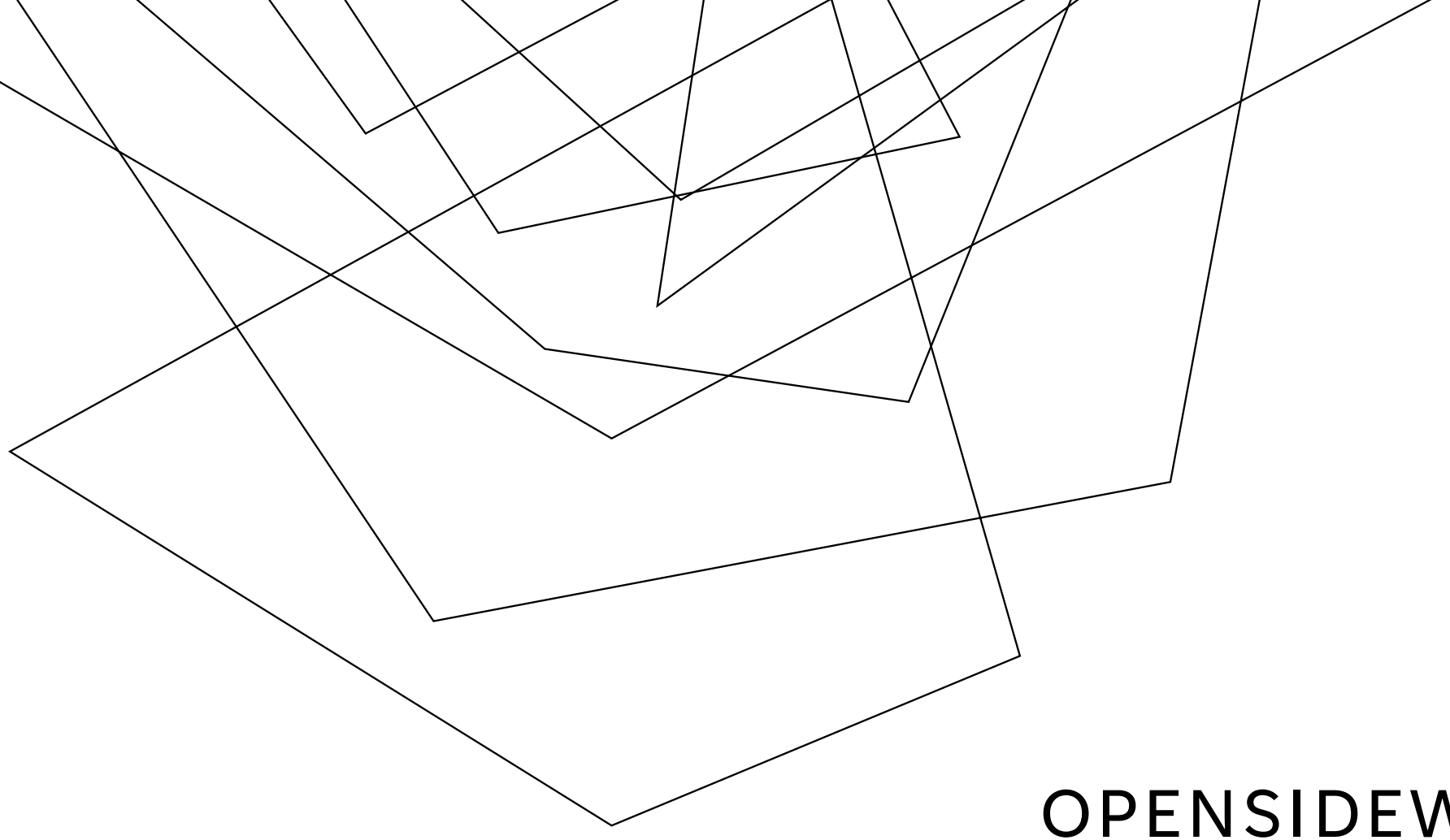


OPENSIDEWALKS CONFLATION

Jolie Tran

AGENDA

Introduction

OpenSidewalks Project Overview

Actions and Challenges

What’s next?

Key Takeaways

INTRODUCTION

Education

Geography: Data Science @ UW Seattle

Expected graduation: March 2024

In-major GPA: 4.0

Coursework: Machine Learning, Database Management, Web GIS Development

Experience

GIS Analyst @ TRAC *since June 2023*

+ Big Data Analytics, Web Development

Social Media Research Intern @ HDSSI *June - August 2023*

+ Qualitative Analysis & Viz, Twitter Data

Undergraduate RA @ LAND *since April 2023*

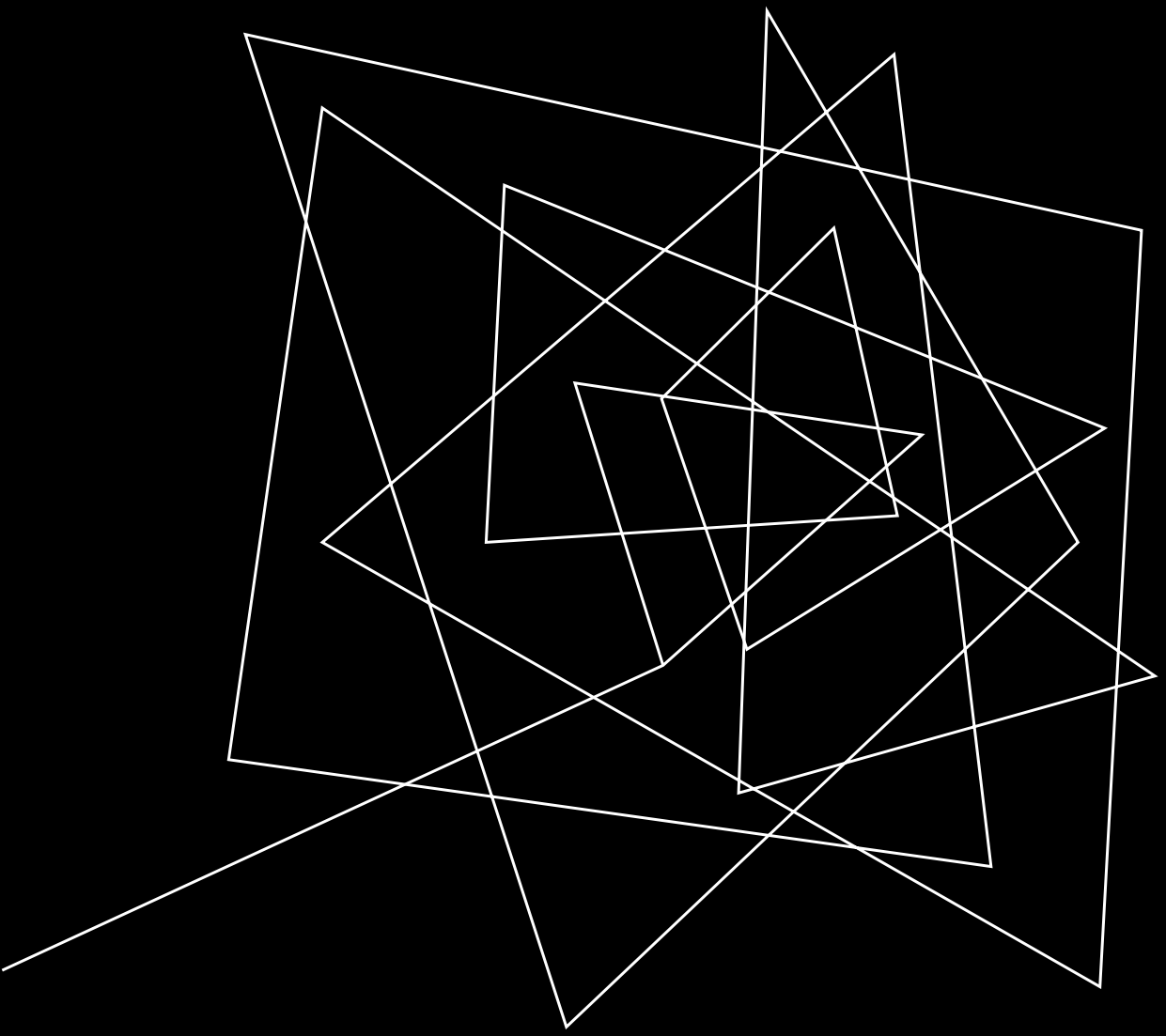
+ Data Processing & Viz, Brain Data (EEG)

Skills

Data: PL/SQL, Python, R, MATLAB

Web Development: JavaScript, CSS, HTML, (Geo)JSON [Deliverables available]

GIS: QGIS, PostGIS



OPENSIDEWALKS OVERVIEW

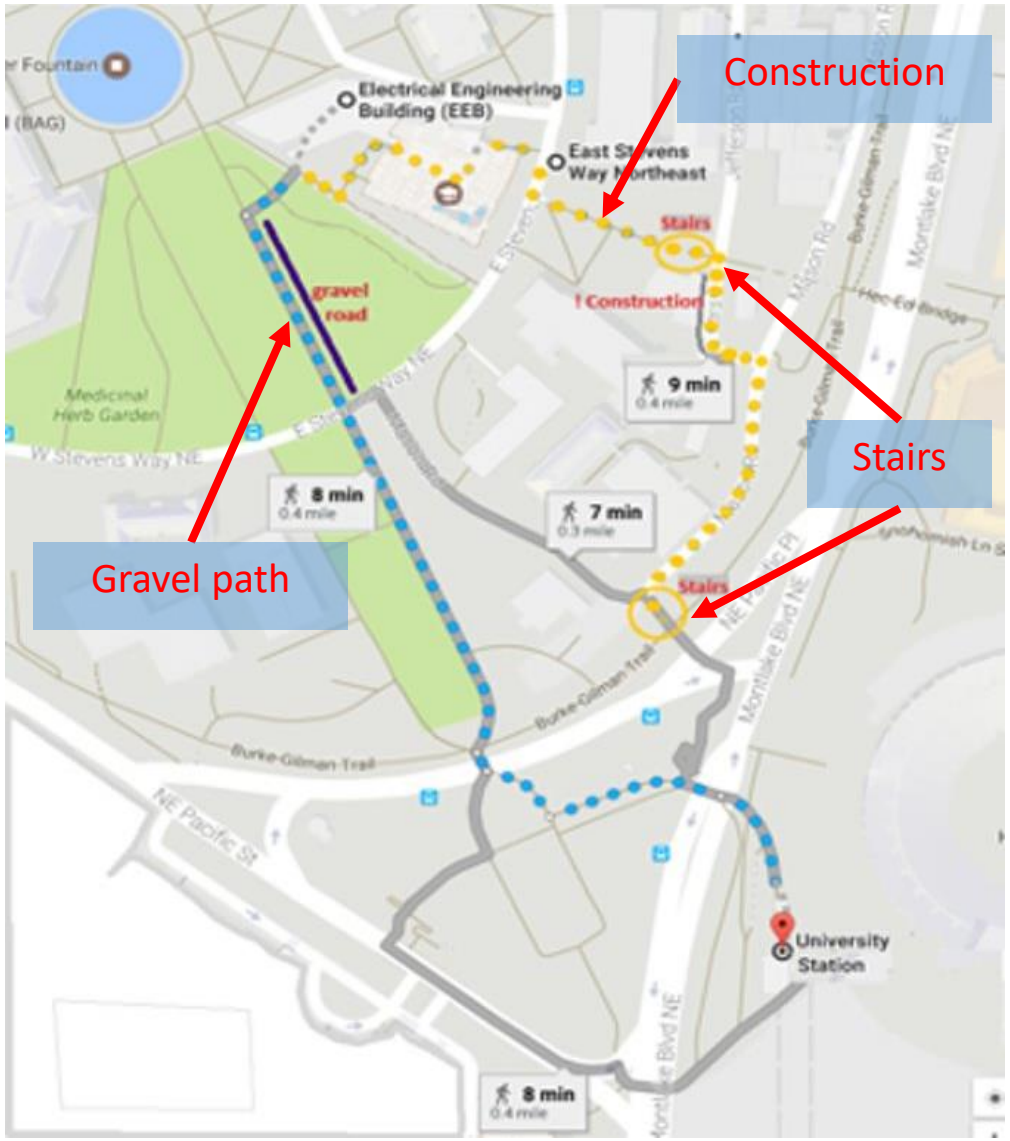
Part of Transportation Data Equity Initiative (TDEI), led by UW's:

- Taskar Center for Accessible Technology (TCAT)
- Washington State Transportation Center (TRAC)

CURRENT SITUATION

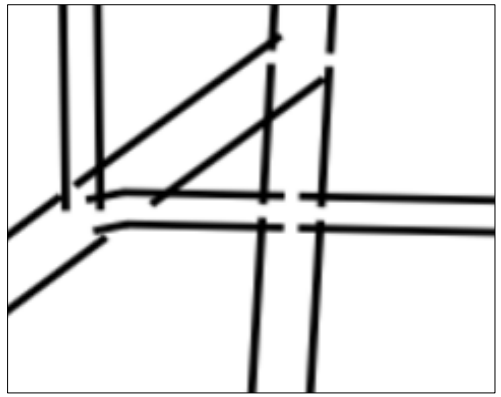
Pedestrian navigation in digital map NOT useful when pedestrian using a wheelchair or pushing a stroller

- Lack information about pedestrian infrastructure (aka sidewalk features)



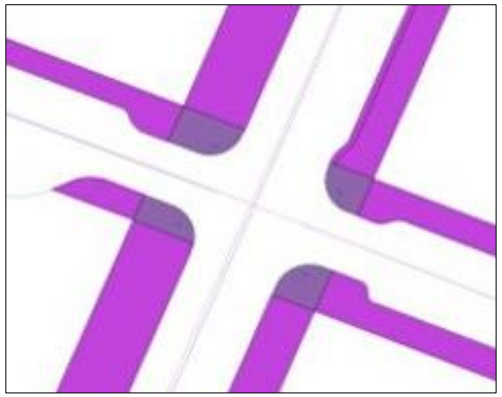
WHERE DATA DO EXIST, THEY ARE NOT IN STANDARDIZED FORMAT!

*Pedestrian data collected from the city's DOT website



Seattle sidewalks

disconnected lines



Portland sidewalks

drawn as polygon

San Francisco curbs

they're just not right

STANDARDIZED PEDESTRIAN DATA
OpenSidewalks (OSW)

What is it?

A standardized, accessible pedestrian data stored in OpenStreetMap (OSM)

Why does it matter?

Pedestrian movements require a **connected AND routable** network with **descriptive attributes**

Now what?

Need a better way to generate sidewalk data and gather detailed information such as sidewalks, curb cuts, crossings, and street furniture.

MY TASK: DATA CONFLATION

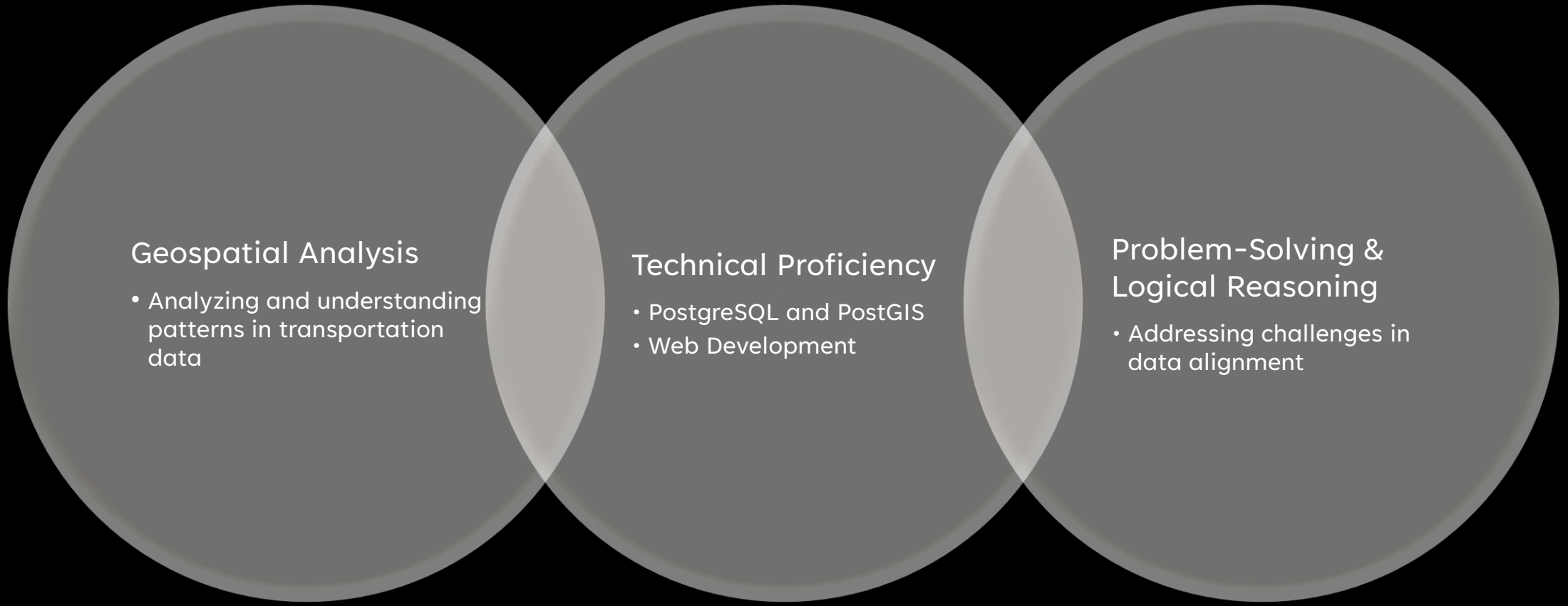
Utilize the DOT data!

Extract those information from the State & City DOT, feed into the OSW through data conflation & suggest the redraw of sidewalks to OSM team where it makes sense

Sounds simple, but it is not!

Every dataset (OSW vs DOT) has its unique representation of the transportation network, and merging disparate data sources demands adeptness in data integration, transformation, and alignment techniques

WHAT DOES IT TAKE TO TACKLE THE TASK?



MY ACHIEVEMENTS

Extract traffic volume from ARNOLD into OSW

- Tested on different neighborhoods (U-District, Downtown Seattle, Capitol Hill, Bellevue)
- Where there exists an ARNOLD, 90% of the time the sidewalk is identified and conflated

Extract sidewalk attributes from SDOT into OSW in Seattle

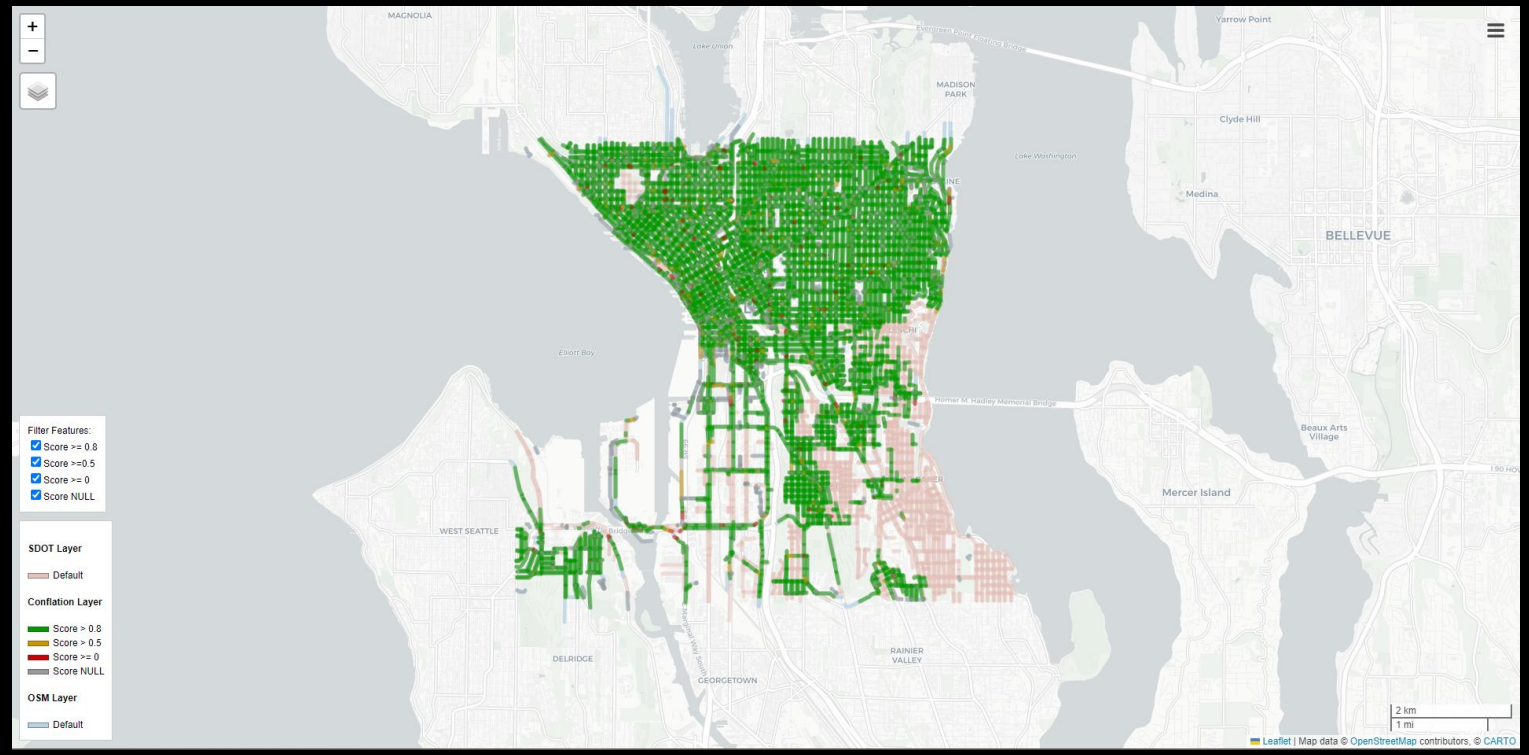
65% (93% of the total length) of the sidewalks in Seattle from OSW conflated, with:

- 90% have the score over 80
- 6% have the score over 50
- 4% have the score over 10

Building a web map interface to review the conflation results

- Interactive web-map, serves as a tool to vet the result
- Pilot with the SDOT-OSW conflation results

WEB DEMO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Score >= 0.8
Score >=0.5
Score >= 0
Score NULL
SDOT Layer
Default
Conflation Layer
Score > 0.8
Score > 0.5
Score >= 0
Score NULL
OSM Layer
Default
MAGNOLIA
MADISON PARK
Yarrow Point
Clyde Hill
Medina
BELLEVUE
Beaux Arts Village
Mercer Island
WEST SEATTLE
DELRIDGE
GEORGETOWN
RAINIER VALLEY
Leaflet | Map data © OpenStreetMap contributors, © CARTO

MY CONFLATION PROCEDURE IS NOT PERFECT! WHY DOES IT FAIL?

NO DATA AVAILABLE!

No data available from the DOT to conflate the OSW against

→ We can’t do much!

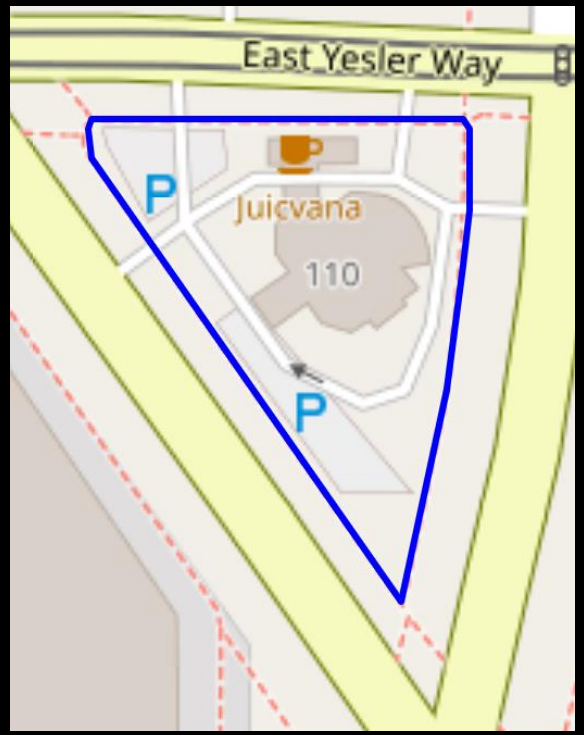
OSW NOT DRAWN RIGHT

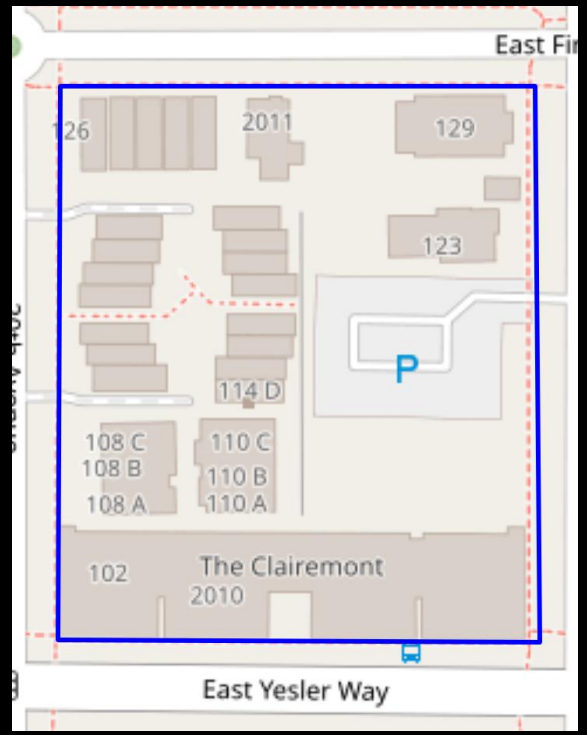
Sidewalks from OSW is not drawn correctly

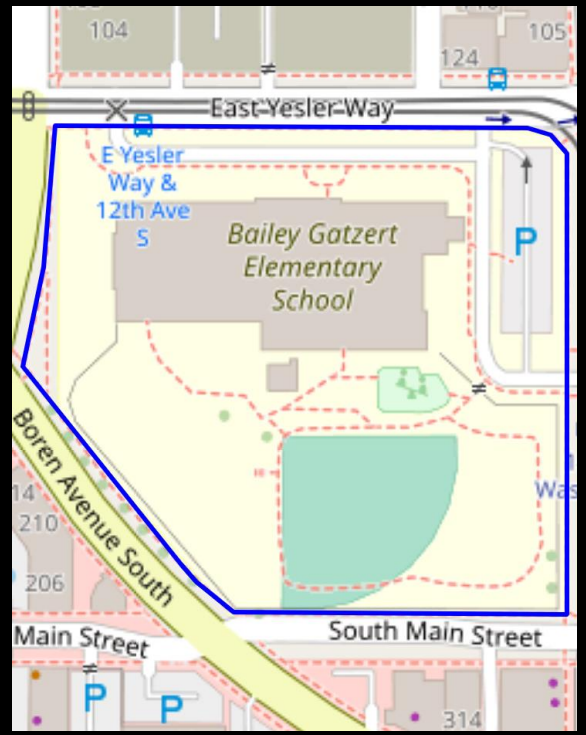
→ We have some control over this but require the redraw of sidewalk in OSM!

FAILED CASE EXAMPLES

You might thing there are several sidewalk segments in each example. However, it is only one segment!







MY SOLUTION TO FAILED CASES

Preprocessing data improve the accuracy of conflation process!

BREAK

Break those sidewalks segments up into smaller sub-segments at the vertices

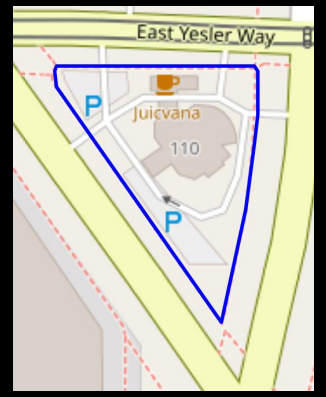
STITCH

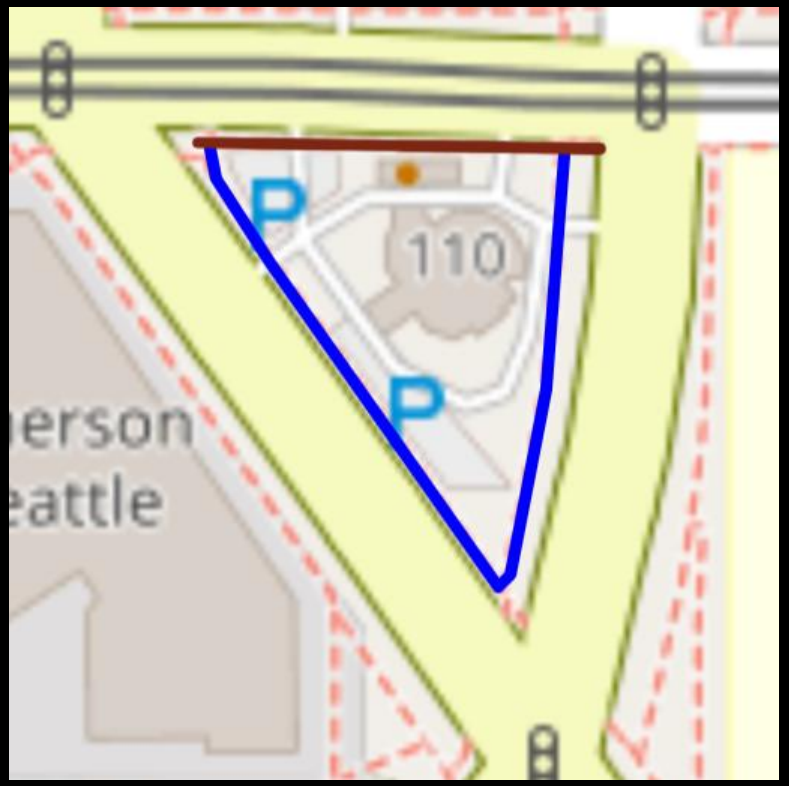
Stitch the sub-segment back where they are adjacent AND parallel to one other

KEEP TRACK

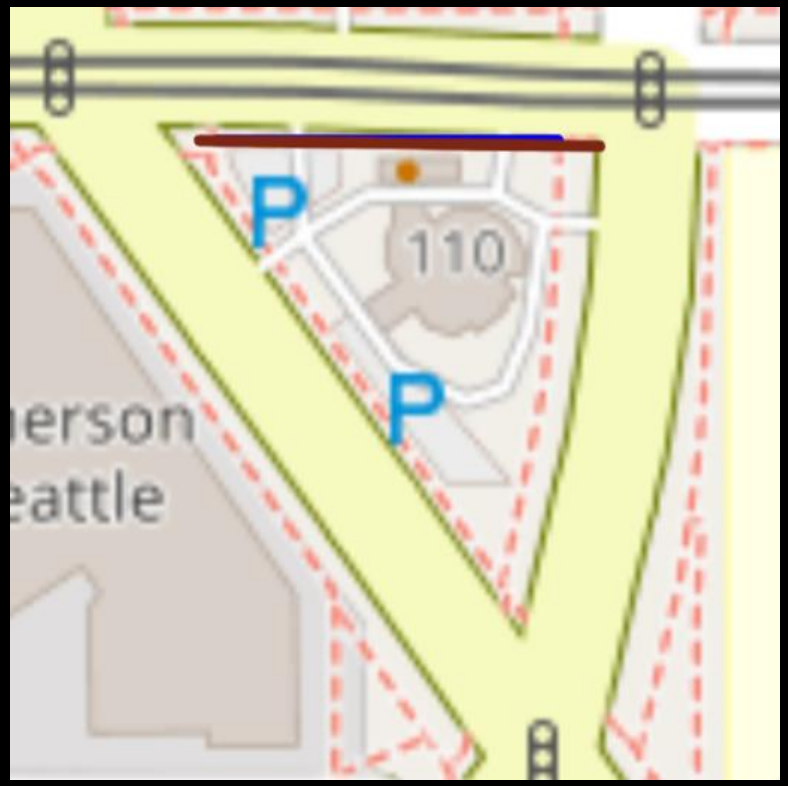
Keep track of the parent-child relationship between the original and processed geometry

COMPARING CONFLATION RESULT



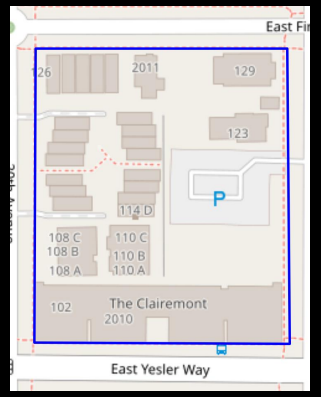


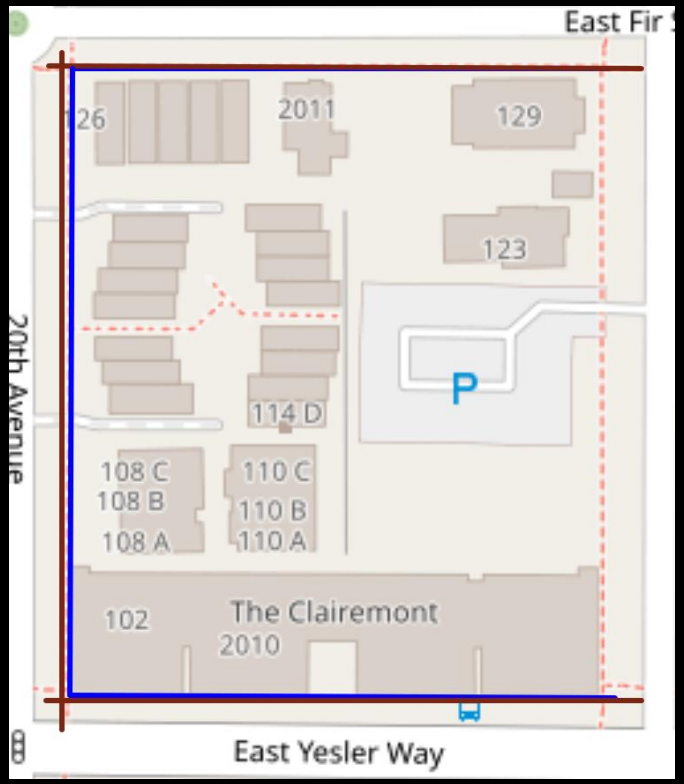
Without processing



With processing

COMPARING CONFLATION RESULT

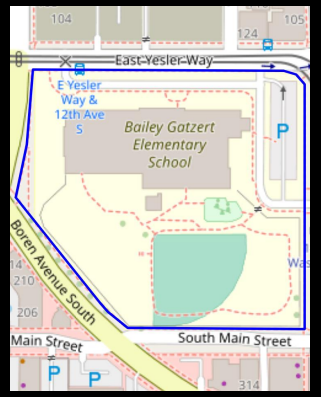


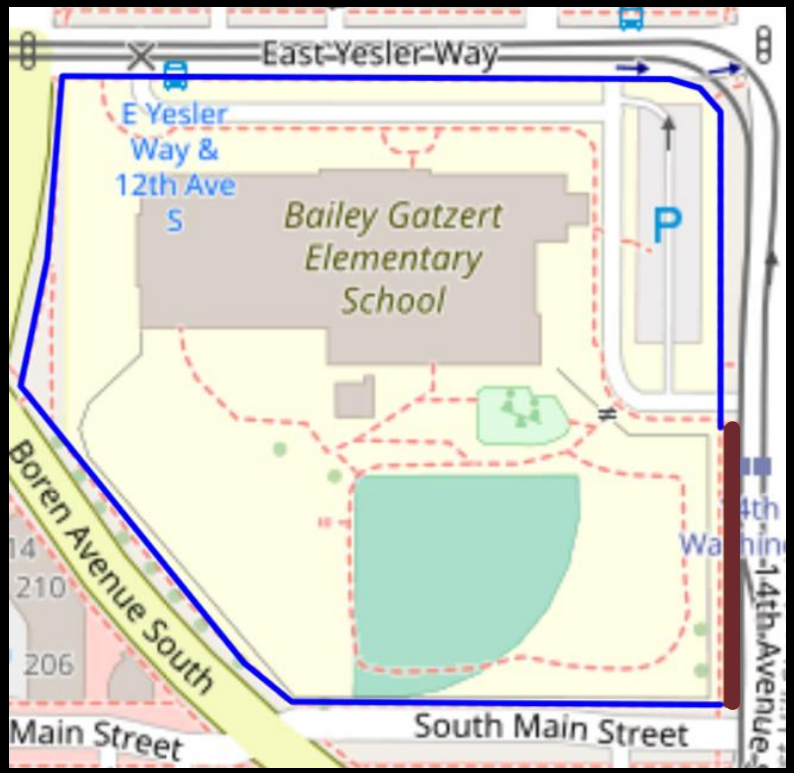


Without processing

With processing

COMPARING CONFLATION RESULT





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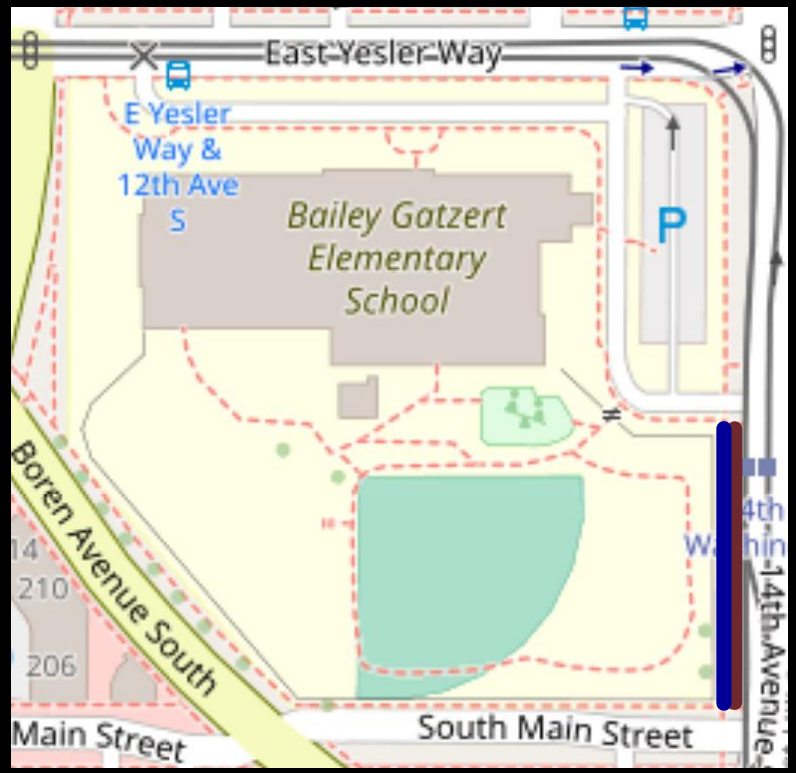


With processing

NEXT STEPS

WEB-MAP INTERFACE

Embrace UI/UX design process, improve the web interface that can be used by people who does not have as deep understanding about the data

Set up the connection to live database instead of local file

REFINING THE PROCEDURE

Refine the current procedure, so it can be scaled up to other cities: Portland (OR), Baltimore (MD)

Improve the scoring system

NEW PROJECT

Take on ORCA project, building dashboards

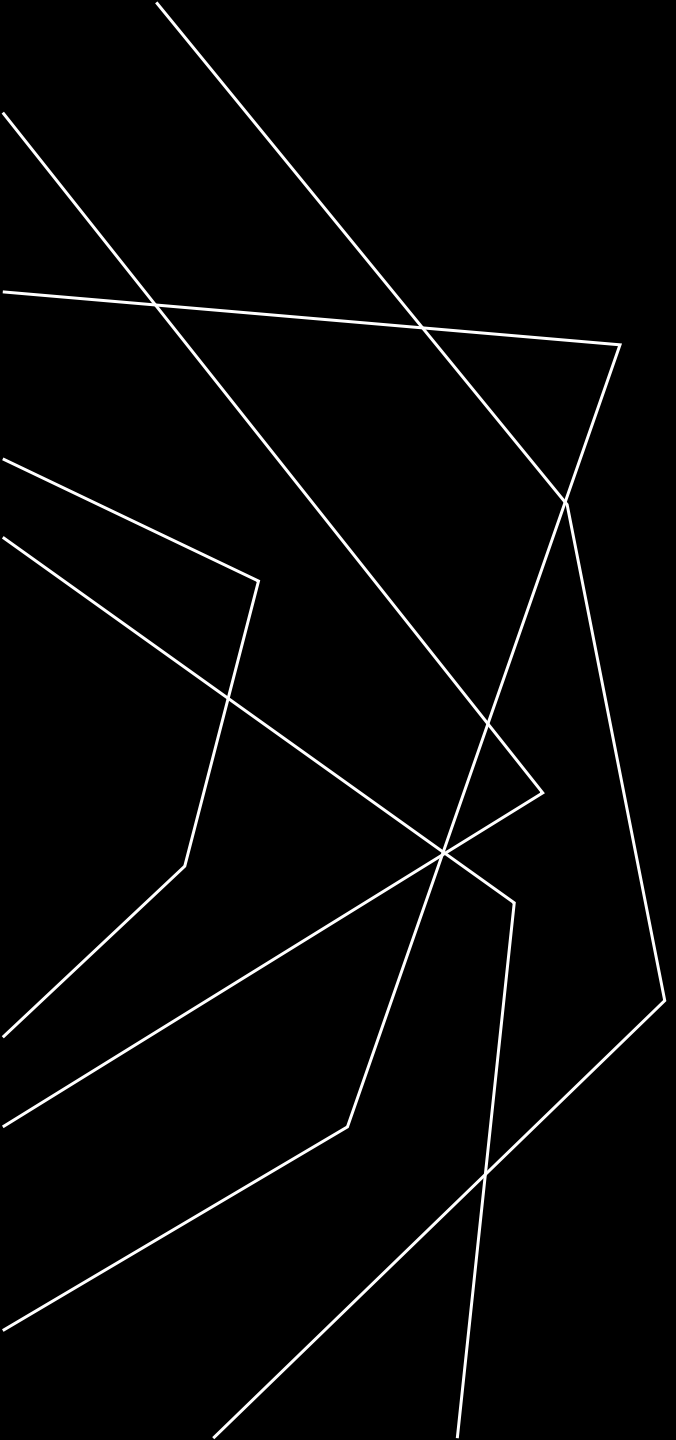
MY TAKEAWAYS AS A GIS ANALYST @ TRAC

Navigating Complex Data Challenges

Support and Growth

Professional Goals

High Standards and Adventurous



THANK YOU

Feel free to ask me any questions!