils.py
            utils.py
            tests_utils.py
        Data/
            bus_seattle/
                network.shp
            zips_sea/
                shp.shp
            zipcode_latlong.xlsx
            zips_seattle.csv
```

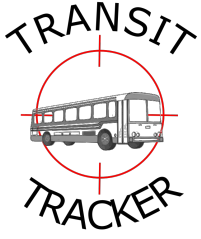
```
uwseds-transit-trackers/
        README.md
        LICENSE
        .gitignore
        TransitTrackers/
        Data/
        Docs/
            Component_Design.md
            data.md
            specifications.md
            Project_summaries.pdf
        examples/
            example_mapping_notebook.ipynb
            Data/
                example_trips_data.csv
        setup.py
```

Challenges



- Handling shapefiles in Python
- Extracting parts of the shapefiles and store them in separate shapefiles
- Merging data from data frames to shapefiles
- Limited data once filtered/extracted
- Working out callbacks in Bokeh
    - Required some JavaScript code in order to achieve the interactive nature we wanted

Lessons Learned



- Bokeh is more efficient for low level interactive features so it’s not the best package for high level interaction
- Even large datasets may not be sufficient for disaggregated analysis
- Importance of version control for efficient coding
- Importance of commenting so that your peers can easily understand your code

Future Work

- For travel trends, replacing survey data with GPS data can be useful to get more observations and better accuracy.
- Socioeconomic data can be improved by weighting the data instead of using raw observations.
- Other factors such as job opportunities, closeness to central business district, and etc for each region can also be added to help better understand needs.
- By replacing current travel trends with forecasted trends as a result of Seattle growth, user can use this tool to explore if current transit system is sufficient or where are the high demanded areas.