

PRINCES
BUILDING
太子大廈

SEATTLE COLLISION RESEARCH TOOL

COLLIDIUM

WE ARE DEVELOPING FIVE USE CASES FOR OUR TARGETED USERS

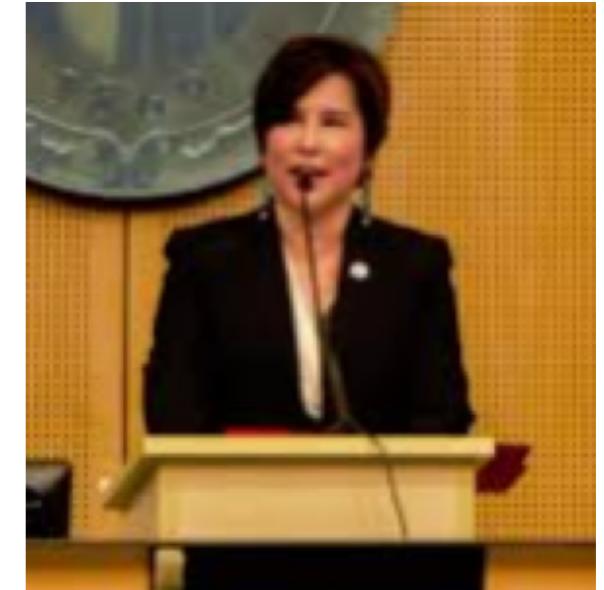
Our targeted users:



Cyril City Planner



Carol Community Activist



Mandy Municipal Politician

Each of these users wants information to help them support their agenda. Their priorities are:

- Information is presented in a way that is easy to interpret
- They can select options to focus on the questions that are most interesting to them

USE CASES

Each of our use cases allows users to see visualizations of data that is filtered in different ways. These include:

Time frame of construction: “I want to see how collisions increased around buildings built in 2016”

Building type: “I want to see how multifamily construction affects collisions. Now I just want to look at commercial construction”

Accident victims: “I only want to see accidents that involve pedestrians or cyclists”

Accident severity: “I only care about accidents with injuries”

Distance between collision and construction: “I am interested in accidents that were directly adjacent to new construction” or “I want to see how accidents change up to a quarter mile from the new building.”

SEATTLE OPEN DATA PORTAL

[Open Data Program](#)[TechTalk Blog](#)[Public Records Requests](#)[Other City Data](#) ▾[Sign In](#)

Welcome to the City of Seattle Open Data portal, where we make data generated by the City openly available to the public.

Search



City Business

Includes City Fleet, City Council, wage data



Community

Includes Neighborhoods, Community organizations, and Equity initiatives data



Education

Includes Education and related Social Services data



Finance

Includes data on City Financial operations



Land Base

Includes GIS layers



Permitting

Includes Building, Electrical, Trade and other permit types



Public Safety

Includes 911 data, Police, Fire and other public safety agencies



Transportation

Includes data on public transit in Seattle

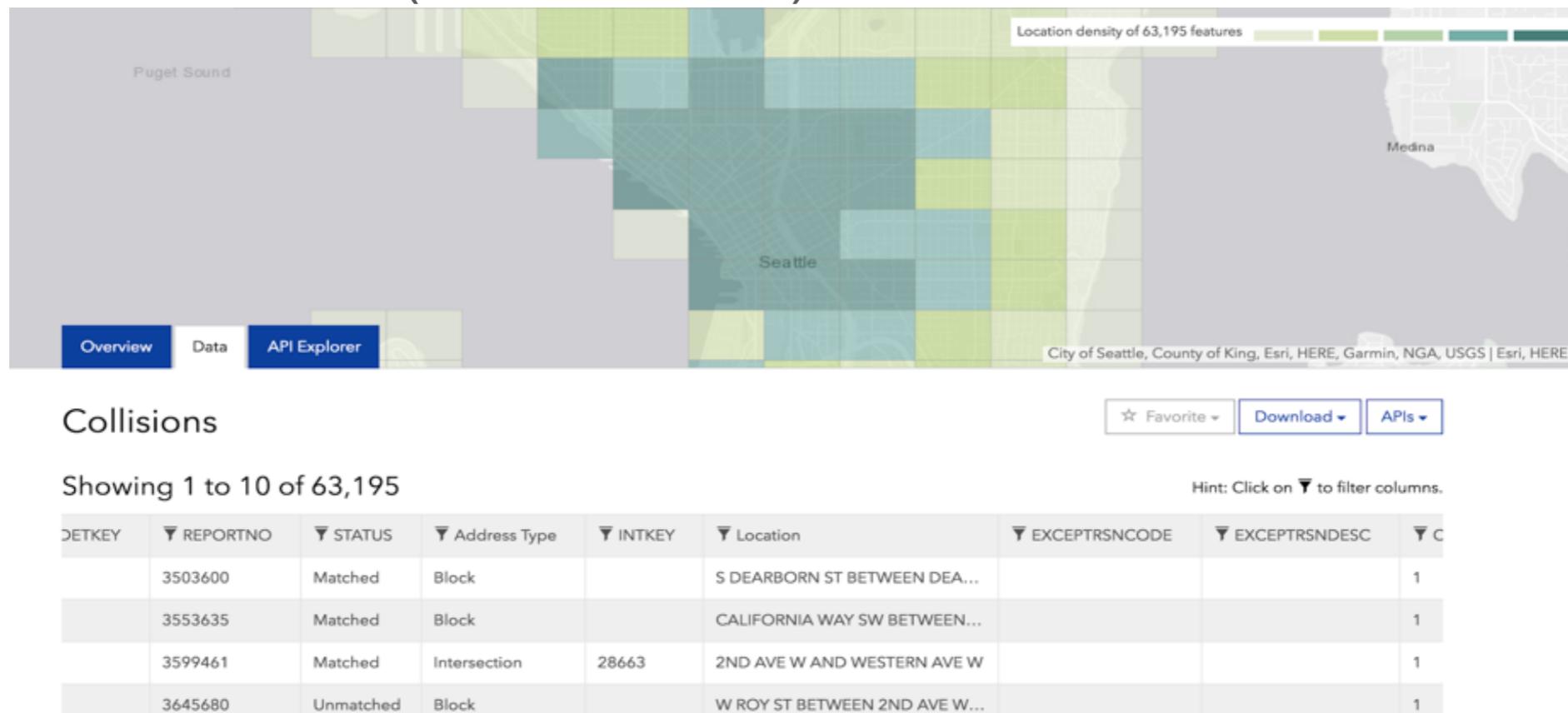
BUILDING PERMIT DATASET

- Building Permit Data from 2014-2018 (~60,000 rows)
- Missing Data, Duplicate Observations
- Filtered on permit types and construction value (>\$1mil)
- Final cleaned dataset (~440 rows)

PermitNu ::	PermitClass ::	PermitClassMapp ::	PermitTypeMapp ::	PermitTypeDes ::	Description
6183686-CN	Single Family/Duplex	Residential	Building	Addition/Alteration	Construct detached garage porch addition and alterations to
6103233-CN	Single Family/Duplex	Residential	Building	Addition/Alteration	Construct 2-story addition and alter existing single family res
6206946-CN	Single Family/Duplex	Residential	Building	New	Establish Use as Single Family Residence, Construct Single Fa
6385013-CN	Single Family/Duplex	Residential	Building	Addition/Alteration	Alterations to existing single family residence, new covered c
6512823-CN	Commercial	Non-Residential	Building	Addition/Alteration	Construct interior alterations to the Great NW Soup Compan
6234242-CN	N/A	N/A	Building		Seattle City Light project - Replace existing buried cable pow
6235644-CN	Commercial	Non-Residential	Building	Addition/Alteration	CLOSED AS INCOMPLETE - EXPIRED PERMIT. Construct altera
6448014-CN	Commercial	Non-Residential	Building	Addition/Alteration	Interior remodel to convert (E) office uses to electronic data
6100927-DM	Single Family/Duplex	Residential	Demolition		DEMOLISH SINGLE FAMILY RESIDENCE ****APPLICATION TO
6636584-CN	Commercial	Non-Residential	Building	Addition/Alteration	TENANT IMPROVEMENTS TO THE CENTRAL PORTION OF LEV

COLLISIONS DATASET

- Collisions Data from 2003-2018 (~200,000 rows)
- Missing Data, Duplicate Observations
- Filtered for complete observations only, occurring after 2013
- Final cleaned dataset (~60,000 rows)



COLLIDIUM DATABASE

Database Construction

1. Calculates distances between collisions and buildings
2. Joins collisions that occur within 1500 ft and 1 year of building permit.
3. Contains dates and information about each collision and each building
4. Use SQLite queries to extract information for mapping

Advantages

- Updates quickly and dynamically, feeding directly into Folium Map
- Organizes and normalizes collisions depending on query specifications

COLLIDIUM: SEATTLE COLLISION RESEARCH TOOL

DESIGN

QUERY_CLASS.PY

PROCESS_DATA.PY

TABLE_BUILDER.PY

DRAW_MARKERS.PY

INTERACTIONS_FUNCTIONALITY.PY

COLLIDIUM: SEATTLE COLLISION RESEARCH TOOL

DESIGN

PROCESS_DATA.PY

- ▶ Cleans the Collisions and Buildings datasets.
- ▶ Creates a table called Collidium that contains building-collision pairs.
- ▶ Exports to CSV file.

QUERY_CLASS.PY

DRAW_MARKERS.PY

INTERACTIONS_FUNCTIONALITY.PY

TABLE_BUILDER.PY

COLLIDIUM: SEATTLE COLLISION RESEARCH TOOL

DESIGN

TABLE_BUILDER.PY

- ▶ Takes the CSV file generated from PROCESS_DATA.PY (called Collidium Data) and generates a database file with the given table.
- ▶ This database file is used extensively throughout our project.

QUERY_CLASS.PY

DRAW_MARKERS.PY

INTERACTIONS_FUNCTIONALITY.PY

DESIGN

QUERY_CLASS.PY

- ▶ This module generates SQL queries based on the values of the interactive input.
- ▶ Structured as a class, that allows the attributes to be set.
- ▶ Uses these attributes to create a query string, and returns the string.

DRAW_MARKERS.PY

INTERACTIONS_FUNCTIONALITY.PY

DESIGN

DRAW_MARKERS.PY

- ▶ This module creates 3 maps, and plots building permits as dots on the map.
- ▶ The size of the dot corresponds to the number of collisions that occurred near the building.

INTERACTIONS_FUNCTIONALITY.PY

DESIGN

INTERACTIONS_FUNCTIONALITY.PY

- ▶ Responsible for updating the map based on the values of the interactive components.
- ▶ Takes updated values of interact components, generates a new query and takes this new data to plot the updated points.

PROJECT STRUCTURE: VIRTUAL ENVIRONMENT

- Required Python Packages:
 - pandas
 - numpy
 - branca
 - folium
 - geopy
- Folium requires PIP install
- We are currently working on creating a minimum environment

 doc	updated file structure
 seattlecollision	updated test file paths
 tutorial	first commit
 .coveragerc	setting up travis
 .travis.yml	fixing travis
 LICENSE	first commit
 README.md	fixed readme
 collidium_env.yml	cleaned up repo
 requirements.txt	added geopy to requirements

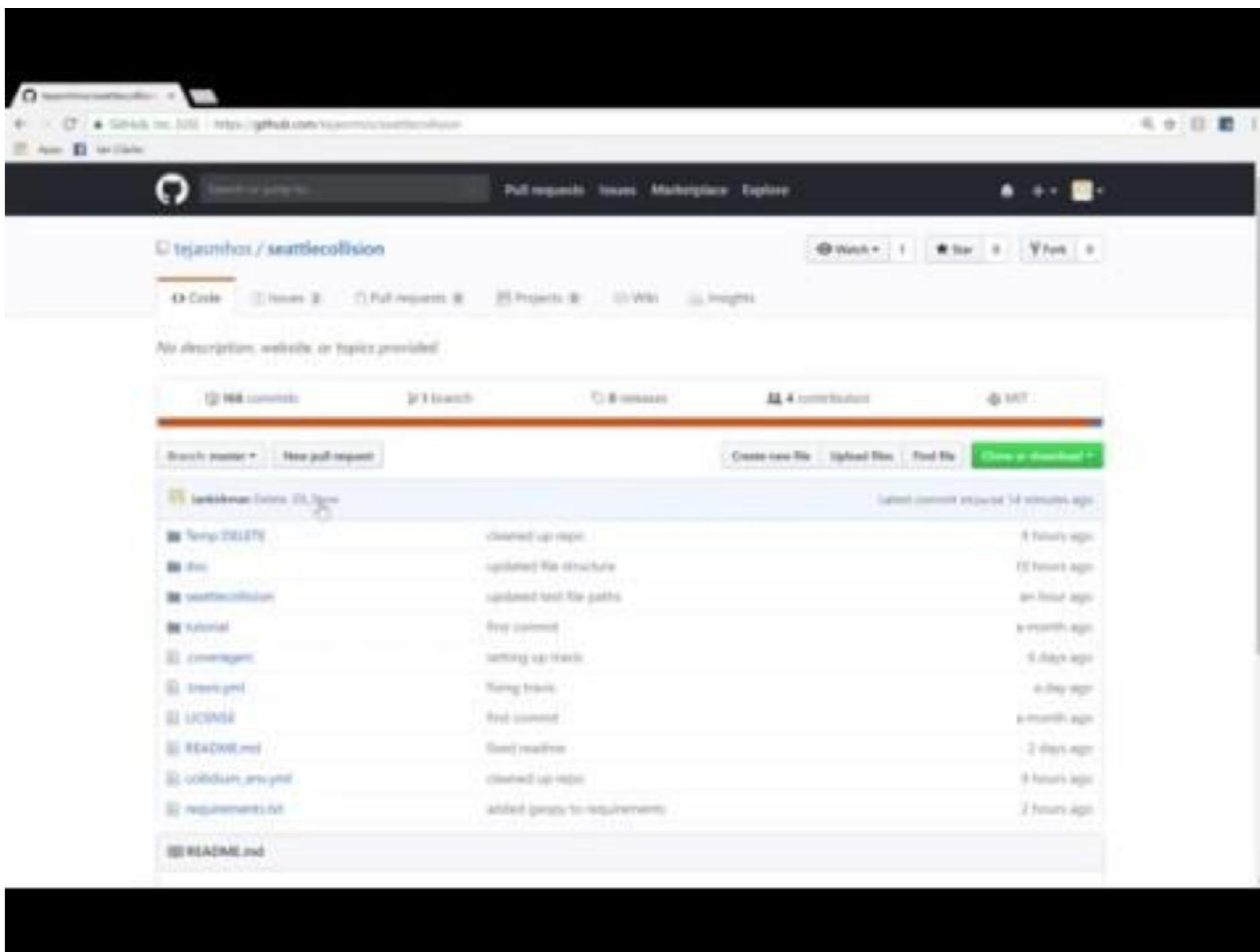
PROJECT STRUCTURE: TRAVIS

- Pylint
- PEP8
- Unittest Coverage
- Dependency Checks
- Currently not so good...

build passing coverage unknown

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PROJECT STRUCTURE: SHABLONA COMPLIANT



PROJECT STRUCTURE: HOW TO PACKAGE?

- We have segregated code used to build our database. We want to include it for reproducibility, but we don't want the user to accidentally execute it because it is time-consuming.
- Our user interface is a Jupyter notebook. How do we highlight this for the user to open the correct file?
- Do we still need an `__init__.py` in our main folder?
- How do we package the virtual environment so the user knows what it is/how to interact with it?

LESSONS LEARNED

- ▶ Don't overcomplicate your code.
- ▶ Became comfortable using GIT.
- ▶ Understood package documentation and testing procedures.
- ▶ Hands on experience with Folium.
- ▶ Tradeoffs between pre-processing and on the fly data processing.

FUTURE WORK

- ▶ Perform more exploration to find better datasets.
- ▶ Structure our project as a website to improve accessibility.
- ▶ Find ways to improve the speed of map updates.

An aerial photograph of a long, dark highway bridge stretching across the frame. The bridge has a solid concrete barrier on the left and a metal guardrail on the right. A single person is walking along the center of the bridge, appearing very small against the vast structure. The surrounding landscape is dark and indistinct.

THANK YOU!