AccessMap and Global Open Sidewalks

Nick Bolten & Anat Caspi

2016-08-15

Hello!

I am Nick Bolten

I live a double life:

- I'm a PhD researcher in synbio
- I work on AccessMap / OpenSidewalks

Hello!

TCAT The Taskar Center for Accessible Technology

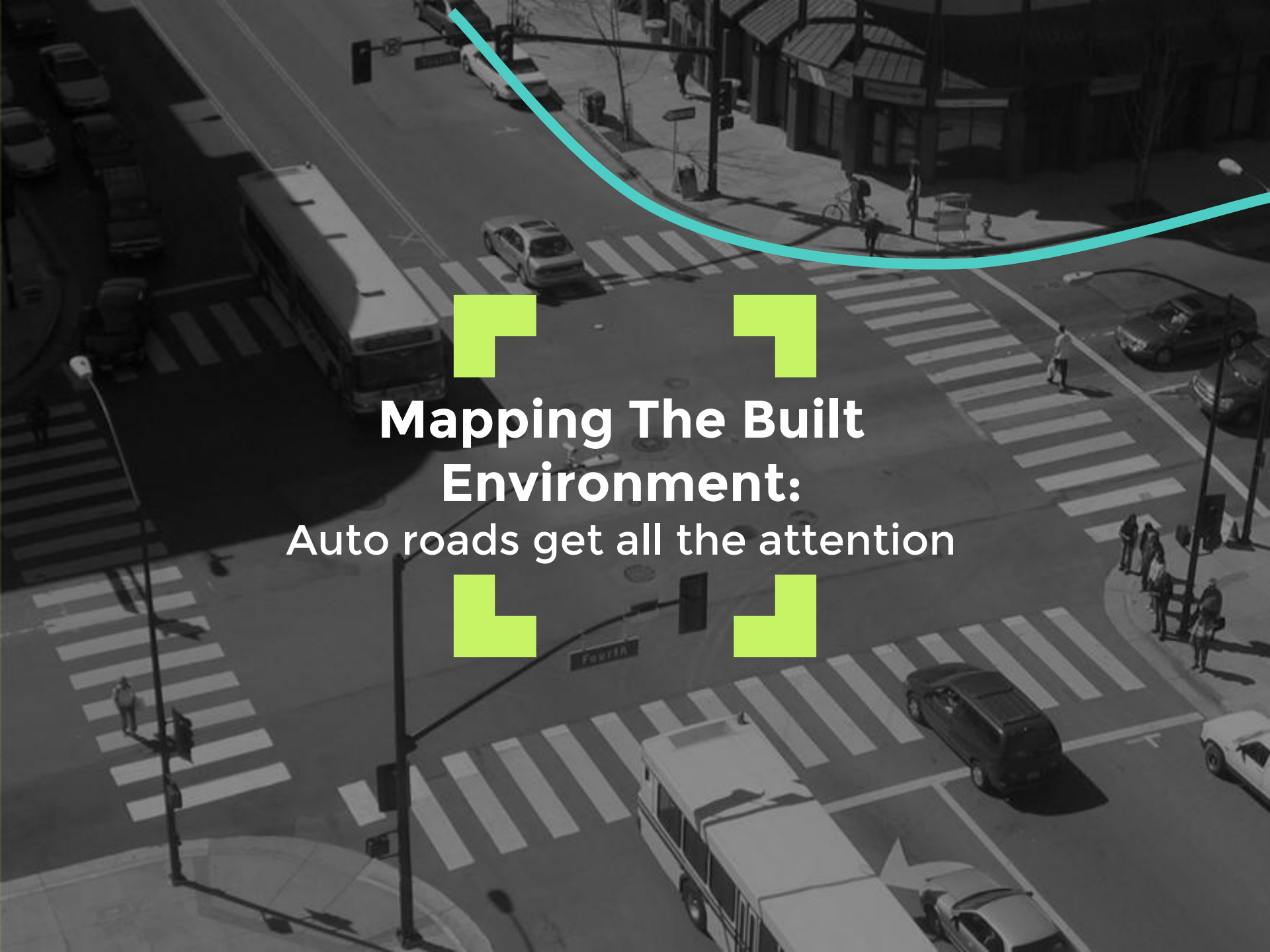
I am Anat Caspi

I direct the Taskar Center for Accessible Technology at UW (a CS&E initiative)

- I work on AccessMap / OpenSidewalks
- I am broadly interested in ways in which collaborative commons can incentivize rapid development of accessible technologies.

Mapping The Built Environment:

Auto roads get all the attention



Mapping The Built Environment:

Auto roads get all the attention

Mapping The Built Environment:

What about the sidewalk?

Outline

- Background: motivated by automated routing-AccessMap
- Problem statement
  - Where should (sidewalk) data live (stakeholders, etc)?
  - What kinds of data do we need to record?
  - What is the data model (specification)?
  - How do we populate the data on a global scale?
- Our approach
  - OpenStreetMap
  - Lots (at least individual sidewalks and curb ramps)
  - TBD!
  - With our own new tool(s)! e.g. OSM Tasking Manager fork.
- Wrap-up

1.

Background: AccessMap

Why mapping the built environment matters

Kevin’s Story

“Using a tool like directions on Google Maps doesn’t really help me get around. Actually sometimes this does more harm than good. I’m sent down streets I can’t cross, or up inclines that are impossible to climb. It can be deeply frustrating.”

54.5 million

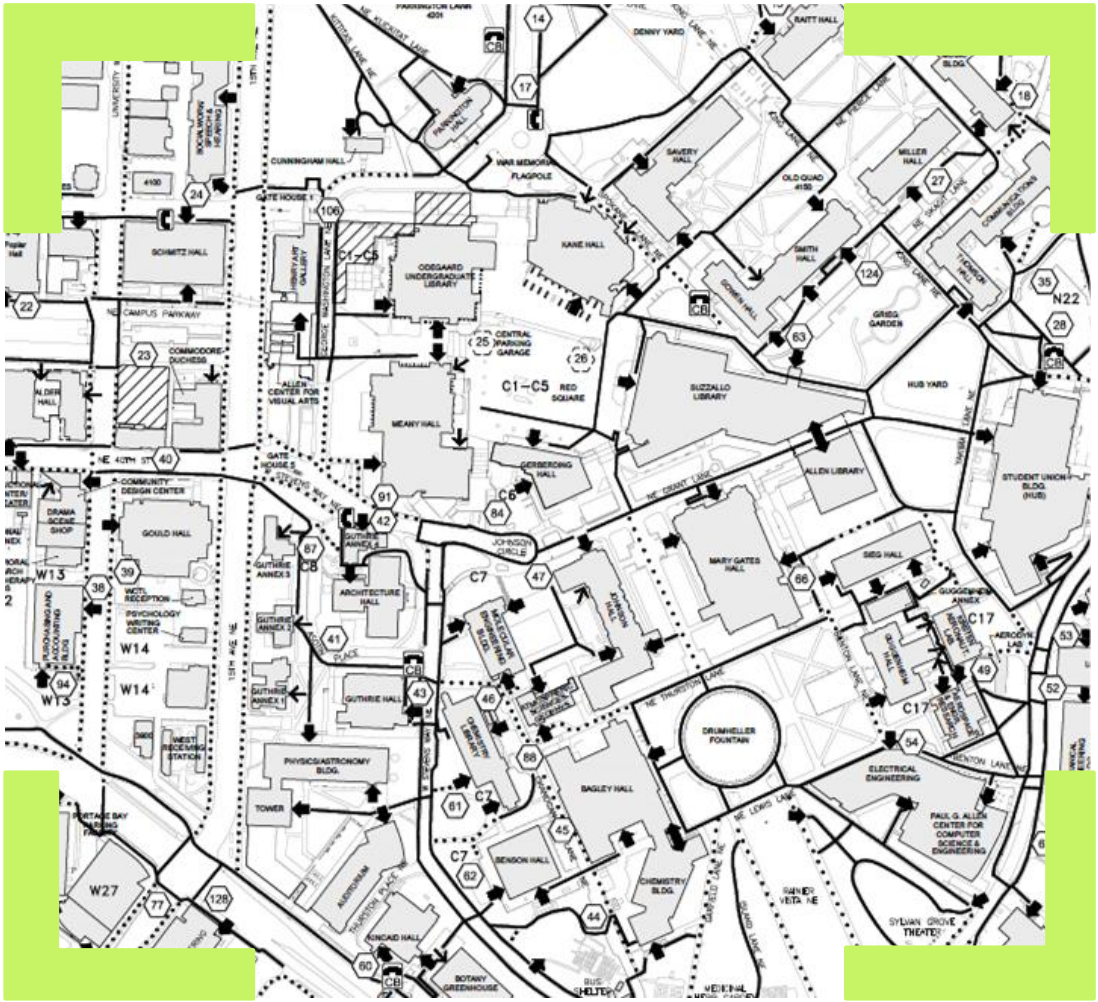
People in the USA need assistive devices or have trouble walking more than a quarter mile.

U.S. Census Bureau, *Americans With Disabilities: 2010, issued July 2012*

Current Accessibility Resources

Static maps that are:

- Cluttered
- Complex
- Out of date
- Non-routable

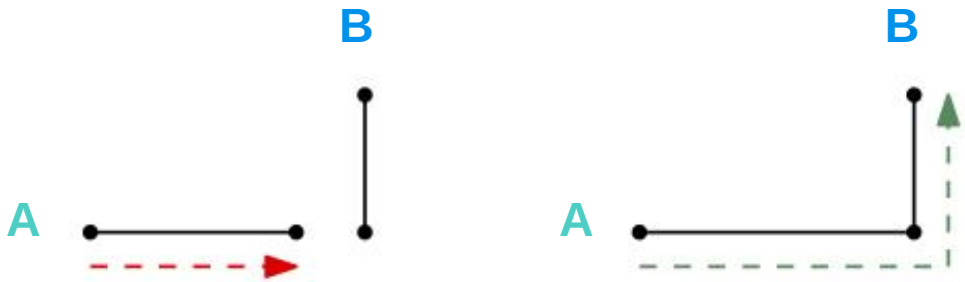


AccessMap Seattle

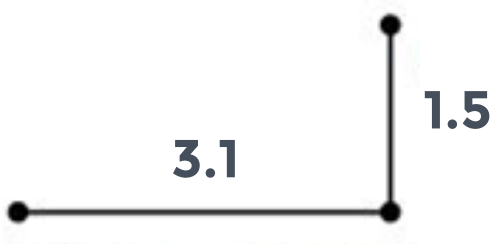
Displays accessibility information about every sidewalk in the city of Seattle using open data on sidewalks, curb ramps, and construction from SDOT, elevation from the USGS, bus stops from OneBusAway.

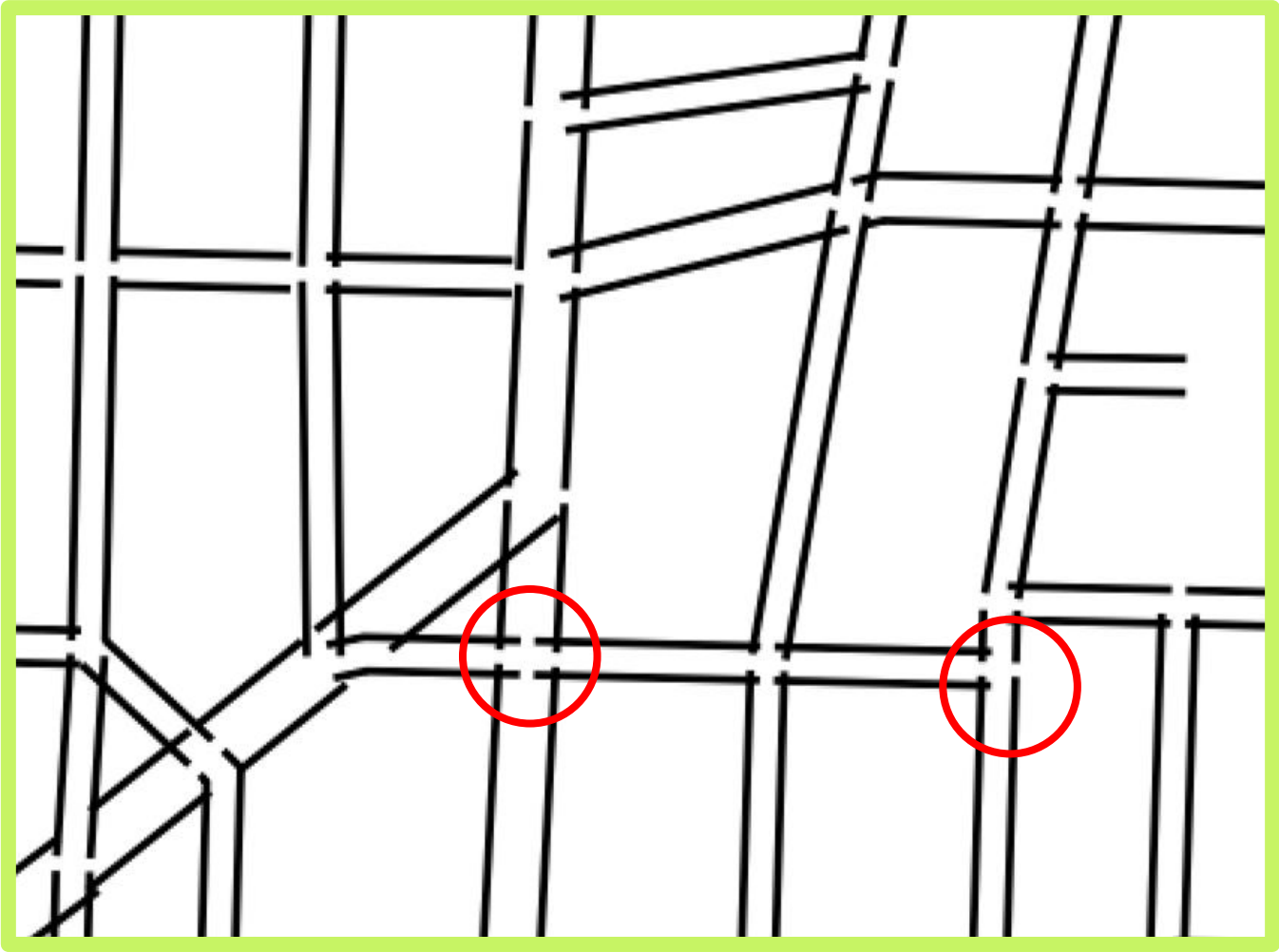
Routing requires two things

Connected graph edges



Costs for traveling on an edge



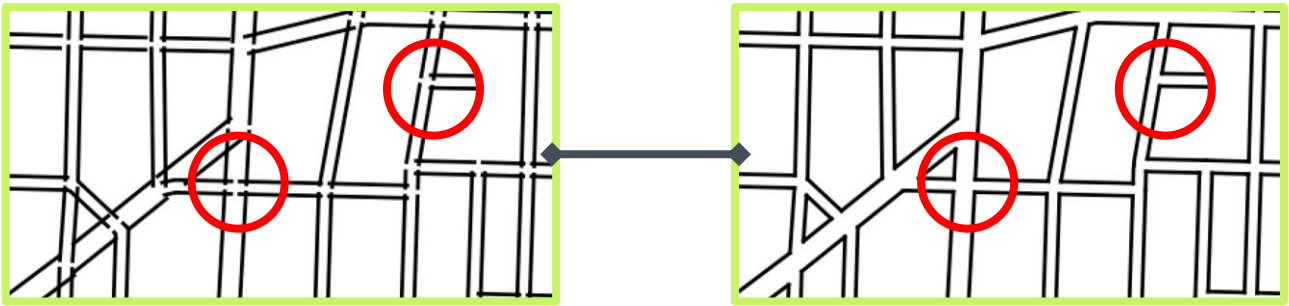


But the data looks like this

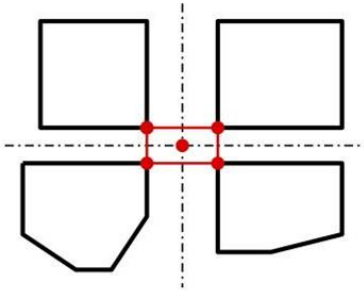
UNIVERSITY of WASHINGTON
eScience Institute
DATA SCIENCE FOR SOCIAL GOOD
SUMMER 2015 - URBAN SCIENCE

DSSG 2015: Routable Sidewalks

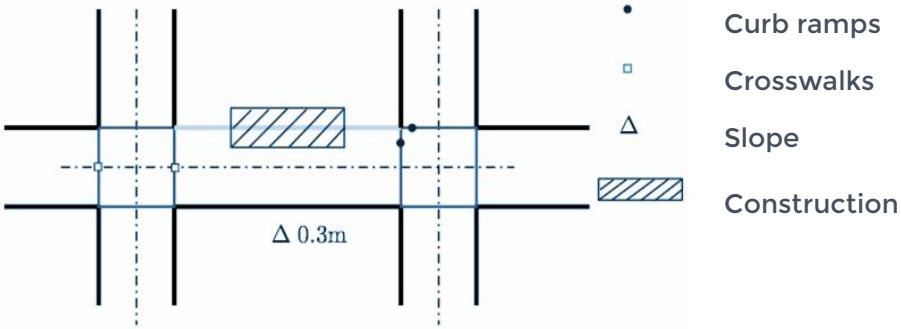
Algorithms to clean 45,000+ sidewalk segments



Generated crossings



Annotated sidewalks



Project Leads:
Nick Bolten
Anat Caspi

ALVA students:
Nick Krasnoselsky
Doris Layman

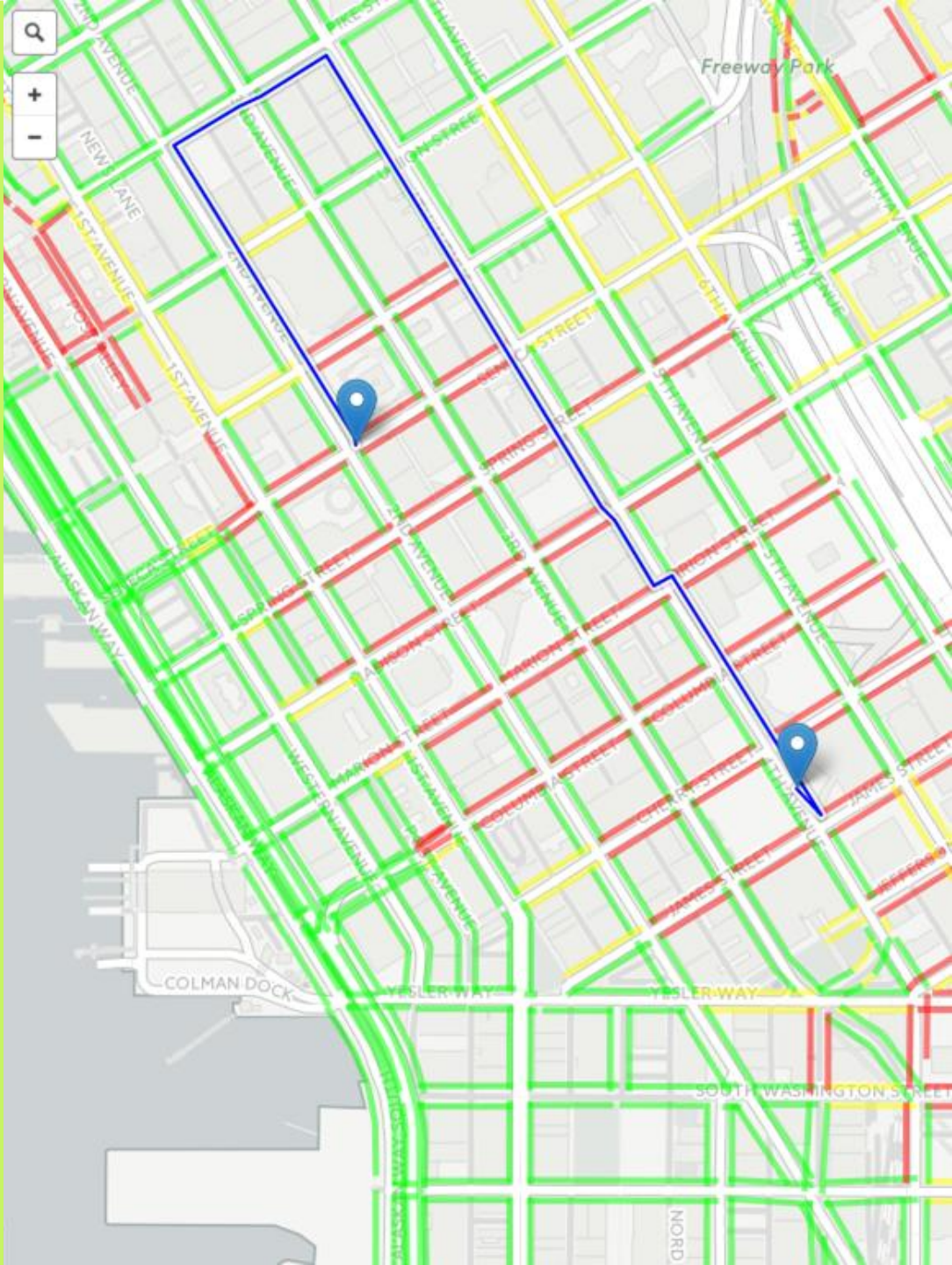
DSSG fellows:
Amir Amini
Yun Hao
Vaishnavi Ravichandran
Andre Stephens

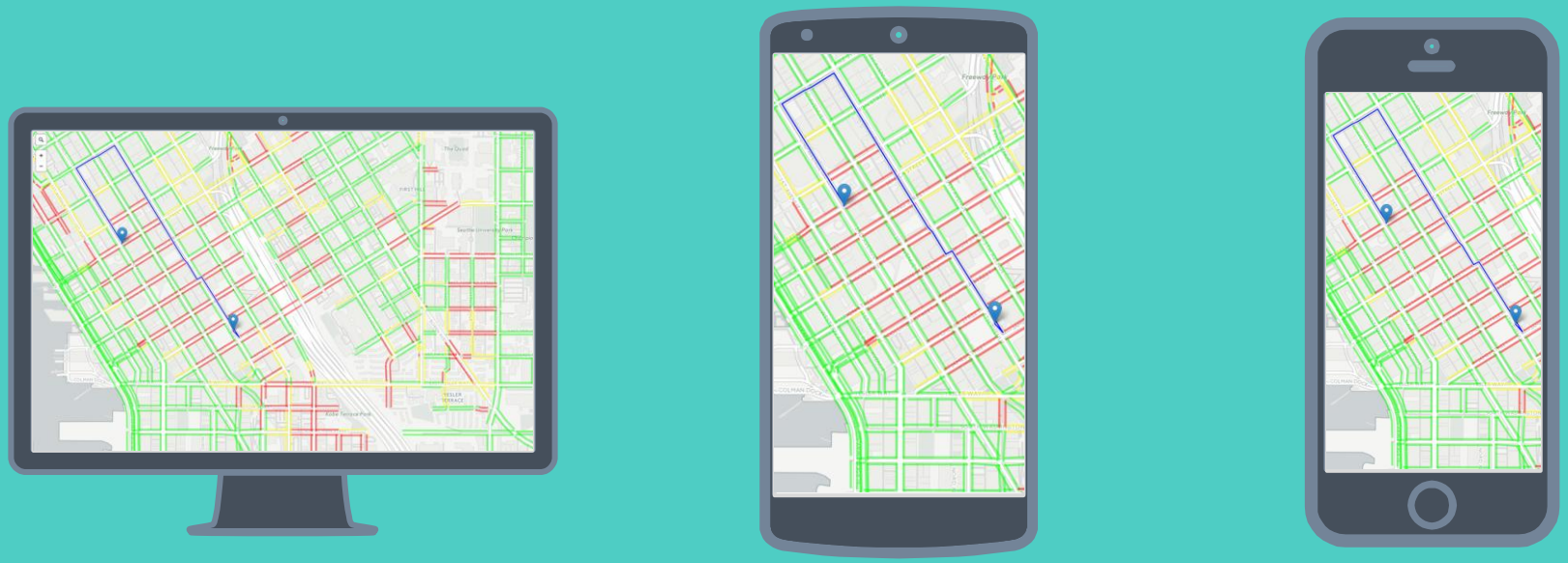
Data Scientists:
Anthony Arendt
Jake Vanderplas

Routing!

- Minimizes steepness and distance over all possible paths
- Note: NOT the shortest path!

Cost function needs improvement. Please fill out our survey!





As a result

We're able to start releasing apps that help people with limited mobility find routes tailored to their needs

2.

Problem Statement

- A home for data
- Needed data
- The data model
- Getting the data

Where should this kind of data live?

Municipal government
Has to keep records to do planning, including new construction and ADA compliance.

Everyone
Owns this data - it's public domain. We should be able to access it and give feedback when it's incorrect.

Researchers
Need high-quality, up to date data for their analysis to be accurate

Software Developers
Need accurate, reliable sources of data, and prefer not to DIY everything.

Where should this kind of data live?

OpenStreetMap (OSM)!

Municipal government
Has to keep records to do planning, including new construction and ADA compliance.

Everyone
Owns this data - it's public domain. We should be able to access it and give feedback when it's incorrect.

Researchers
Need high-quality, up to date data for their analysis to be accurate

Software Developers
Need accurate, reliable sources of data, and prefer not to DIY everything.

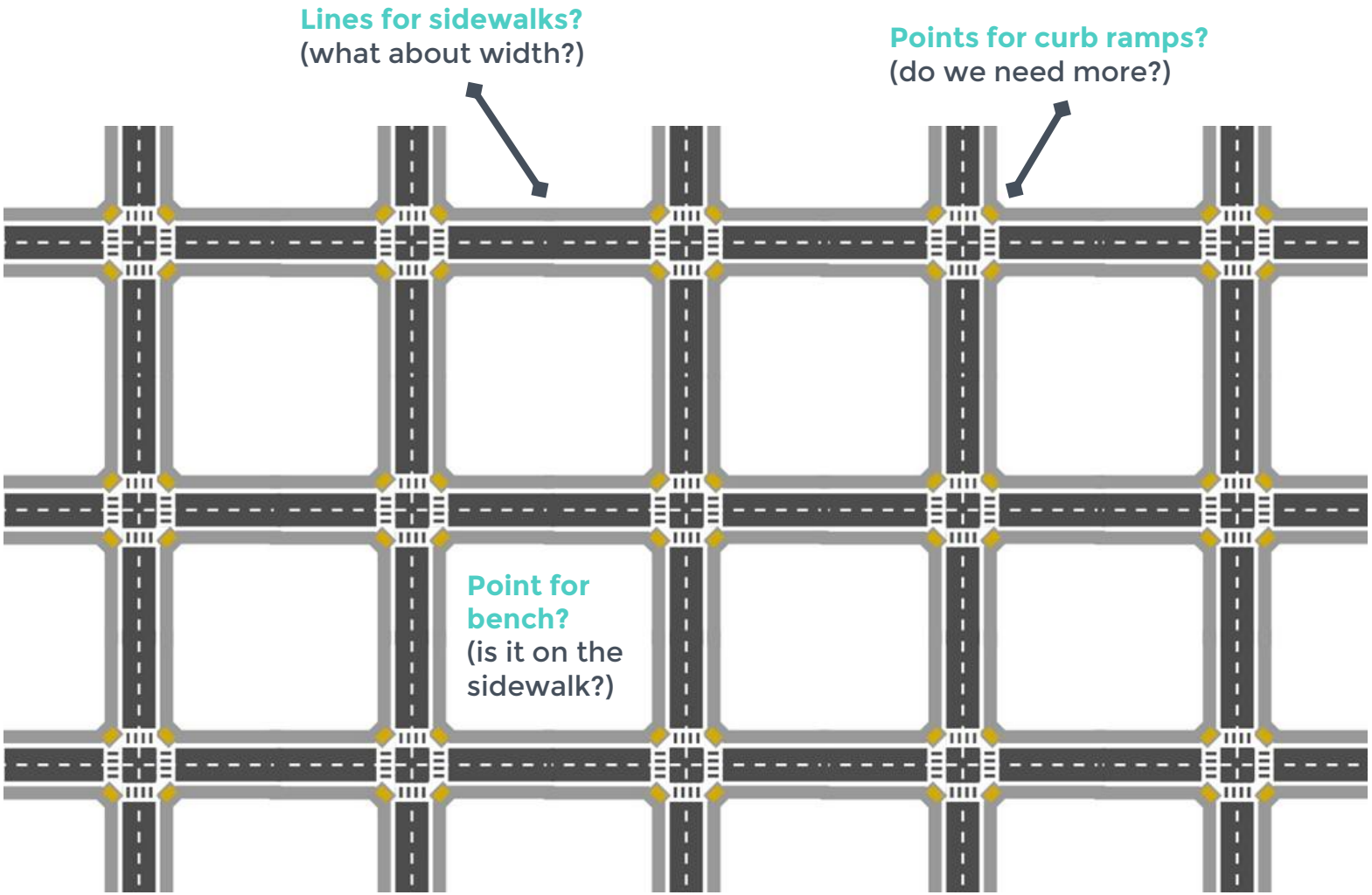
Recording streets in OpenStreetMap

Just draw streets where they are

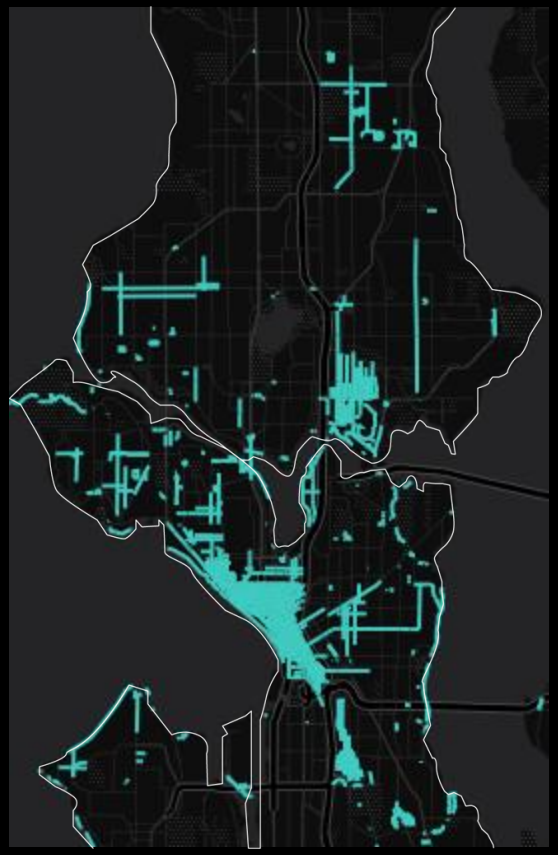
What kind of data do we need?

Sidewalks	Curb Ramps	Crossings	Street furniture	...
Exact shape	**Location**	**Exact shape**	**Benches**	
Width	**Type**	**Crosswalk?**	**?**	
Surface		**Low-vision?**		
Curb				

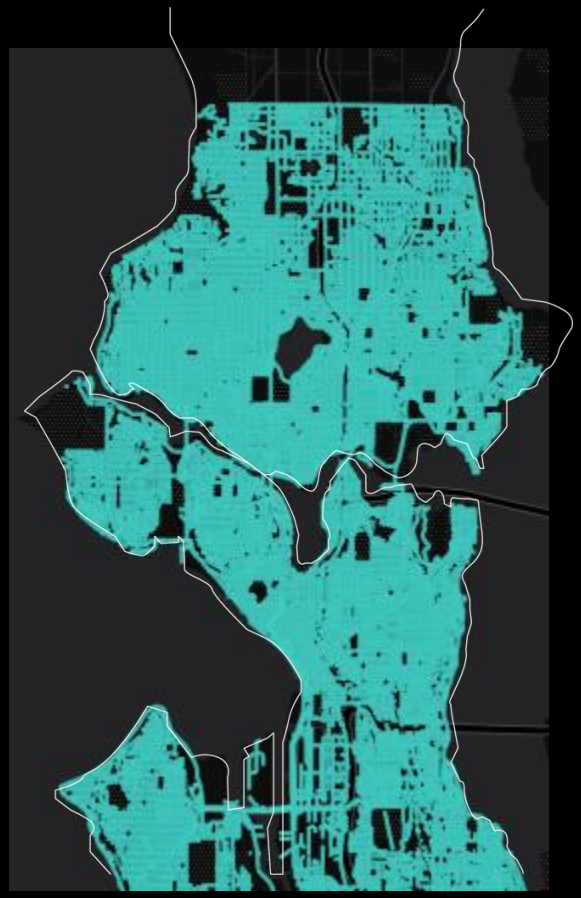
How should we model that data?



The ‘import’ opportunity: SDOT



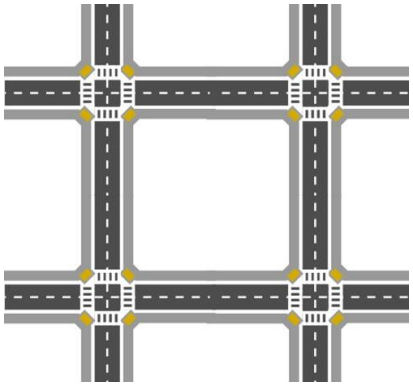
Current OSM sidewalk coverage



Sidewalk coverage with Seattle open data

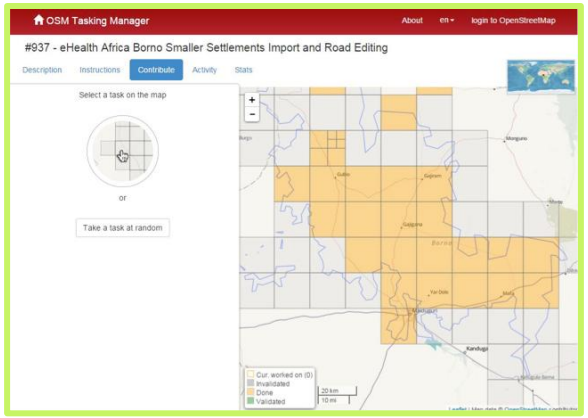
How do we get the data?

We'd like data according to this glorious new specification, please!

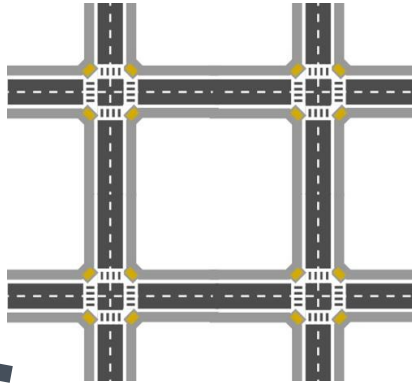


Okay! Here's incomplete records in 8 different file formats

How do we get the data?



Import tool



Goals

- Develop a data model for sidewalks + related data in OpenStreetMap.
- Present that data model to the community (SOTMUS, official online mailing lists).
- Develop a import tools (likely based on the Tasking Manager) that consumes different data formats.
- Import data from Seattle, Denver, and Savannah (GA) into a private (or public!) OSM data layer.
- (Stretch goal: analyze the data)

3.

Results

What we've done this summer

What we've done

- Settled on a data specification
- Went to the SOTMUS conference and gave a talk (and met cool like-minded people)
- Proposed our specification using the official channels: mailing lists
- Ran a map-a-thon to map UW campus according to our spec and developed customized tooling (that are also part of the import tool)
- Acquired important new stakeholders
- Have begun the import process (!)

How is sidewalk data currently being mapped?

Recording streets in OpenStreetMap

Just draw streets where they are

Recording sidewalk data in OpenStreetMap

Sidewalks

Sidewalks hidden as a tag of the street:
`sidewalk=left/right/both/no`

Recording sidewalk data in OpenStreetMap

Kerb ramps

Add a new point,
label as crossing,
label as a kerb.

Sidewalks as lines

Crossings as lines

Kerb-cuts as points

An expressive and intuitive solution
with a minimal set of changes

E Harrison St & 12th Ave E Seattle, WA

Gave a talk at SOTMUS 2016

Presented our specification to the community (opensidewalks.com)

Some grumpy responses:

"I'm not a friend of separately mapped sidewalks but I can live with people mapping them if they desire."

- Frederik

Mostly friendly / useful responses:

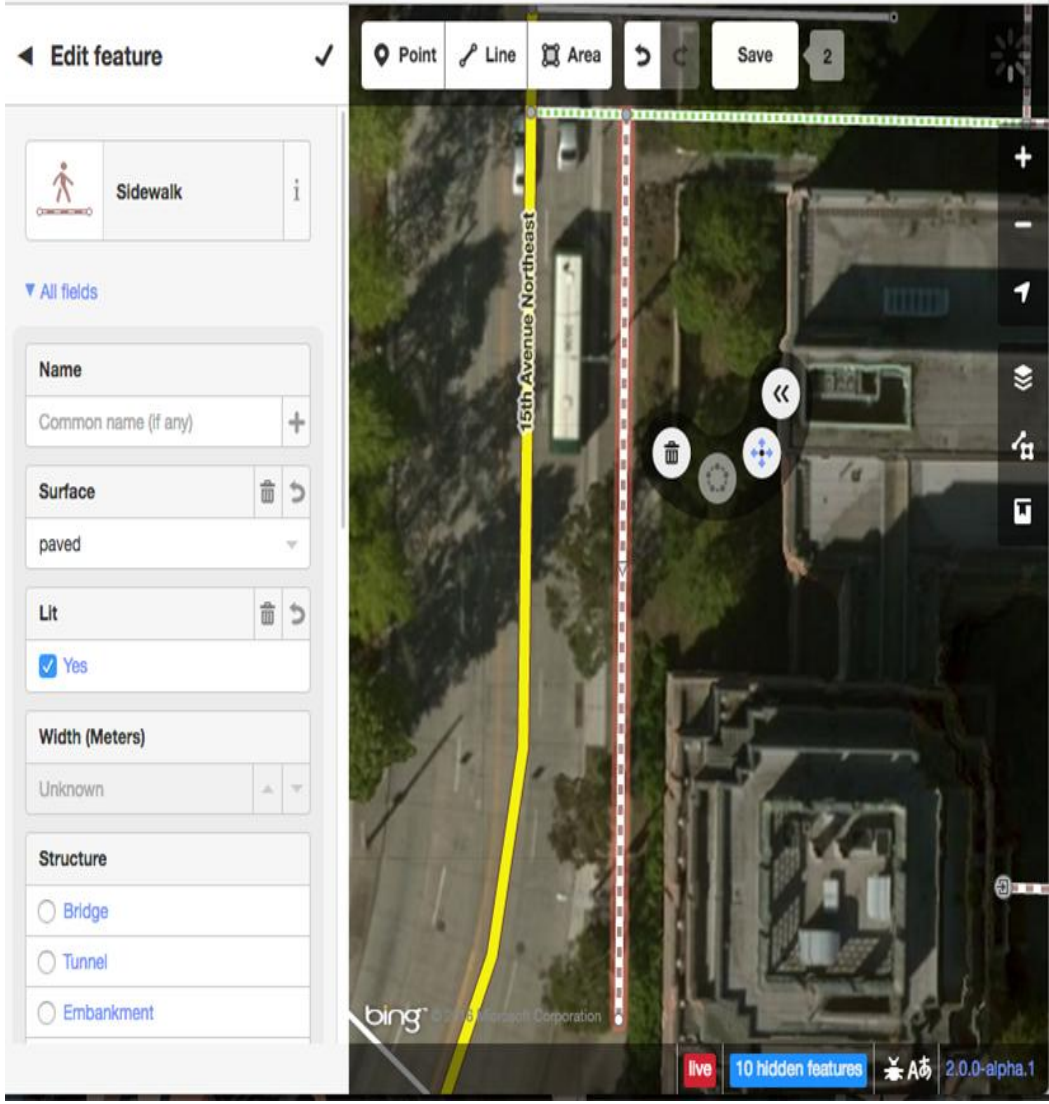
"I completely agree with the current lack of consistency and would like to encourage the search of better description and network approach."

- François

We had a Map-a-thon!

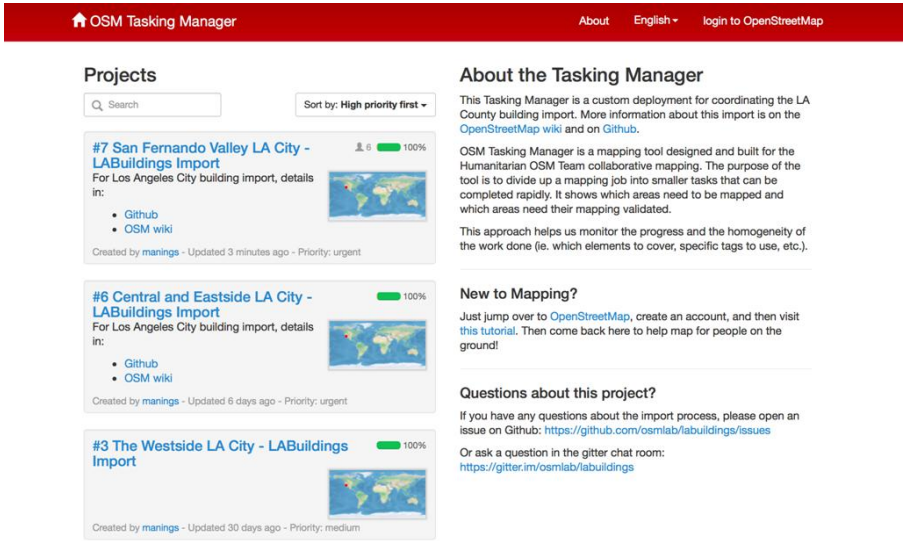
Custom iD Editor

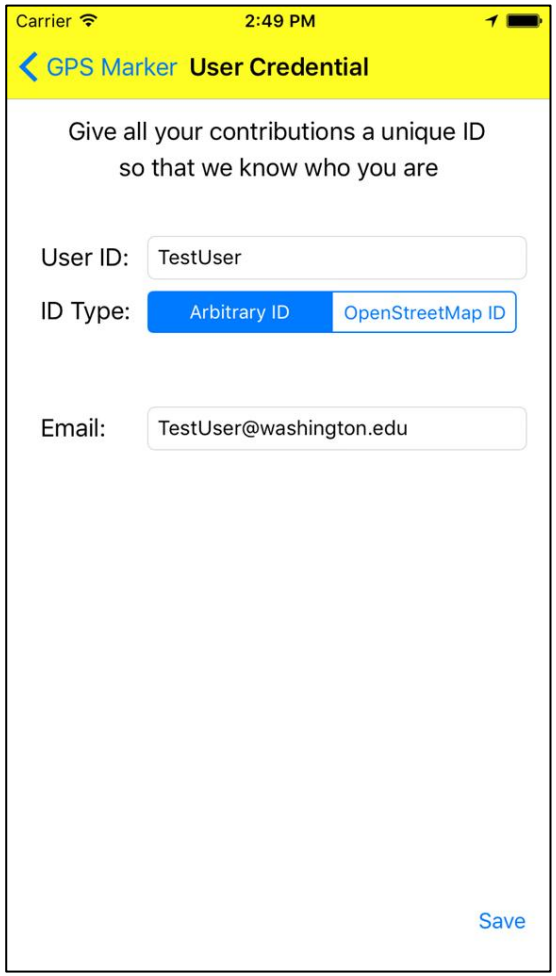
- Forked from existing iD Editor
- Added custom presets
- Running on AWS

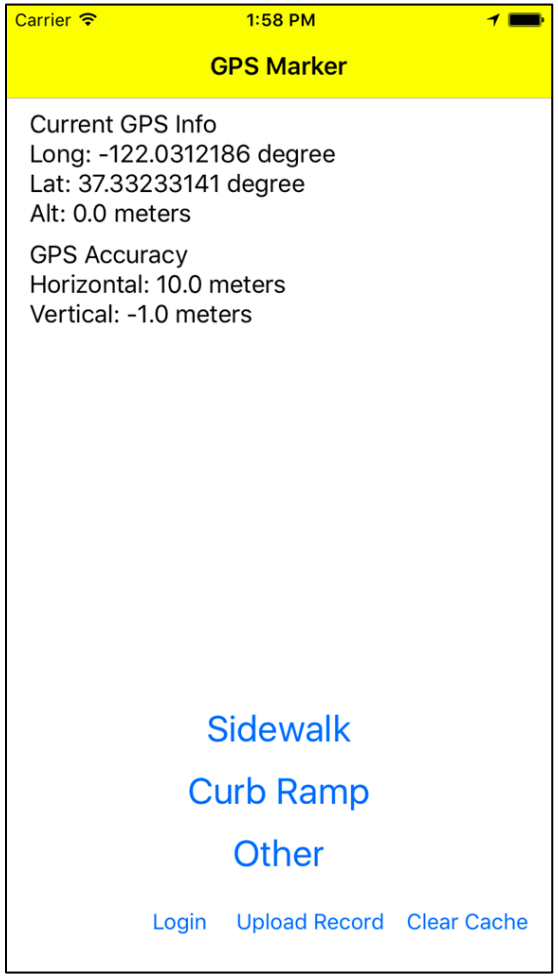


Custom Tasking Manager

- Forked from existing Tasking Manager
- Launch custom iD Editor
- Setting up seattle sidewalk import
- Running on AWS







Crowdsource contribution app

We built a simple app that allows people to trace sidewalks while they walk through the urban environment.

Import: in progress

4.

Going Forward

What we're doing next

AccessMap Seattle

Will use OSM instead, enable users to contribute back data - is there really a curb ramp at that intersection?

Will begin to have a global impact.

KC Metro

ADA compliance group will begin testing OSM-based surveys - they pay people to go check on accessibility conditions, will use OSM instead and now that data will go back to the community.

TriMet

Is evaluating our model for use in the Portland area.

PSRC

Is interested in using OSM for sharing sidewalk data across the Puget Sound region

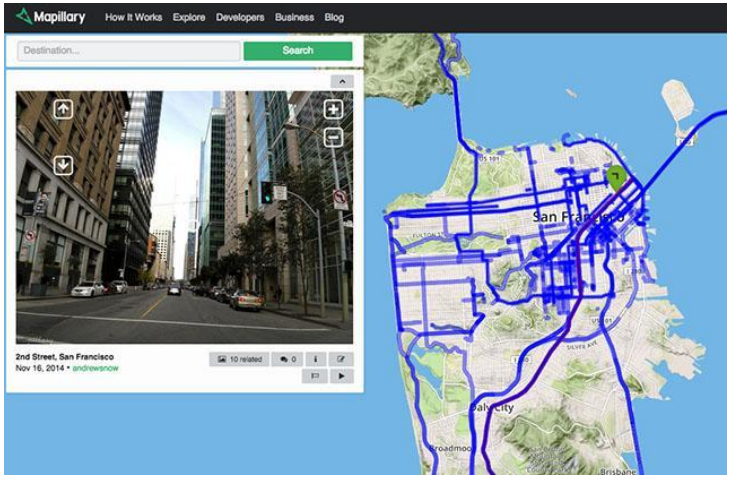
The future of open mapping: massive, passive data

Drones

open drone map

Phones

Mapillary



Thanks!

Any questions?

TCAT The Taskar Center for Accessible Technology

UNIVERSITY of WASHINGTON

eScience Institute

DATA SCIENCE FOR SOCIAL GOOD