At the Intersection of Disability Justice, Pedestrian Safety, and Health

TRB workshop 2024
Standing Committee on Accessible Transportation and Mobility

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Judy
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Thank you to our team:
Valerie Novack, Xiaojun Qi, Camille Tirschner

Welcome!

1. Introduction: Why disability justice, pedestrian safety and health?
2. Section 1: Integrating accessibility planning with health planning, safety planning, environmental planning
3. Break
4. Section 2: Interactive tools for planning accessibility

HUMAN LABELING

Grab five post–its

Find a person

Why are you here?

Who do you know that can't drive or doesn't have reliable access to a car?

Write down response in 2–5 words

Stick it on shirt

Repeat until you're out of stickers

LIVE DEMO!

HUMAN LABELING

Grab five post–its

Find a person

Why are you here?

Who do you know that can't drive or doesn't have reliable access to a car?

Write down response in 2–5 words

Stick it on shirt

Repeat until you're out of stickers

PRESENTING LABELS

Need two volunteers
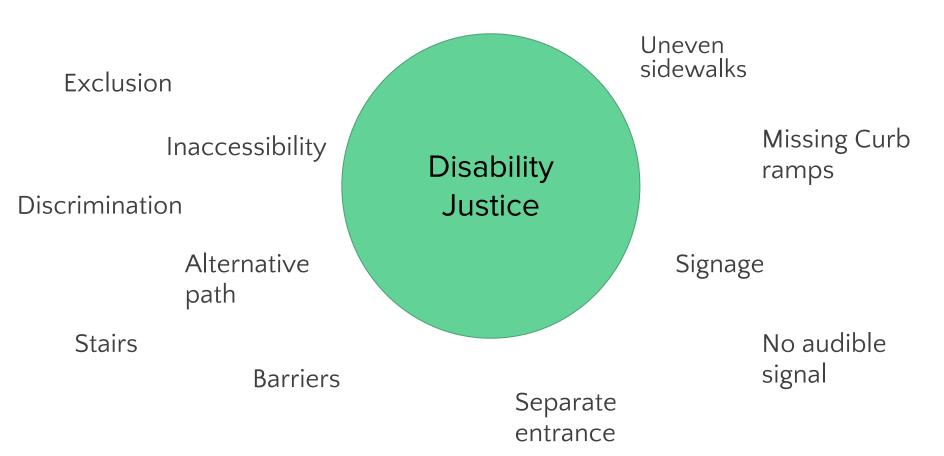
Present each other's stories
based on their labels

(An inductive analysis technique!)
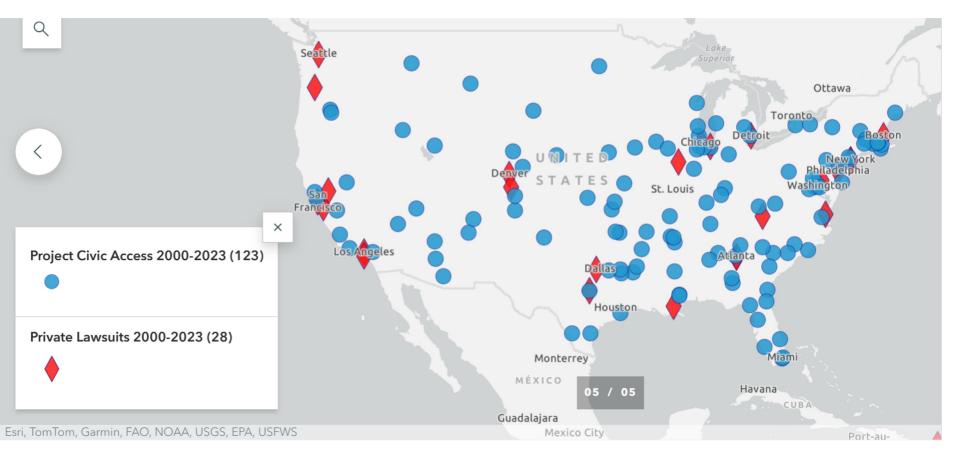
Repeat 3x...

BY THE WAY, WHO'S HERE?

INTRODUCTION

Exclusion

Inaccessibility

Discrimination

Alternative path

Stairs

Barriers

Disability Justice

Uneven sidewalks

Missing Curb ramps

Signage

No audible signal

Separate entrance

Lawsuits/settlement agreements 2000-2004

Project Civic Access 2000-2004 (37)

Private Lawsuits 2000-2004 (1)

Lawsuits/settlement agreements 2000-2014

Lawsuits/settlement agreements 2000-2023

Project Civic Access 2000-2023 (123)

Private Lawsuits 2000-2023 (28)

INTRODUCTION -2

Disability Justice

INTRODUCTION - 3
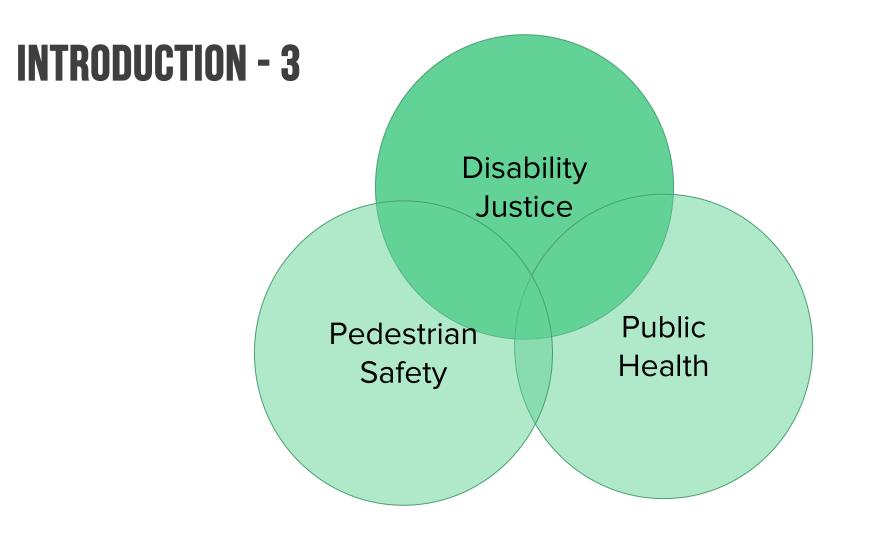
Federal/National Policy and Initiatives: A Catalyst to Address Sidewalk Accessibility

Judy L. Shanley, Ph.D.
Asst. Vice President, Education & Youth Transition
National Director, Transportation & Mobility
Co-Chair, AME50 Committee on Accessibility and Mobility

National Center for Mobility Management

easterseals

Federal Policy Catalysts

- Federal Highway Administration (FHWA) recent dear colleague letter
  - Overview of the funding sources that can help implement ADA Transition Plans
  - Updated website will provide direct links to state DOT ADA Transition Plans and the inventory of structural barriers
  - Federal Transit Administration
    - Coordinating Council on Access and Mobility (CCAM) Strategic Plan. Goal 2: Promote Safer and Accessible pedestrian networks – such as Complete Streets and Vision Zero.
  - Discretionary grant programs
    - All Stations Accessibility Program (ASAP)
    - Innovative Coordinated Access and Mobility Grant Program

There are also Community Programs that Focus on Sidewalk Accessibility

- **Vision Zero** is a strategy to eliminate all traffic fatalities and severe injuries, while increasing safe, healthy, equitable mobility for all.

- **Complete Streets** are streets for everyone. Complete Streets is an approach to planning, designing, building, operating, and maintaining streets that enables safe access for all people who need to use them, including pedestrians, bicyclists, motorists and transit riders of all ages and abilities.

- **Healthy Aging**. Aging in place refers to the phenomena of older adults remaining in their homes and communities as they age, rather than relocating or moving into an institutional setting. The U.S. Centers for Disease Control and Prevention defines aging in place as:

  "the ability to live in one's own home and community safely, independently, and comfortably, regardless of age, income, or ability level."

More Community Programs

- **Safe Routes to School** (SRTS) is an approach that promotes walking and bicycling to school through sidewalk, road, and pathway improvements, enforcement, tools, safety education, and incentives to encourage walking and bicycling to school.

- **America Walks** advances safe, equitable, accessible, and enjoyable places to walk and move by giving people and communities the resources to effectively advocate for change. Programs create walkable communities and work to increase the visibility and demand for public places that allow all people to move and walk in ways that are safe and make the most sense for them.

There are likely many more community programs that encourage accessible pathways!

Ways to Learn about Sidewalk Challenges

- People walking around and looking for sidewalk conditions – this is called a sidewalk audit

- Drones or cameras that fly over sidewalks and record information

- Web Tools like Project Sidewalk which enable people to remotely evaluate sidewalks (this is called crowdsourcing)

- Judy Shanley
  - jshanley@easterseals.com

Scenario #1

Imagine you are working with a city to plan for improved pedestrian infrastructure and a senior staff member tells you - "No thanks, we do *not* want to know where there are sidewalk problems as we do not want to be liable"

Discuss how you would respond? Who would you involve?

Section 1: Integrating accessibility planning with health planning, safety planning, environmental planning

The Link Between Non-driving, Safety, and Health

Anna Zivarts

A Third of Us Can't Drive

- 31 out of every 100 residents in the US lack a driver license (USDOT, 2020).
- Washington State: 30% of the population are nondrivers (JTC, 2023)
- Wisconsin DOT 31% of the population are nondrivers (2021).

Who Are Nondrivers?

- **Disabled People:** 19% of adult nondrivers in WA State can't drive because of a disability (JTC, 2023)
- **Low-Income People:** Close to 15% of the WA population has an annual household income of less than $25,000. In contrast, more than 40% of nondriver survey respondents have a household income of less than $28,000 (JTC, 2023)
- **Seniors:** 18% of people older than 65 don't drive, 35% of women over 75 (AARP, 2022)
- **Youth:** In 2020, 25% of 16 year olds had driver's licenses compared to 43% in 1997; 80% of 20-25 year olds have licenses, compared to 90% in 1997 (FHWA, 2021)
- **Black, Indigenous and Immigrant Communities:** (National Equity Atlas)

Survey respondents: reported negative impacts to their travel behavior and access to life opportunities

- Over **70%** of surveyed nondrivers had travel plans negatively impacted **at least one time** in the **past 30 days**.

- This negative impact is defined as at least once a week or more often:

  - **23%** of surveyed nondrivers will skip going somewhere because of transportation

  - **22%** will be late when not driving

  - **34%** percent worry about being able to get somewhere

  - **39%** worry about inconveniencing friends and family

Emotional Burden of Asking for Rides

"Whenever I call or text somebody asking for a ride I start to wonder, are they going to get back to me or not? Should I call a second person? There are times I would rather walk, even several miles, than deal with the anxiety of finding a ride."

- Amanda, Everett

"It is beyond frustrating having to depend on others for transportation. It really affects me to the point where it's easier to just isolate myself in my room so I don't feel like a burden."

- Jaime, Pasco

On-Demand Rides Aren't the Solution

"In the Blind community, not all Blind people have good jobs. Students and others are struggling financially, and Uber is expensive."

- Amandeep, Everett

"People talk all the time about getting rides [from ride-hailing companies], but people in chairs can't do that."

- Jessica, Kent

"We don't even have Lyft or Uber here. All we have is one taxi, which doesn't run on Sundays, it only runs on certain hours on Saturdays."

- Leah, Port Townsend

Housing and Land Use Matter

"[Housing] can be a struggle to figure out — can I walk to a grocery store if I need to, or is there a bus that can take me without having to transfer five times?"

- Chris, Vancouver

"More affordability means moving further out. Moving further out means more limited transportation."

-

Vaughn, Spokane

"An inch represents a foot if you're in a wheelchair. If you go over a bump, it's like you're going over a whole foot of a bump when you're walking regularly. When you're trying to go three blocks down the street on your side of the street, sometimes you have to go a nine-block radius to get to where you're going." - Erin, Seattle
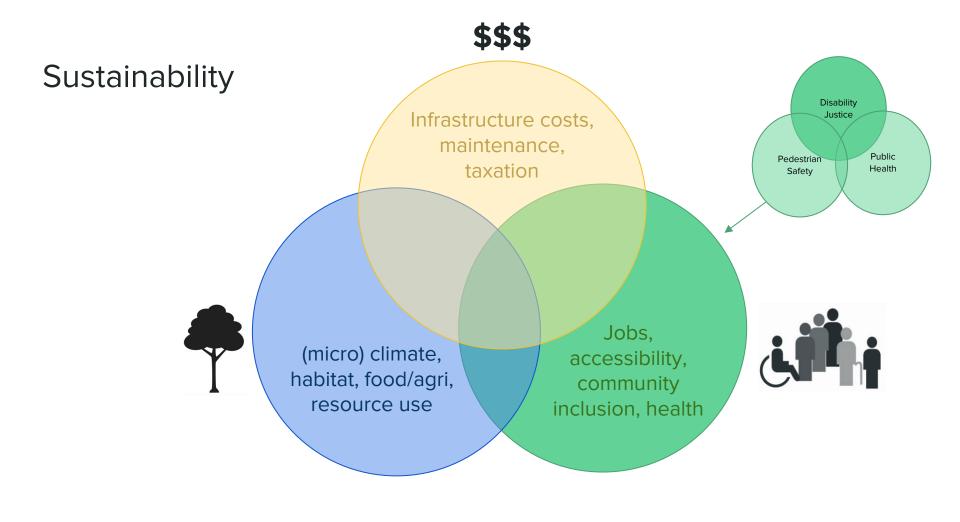
"One of the bigger barriers is that sidewalks are atrocious in many places. Sometimes they are completely nonexistent. And we're in the part of the year where there's a great deal of ice." -Aileen, Yakima

Pedestrian Connectivity Is the Root of Access

Inclusive, accessible design can contribute to culture of sustainability

Brent Chamberlain

Sustainability

$$$

Infrastructure costs, maintenance, taxation

(micro) climate, habitat, food/agri, resource use

Jobs, accessibility, community inclusion, health

Disability Justice

Pedestrian Safety

Public Health

Economic and Infrastructure

Initial costs

Maintenance

Taxes and land value

Suburban Homes

Rural Home
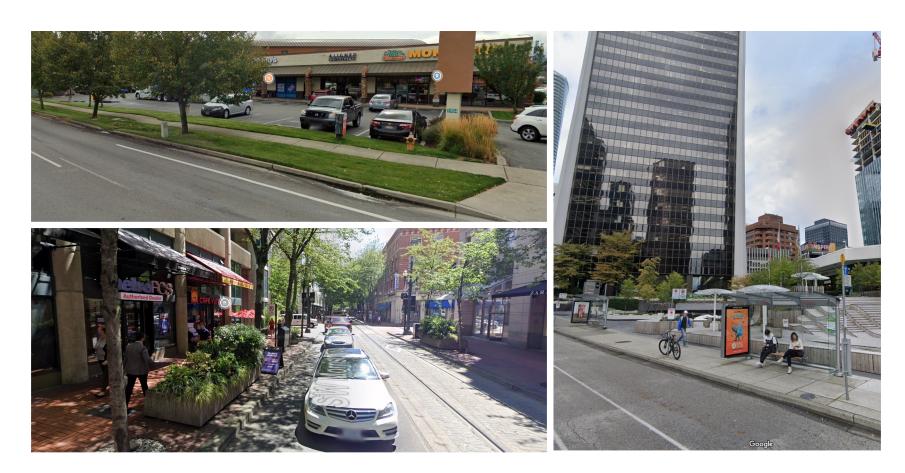
Apartments and Condos

Commercial Districts

Social Inclusion and Well-being

Jobs access

Transportation accessibility

Community inclusion

Health

Ageing Process and Transportation

Exploration and play

Ageing Process and Transportation
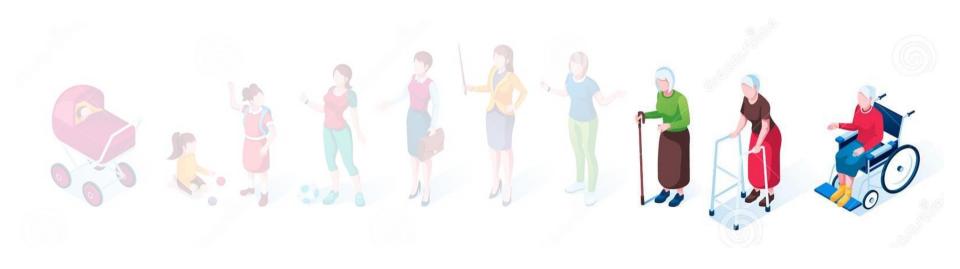
Independence, healthy habits

Ageing Process and Transportation

Healthy lifestyle & exercise, significant environmental impacts

Ageing Process and Transportation

Health maintenance, time flexibility

Ageing Process and Transportation

Health maintenance, time flexibility

Pedestrian Problems

Inclusive Design & Benefits for All

Environmental Impacts

Habitat

Food and Agriculture
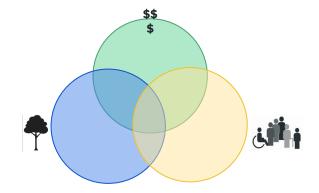
Resource use

Landuse Change

Inclusive Design = Sustainability

Inclusive Design = Higher *Initial* Costs = Lower or Smarter Land Development = Improved Sustainability

Community planning for participation and employment outcomes

Keith Christensen

- Community Planning
  - Social - Participation
  - Economic - Employment
  - Environmental - Access (Housing & Transportation)
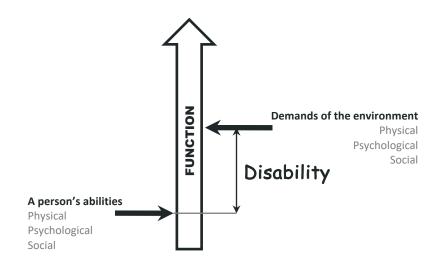
●Olmstead v. L.C., (98-536) 527 U.S. 581 (1999)

Step 1 - Participation

●Step 2 - Identify

FUNCTION

Demands of the environment
Physical
Psychological
Social

Disability

A person's abilities
Physical
Psychological
Social

● Process
- ○ Participation in planning process.
- ○ Established lived experience outcomes goal.
- ○ Identify unnecessary demands
- ○ Identify mitigation strategies
- ○ Identify reduction strategies
- ○ Prioritize strategies

Scenario #2

Imagine that the city manager tells you that "There is no time or funding for disability inclusive city planning."

What are existing or upcoming planning efforts that can be linked to planning for disability inclusive cities?

What challenges might there be to linking planning initiatives?

Break

Section 2: Interactive tools for planning accessibility

Artificial Intelligence Community Contributions to Map and Assess Transit Accessibility

Jon Froehlich

AI + COMMUNITY

MAPPING AND ASSESSING TRANSIT ACCESSIBILITY AT SCALE

Jon E. Froehlich, Computer Science, UW

Yochai Eisenberg, Disability & Human Development, UIC

Delphine Labbé, Disability & Human Development, UIC

Joy Hammel, Disability & Human Development, UIC

Judy Shanley, Assistant Vice President, Easterseals

Brent Chamberlain, Landscape Architecture & Planning, Utah State

Valerie Novack, Disability Rights Advocate / Policy Researcher

Presented at TRB's Workshop on "*At the Intersection of Disability Justice, Pedestrian Safety, and Health*", Jan 7, 2024

PROJECT SIDEWALK

UNIVERSAL PATHWAYS

UNIVERSITY *of* WASHINGTON

UIC UNIVERSITY OF ILLINOIS CHICAGO

UtahStateUniversity

easterseals

PUBLIC TRANSIT & SIDEWALKS ARE CRITICAL INFRASTRUCTURE

INDEPENDENCE,
QUALITY OF LIFE,
PHYSICAL ACTIVITY

Thapar *et al.,* 2004 ; Nuernberger, 2008

NO CURB RAMPS

PHYSICAL OBSTACLES

INCOMPLETE SIDEWALKS

SURFACE PROBLEMS

IN ACCESSIBLE BUS STOP

THE PROBLEM IS
NOT JUST A LACK
OF ACCESSIBLE
INFRASTRUCTURE

A LACK OF DATA

The National Council on Disability notes that there is **no comprehensive information** on "the degree to which sidewalks are accessible" in cities.
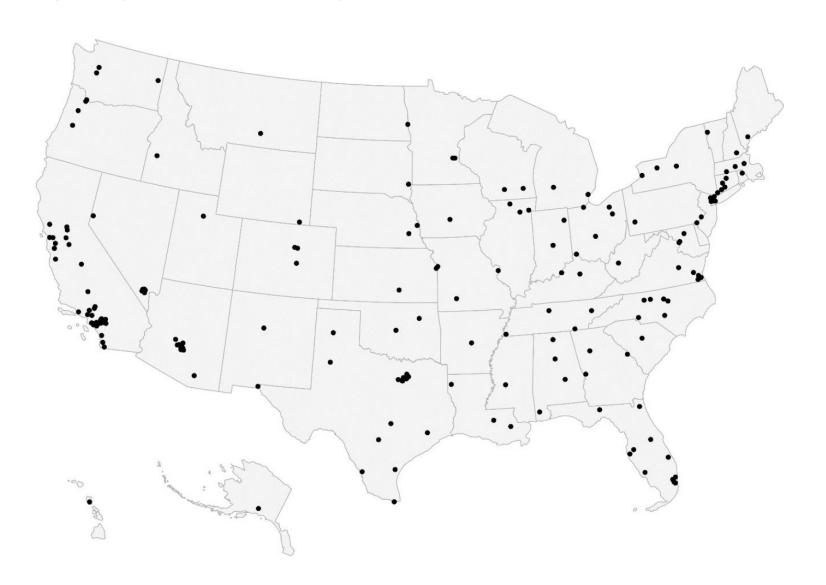
National Council on Disability, 2007
The impact of the Americans with Disabilities Act: Assessing the progress toward achieving the goals of the ADA

BACKGROUND
STUDY OF OPEN DATA ON SIDEWALKS

178 US CITIES

54% OPEN STREET DATA
20% SIDEWALKS
10% CURB RAMPS
<5% BASIC ACCESSIBILITY INFO

STUDY OF ADA TRANSITION PLANS

401 LOCAL GOVERNMENTS

13%
w/ADA transition plans
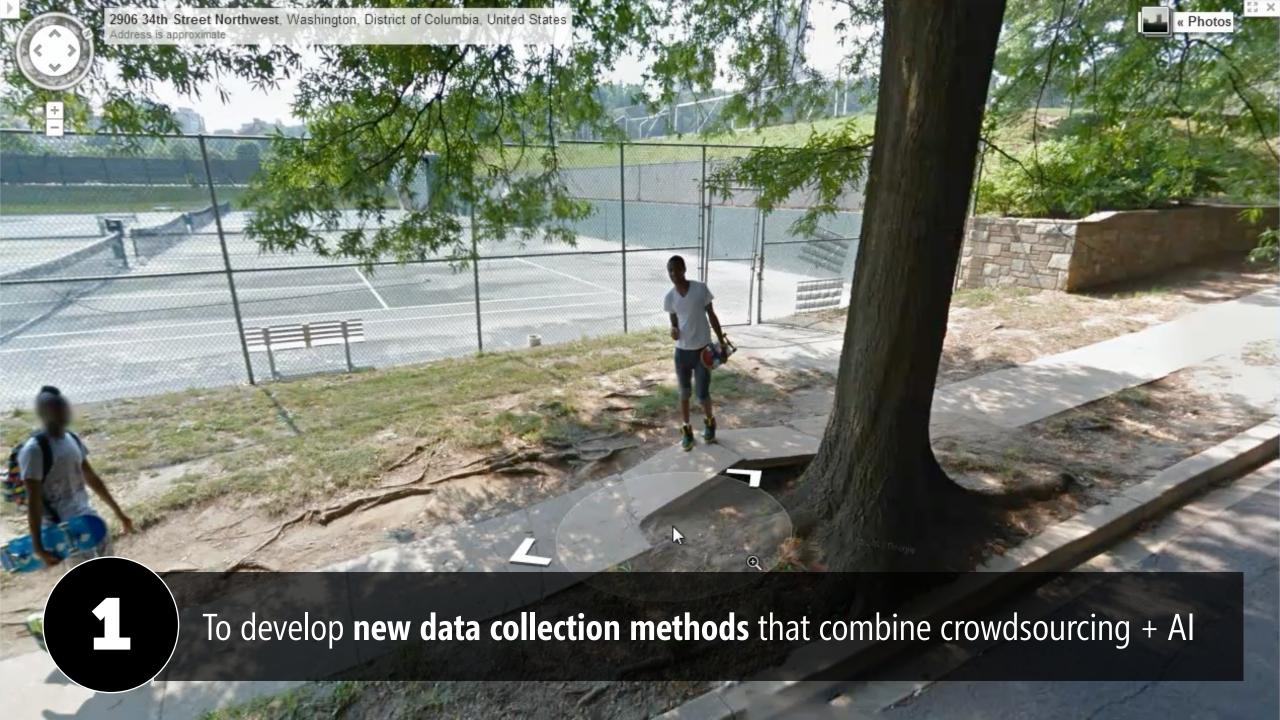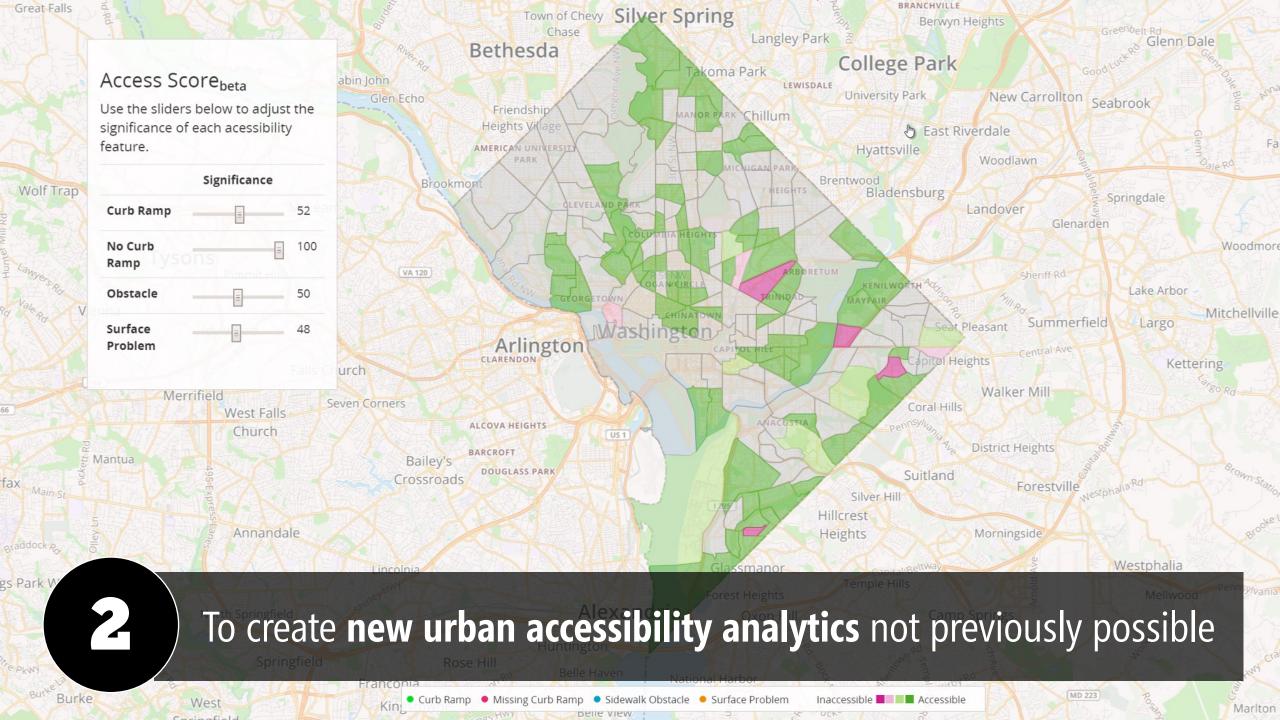
1.7%
Met minimum requirements
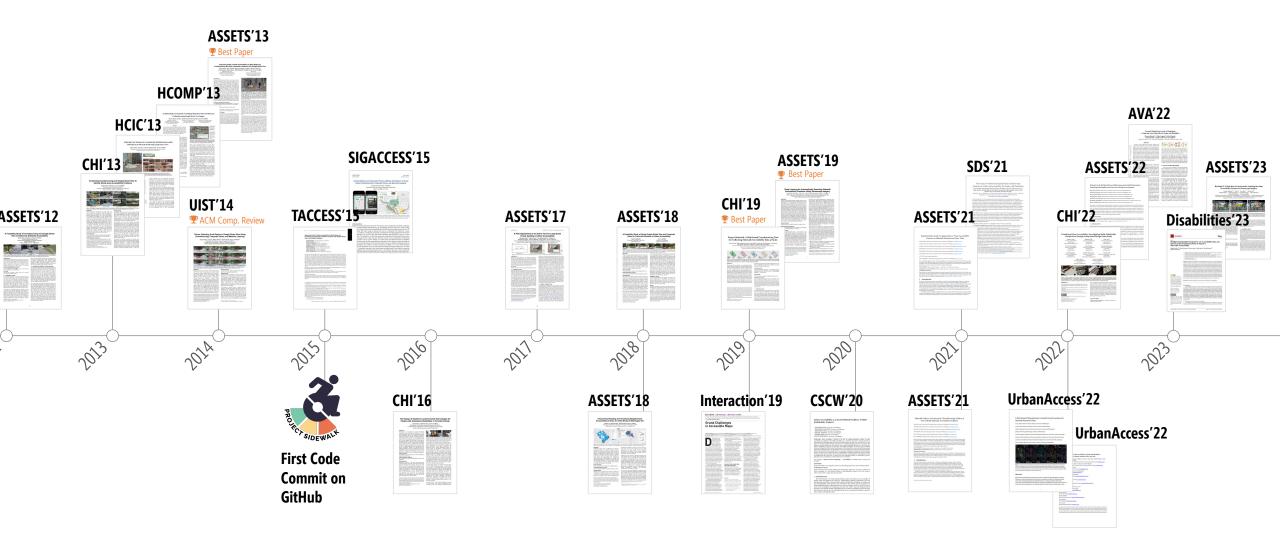
We are pursuing a **two-fold solution**

1 To develop **new data collection methods** that combine crowdsourcing + AI

Access Score~beta~

Use the sliders below to adjust the significance of each accessibility feature.

Significance

Curb Ramp	▭	52
No Curb Ramp	▭	100
Obstacle	▭	50
Surface Problem	▭	48

2 To create **new urban accessibility analytics** not previously possible

● Curb Ramp ● Missing Curb Ramp ● Sidewalk Obstacle ● Surface Problem Inaccessible ▮▮▮ Accessible

SCALABLE TECHNIQUES TO MAP & ASSESS TRANSIT INFRASTRUCTURE THROUGHOUT THE WORLD

ASSETS'13
🏆 Best Paper

HCOMP'13

HCIC'13

CHI'13

ASSETS'12

UIST'14
🏆 ACM Comp. Review

SIGACCESS'15

TACCESS'15

AVA'22

ASSETS'22

ASSETS'23

ASSETS'17

ASSETS'18

CHI'19
🏆 Best Paper

ASSETS'19
🏆 Best Paper

SDS'21

ASSETS'21

CHI'22

Disabilities'23

2013   2014   2015   2016   2017   2018   2019   2020   2021   2022   2023

PROJECT SIDEWALK

First Code Commit on GitHub

CHI'16

ASSETS'18

Interaction'19

CSCW'20

ASSETS'21

UrbanAccess'22

UrbanAccess'22

PROJECT
SIDEWALK

http://projectsidewalk.org

ONLINE MAP IMAGERY

+

REMOTE CROWDSOURCING INTERFACES

Labeling missions

Is this a **Surface Problem**?

Validation missions

HUMAN LABELS

MACHINE LEARNING

PROJECT SIDEWALK
HTTP://PROJECTSIDEWALK.IO

PROJECT SIDEWALK

REMOTE CROWDSOURCING

LABELING MEXICO CITY FROM GERMANY!

Source: Edgar Martínez, Liga Peatonal

HOW TO USE
PROJECT SIDEWALK
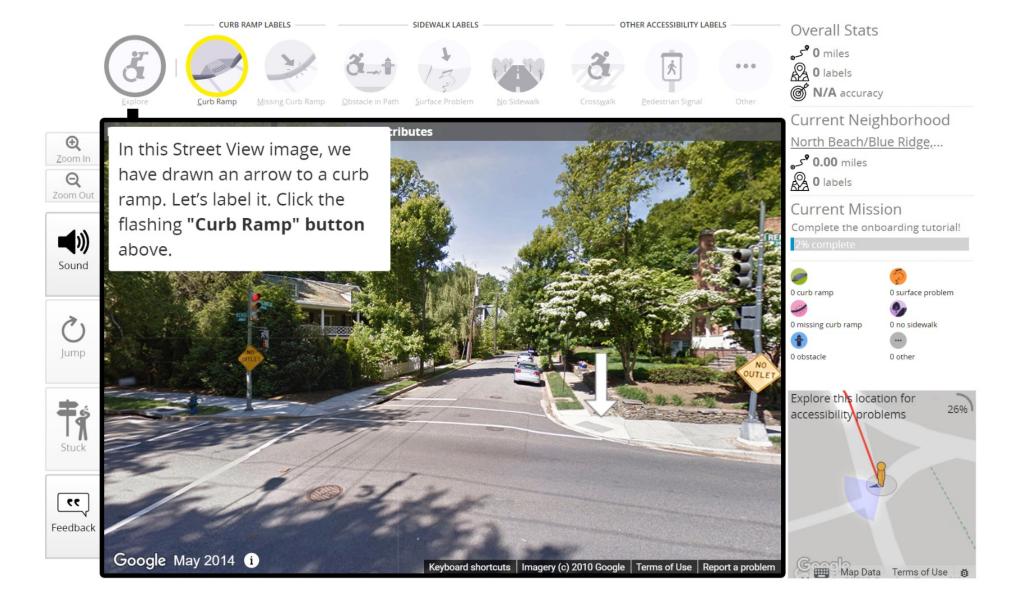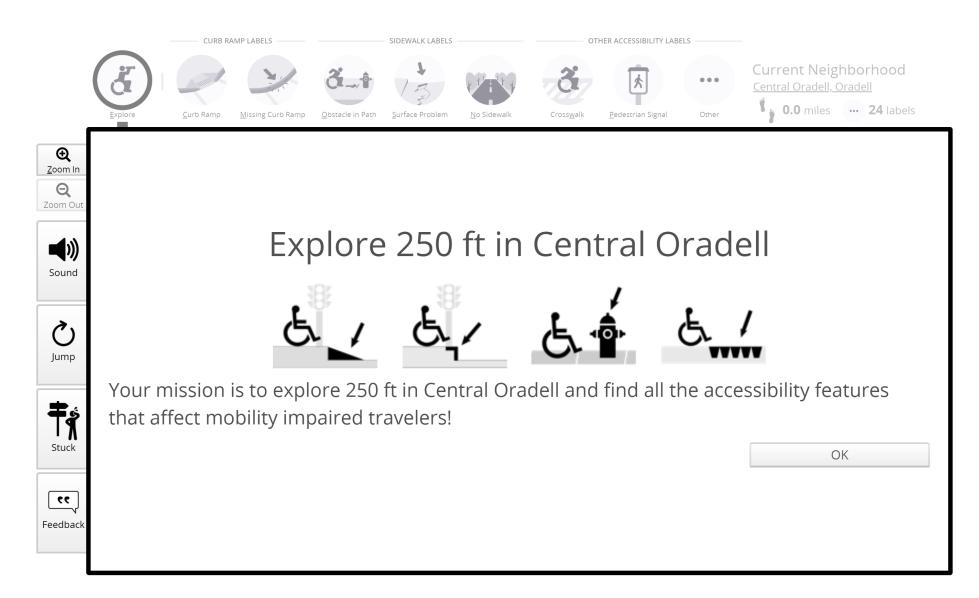
PROJECT SIDEWALK
TWO DATA COLLECTION MISSIONS

1 FIND, LABEL, & ASSESS SIDEWALKS

2 VALIDATING & CORRECTING LABELS

PROJECT SIDEWALK
EXPLORATION MISSION

CURB RAMP LABELS | SIDEWALK LABELS | OTHER ACCESSIBILITY LABELS

Explore | Curb Ramp | Missing Curb Ramp | Obstacle in Path | Surface Problem | No Sidewalk | Crosswalk | Pedestrian Signal | Other

Current Neighborhood
Central Oradell, Oradell

0.0 miles   24 labels

Zoom In

Zoom Out

Sound

Jump

Stuck

Feedback

Explore 250 ft in Central Oradell

Your mission is to explore 250 ft in Central Oradell and find all the accessibility features that affect mobility impaired travelers!

OK

CURB RAMP LABELS   SIDEWALK LABELS   OTHER ACCESSIBILITY LABELS

7 LABEL TYPES

Curb Ramp   Missing Curb Ramp   Obstacle in Path   Surface Problem   No Sidewalk   Crosswalk   Pedestrian Signal   Other

Explore

Zoom In

Zoom Out

Sound

Jump

Stuck

Feedback

Explore the streets and find all the accessibility attributes

GOOGLE STREET VIEW

Do you see any unlabeled problems? If not,

Turn slightly right

Google Jul 2019   © 2022 Google   Terms of Use   Report a problem

Current Neighborhood
Central Oradell, Oradell

0.7 miles   409 labels

Current

MISSION STATS

Explore 5
neighborhood

20% co

0 curb ramp   3 surface problems

0 missing curb ramp   5 no sidewalks

1 obstacle   0 other

Follow the red line

MISSION MAP

Map data ©2022   Terms of Use

Explore

Curb Ramp

Missing Curb Ramp

Obstacle in Path

Surface Problem

No Sidewalk

Crosswalk

Pedestrian Signal

Other

Zoom In

Zoom Out

Sound

Jump

Stuck

Feedback

Explore the streets and find all the accessibility attributes

Do you see any unlabeled problems? If not,

↱ **Turn right**

Google Jun 2018

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Current Neighborhood
Central Oradell, Oradell

0.0 miles   ⋯ 33 labels

Current Mission
Explore 250 ft of this neighborhood

0% complete

4 curb ramps

0 surface problem

0 missing curb ramp

1 no sidewalk

0 obstacle

4 others

Follow the red line

Google   Map Data | Terms of Use

CURB RAMP LABELS

Explore

Curb Ramp

Missing Curb Ramp

Obstacle in Path

Press the "S" key

Surface Problem

No Sidewalk

OTHER ACCESSIBILITY LABELS

Crosswalk

Pedestrian Signal

Other

Current Neighborhood
Central Oradell, Oradell

0.0 miles   33 labels

Current Mission
Explore 250 ft of this neighborhood
0% complete

4 curb ramps   0 surface problem

0 missing curb ramp   1 no sidewalk

0 obstacle   4 others

Follow the red line

Zoom In

Zoom Out

Sound

Jump

Stuck

Feedback

Explore the streets and find all the accessibility attributes

CLICK SURFACE PROBLEM

© 2022 Google

Google Jun 2018

Do you see any unlabeled problems? If not,

Turn right

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Google   Map Data Terms of Use

Explore

Curb Ramp

Missing Curb Ramp

Obstacle in Path

Surface Problem

No Sidewalk

Crosswalk

Pedestrian Signal

Other

Explore the streets and find all the accessibility attributes

Zoom In

Zoom Out

Sound

Jump

Stuck

Feedback

Passable   1   2   3   4   5   Not Passable

Description (optional)

Add Tags: bumpy   cracks   grass   narrow   brick   construction

uneven/slanted   very broken   height difference

rail/tram track   sand/gravel

☐ Temporary (e.g., construction)   OK

unlabeled problems? If not,

ght

Google Jun 2018

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Current Neighborhood
Central Oradell, Oradell

0.0 miles   ··· 34 labels

Current Mission
Explore 250 ft of this neighborhood

0% complete

4 curb ramps

1 surface problem

0 missing curb ramp

1 no sidewalk

0 obstacle

4 others

Follow the red line

Google   Map Data | Terms of Use

Explore

Curb Ramp

Missing Curb Ramp

Obstacle in Path

Surface Problem

No Sidewalk

Crosswalk

Pedestrian Signal

Other

Current Neighborhood
Central Oradell, Oradell

0.0 miles   34 labels

Explore the streets and find all the accessibility attributes

Zoom In

Zoom Out

Sound

Jump

Stuck

Feedback

Current Mission
Explore 250 ft of this neighborhood

0% complete

4 curb ramps   1 surface problem

0 missing curb ramp   1 no sidewalk

0 obstacle   4 others

Passable   1   2   3   4   5   Not Passable

RATE SEVERITY

Description (optional)

COMMENTS

Add Tags: bumpy | cracks | grass | narrow | brick | construction | uneven/slanted | very broken | height difference | rail/tram track | sand/gravel

TAGS

☐ Temporary (e.g., construction)

unlabeled problems? If not, **ght**

OK

Follow the red line

Google   Jun 2018

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Map Data | Terms of Use

CURB RAMP LABELS   SIDEWALK LABELS   OTHER ACCESSIBILITY LABELS

Explore   Curb Ramp   Missing Curb Ramp   Obstacle in Path   Surface Problem   No Sidewalk   Crosswalk   Pedestrian Signal   Other

Zoom In
Zoom Out
Sound
Jump
Stuck
Feedback

Explore the streets and find all the accessibility attributes

©2019 Google

Google   Jan 2010

Do you see any unlabeled problems? If not,
U turn

© 2022 Google | Terms of Use | Report a problem

Current Neighborhood
Jardines del Carmen, La Piedad

1.5 miles   ··· 1024 labels

Current Mission
Explore 500 ft of this neighborhood

0% complete

0 curb ramp   0 surface problem
0 missing curb ramp   0 no sidewalk
1 obstacle   0 other

Follow the red line

Map Data | Terms of Use

CURB RAMP LABELS

SIDEWALK LABELS

OTHER ACCESSIBILITY LABELS

Explore

Curb Ramp

Missing Curb Ramp

Obstacle in Path

Surface Problem

No Sidewalk

Crosswalk

Pedestrian Signal

Other

Zoom In

Stuck

Feedback

Explore the streets and find all the accessibility attributes

Passable | 1 | 2 | 3 | 4 | 5 | Not Passable

Description (optional)

Add Tags: pole | tree | vegetation | trash/recycling can | parked car (u)

sign | garage entrance | stairs | street vendor (j)

height difference | narrow | litter/garbage (x)

parked scooter/motorcycle

☐ Temporary (e.g., construction)

OK

Google   Jan 2010

Do you see any unlabeled problems? If not,
↰ **U turn**

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Current Neighborhood
Jardines del Carmen, La Piedad

1.5 miles   •••   1024 labels

Current Mission
Explore 500 ft of this neighborhood

0% complete

0 curb ramp

0 surface problem
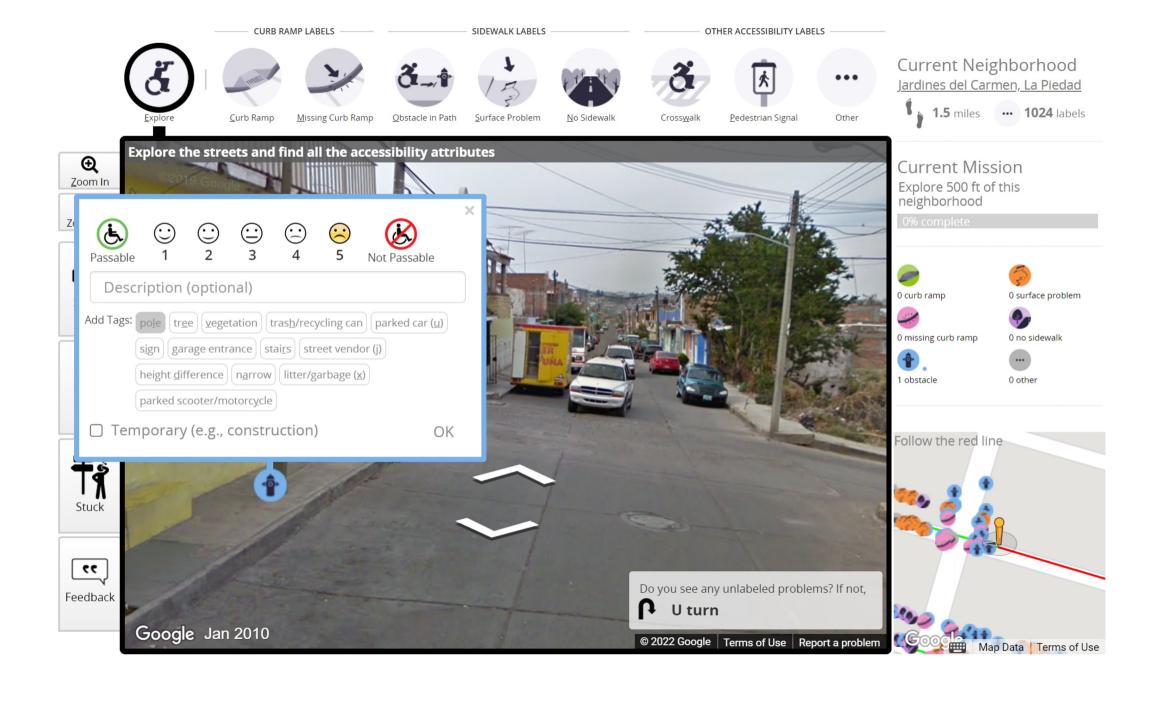
0 missing curb ramp

0 no sidewalk

1 obstacle

0 other

Follow the red line

Google   Map Data | Terms of Use

EXAMPLE OBSTACLE TAGS

Explore the streets and find all the accessibility attribute

Passable 1 2 3 4 5 Not Passable

Description (optional)

Add Tags: pole tree vegetation trash/recycling can parked car (u)
sign garage entrance stairs street vendor (j)
height difference narrow litter/garbage (x)
parked scooter/motorcycle

☐ Temporary (e.g., construction) OK

Tree

Fire hydrant

Parked car

Pole

Garbage/recycling can

Stairs

Vegetation

Height difference

PROJECT SIDEWALK
TWO DATA COLLECTION MISSIONS

1 FIND, LABEL, & ASSESS SIDEWALKS

2 VALIDATING & CORRECTING LABELS

Is this an **Obstacle**?

Google Aug 2021

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Current Mission
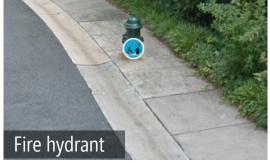Validate 10 labels
10% complete

Correct Examples

Incorrect Examples

✓ Agree   ✗ Disagree   ? Not sure

Add comment here...

Is this a **Curb Ramp**?

Current Mission

Validate 10 labels

0% complete

Curb Ramp

NOT a Curb Ramp

✓ Agree   ✗ Disagree   ? Not sure

Is this a **Curb Ramp**?

THIS IS A DRIVEWAY, NOT A CURB RAMP

✓ Agree   ✗ Disagree   ? Not sure

Curb Ramp

NOT a Curb Ramp

Is this a **Missing Curb Ramp**?
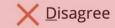
1113 labels

Google May 2019

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Current Mission
Validate 10 labels

50% complete

CORRECT Missing Curb Ramp

INCORRECT Missing Curb Ramp

✓ Agree   ✗ Disagree   ? Not sure

Add comment here...

Is this a **Missing Curb Ramp**?

♿ * **1113** labels

Current Mission
Validate 10 labels

50% complete

CORRECT Missing Curb Ramp

INCORRECT Missing Curb Ramp

OYAMELES

16 DE SEPTIEMBRE

Google May 2019

© 2020 Google | Terms of Use | Report a problem

✓ Agree   ✗ Disagree   ? Not sure

Add comment here...

Is this a **Missing Curb Ramp**?

0 labels

© 2019 Google | Terms of Use | Report a problem

Current Mission
Validate 10 labels

0% complete

Missing Curb Ramp

NOT a Missing Curb Ramp

✓ Agree

✗ Disagree

? Not sure

Is this a **Missing Curb Ramp**?

0 labels

Current Mission
Validate 10 labels

0% complete

Missing Curb Ramp

NOT a Missing Curb Ramp

© 2019 Google | Terms of Use | Report a problem

✓ Agree   ✗ Disagree   ? Not sure

Is this a **Missing Curb Ramp**?

8776 labels

Google Jul 2011

© 2021 Google | Terms of Use | Report a problem

✓ Agree   ✗ Disagree   ? Not sure

Add comment here...

Current Mission
Validate 10 labels

90% complete

Correct Examples

Incorrect Examples

Is this a **Missing Curb Ramp**?

THIS IS A RESIDENTIAL WALKWAY. IT IS NOT INTENDED TO BE A STREET CROSSING.

Google Jul 2011

© 2021 Google | Terms of Use | Report a problem

✓ Agree   ✗ Disagree   ? Not sure

Add comment here...

8776 labels

Current Mission
Validate 10 labels

90% complete

Correct Examples

Incorrect Examples

Is this a **Surface Problem**?

Hide Label

Zoom In

Zoom Out

♿ * **9** labels

Current Mission
Validate 10 labels
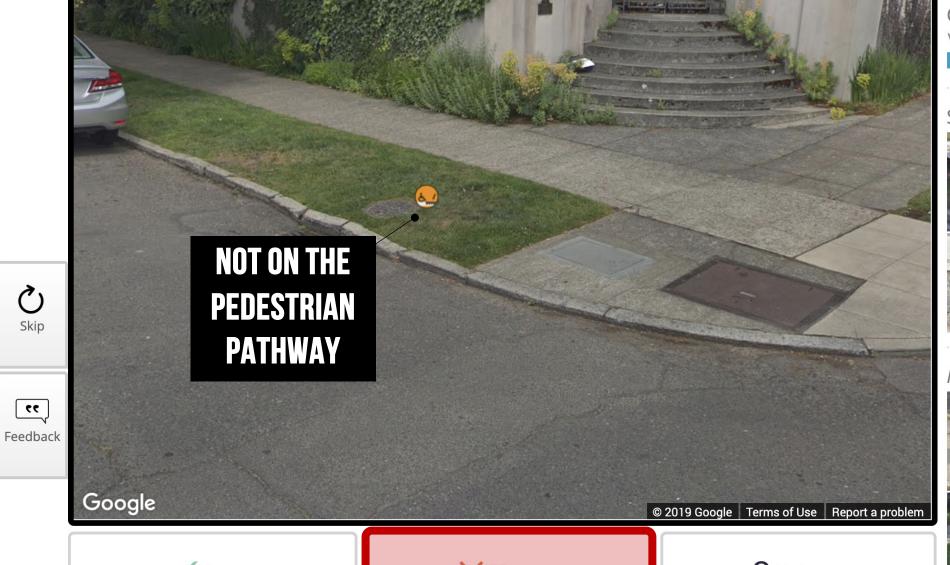
90% complete
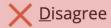
Surface Problem

NOT a Surface Problem

Skip

Feedback

NOT ON THE PEDESTRIAN PATHWAY

Google

© 2019 Google   Terms of Use   Report a problem

✓ Agree

✗ Disagree

? Not sure

Is this a **Surface Problem**?

Hide Label

Zoom In

Zoom Out

3337 labels

Current Mission
Validate 10 labels
0% complete

Correct Examples

Incorrect Examples

Skip

Feedback

✓ Agree

✗ Disagree

? Not sure

Add comment here...

Is this an **Obstacle**?

Hide Label   Zoom In   Zoom Out

934 labels

E. Pershing Rd.
3900 S

Apostolic Faith Church
©2019 Google

ONE
WAY

POLE IS NOT AN OBSTACLE HERE

Google May 2019

© 2021 Google   Terms of Use   Report a problem

Skip

Feedback

Correct Examples

Incorrect Examples

✓ Agree   ✗ Disagree   ? Not sure

Add comment here...

SIDEWALKS OFTEN HAVE BUFFER ZONES

Frontage Zone

Pedestrian Zone

Planting/ Furnishing

Curb Zone

Bike Facility

Buffer

ONLY MARK BARRIERS IN THE PEDESTRIAN PATH

Frontage Zone

Pedestrian Zone

Planting/ Furnishing

Curb Zone

Bike Facility

Buffer

We also try to make Project Sidewalk **fun** and **educational**

Start Exploring | Start Validating | How to Label | Data ▾ | jonfroehlich ▾

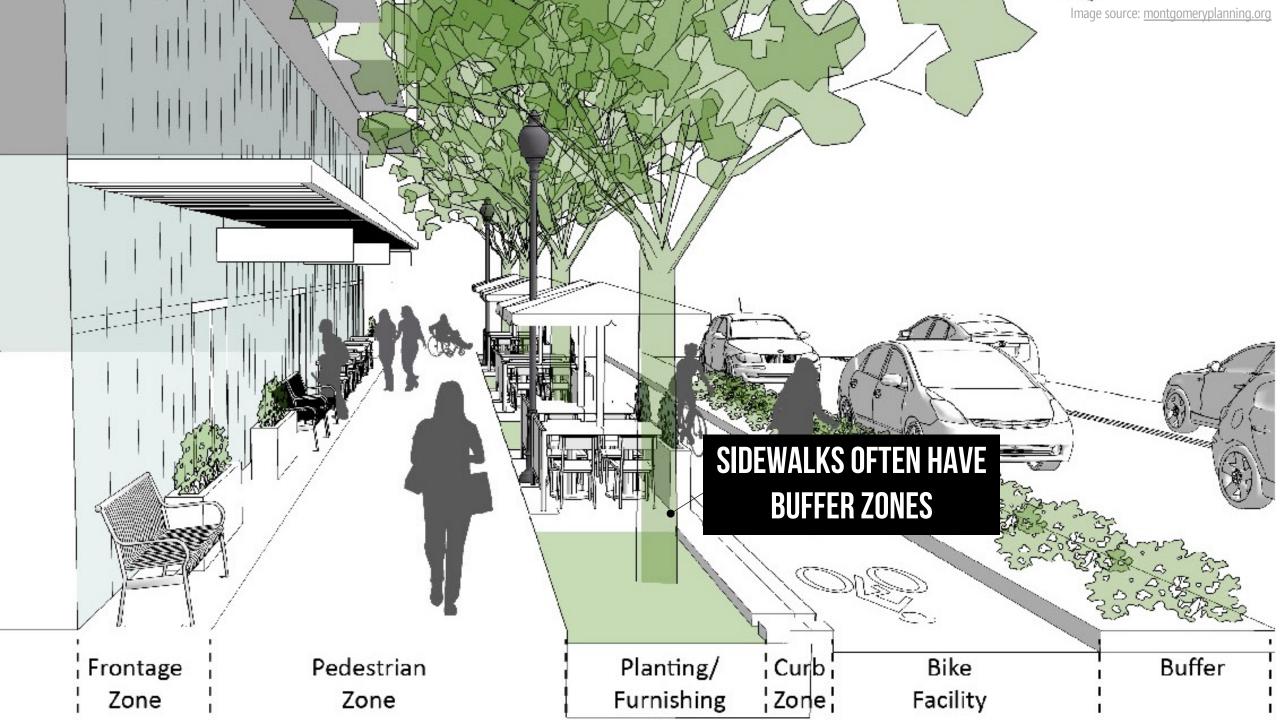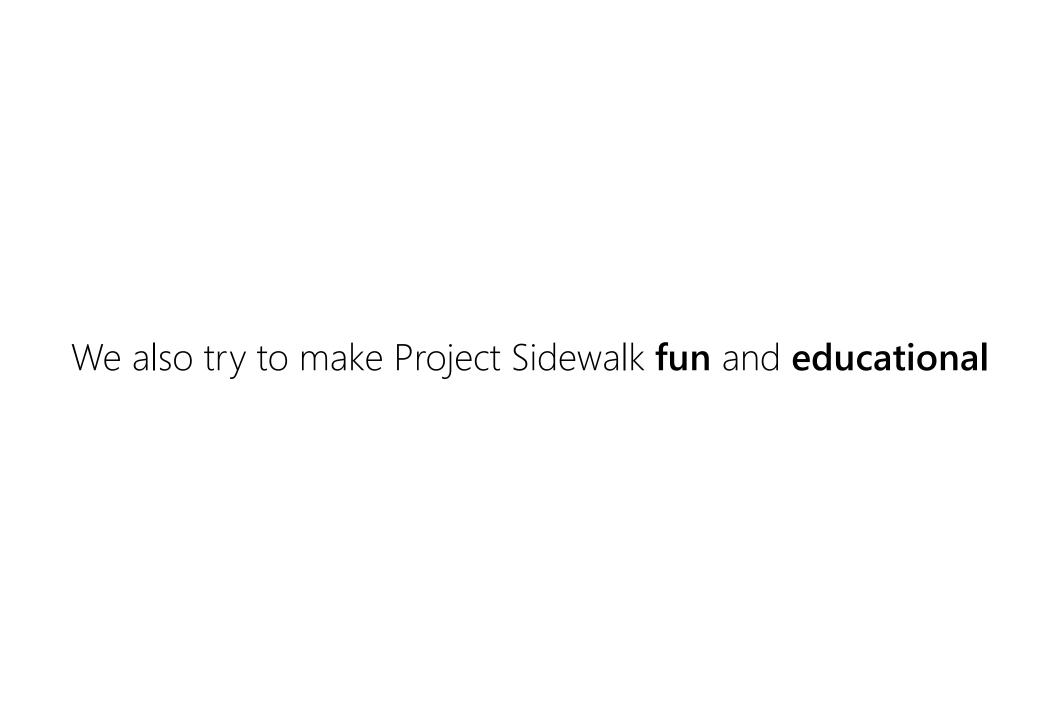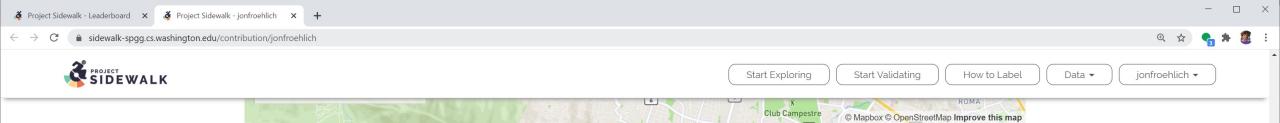**Your missions**

140

Distance

2.03 mi

Labels

568

Validations

1249

Accuracy

90.7%

Achievements

Missions

Congratulations, you've earned all mission badges!

5 | 10 | 20 | 50 | 100

Distance

Thanks for helping! **2.97 more miles** until your next achievement.

500 ft | 0.25 mi | 0.5 mi | (1 mi) | (5 mi)

Labels

Great job! **432 more labels** until your next achievement.

50 | 250 | 500 | (1k) | 5k

Validations

Amazing work! **3751 more validations** until your next achievement.

100 | 250 | 500 | (1k) | 5k

PROJECT SIDEWALK

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PROJECT
SIDEWALK

Start Exploring | Start Validating | How to Label | Data ▾ | jonfroehlich ▾

Overall Leaderboard

Leaders are calculated based on their labels, distance, and accuracy

#	Username	Labels	Missions	Distance	Accuracy
1	mariana.velasco	2894	150	9.6 miles	85.3%
2	maria	1918	51	9.0 miles	89.1%
3	abarragan99	1895	81	2.7 miles	86.5%
4	marian.trevino	1543	66	9.4 miles	82.2%
5	dordaz	1483	46	3.5 miles	84.2%
6	Gerardo R	1274	86	5.4 miles	87.6%
7	mariagarza	1205	62	9.4 miles	87.2%
8	ana.alvarezc	1053	63	9.8 miles	84.8%
9	Gari01234	848	62	4.6 miles	89.1%
10	Luis Gonzalez	812	59	9.7 miles	94.1%

Want to make it into the Top 10? Start exploring!

PROJECT SIDEWALK

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Terms of Use

Help

Labeling Guide

DEVELOPER

Sidewalk API

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PROJECT SIDEWALK

DEPLOYMENTS AND PARTNERSHIPS

DEPLOYMENTS

20 CITIES, 10K MILES, 1.5M DATA POINTS

13K USERS

913K LABELS

609K VALIDATIONS

World Enabled

CREATE
Center for Research and Education on Accessible Technology and Experiences
UNIVERSITY of WASHINGTON

WORCESTER POLYTECHNIC INSTITUTE 1865
WPI

ACCESS LIVING

nua CITIES FOR ALL
GLOBAL CAMPAIGN ON INCLUSIVE AND ACCESSIBLE CITIES

Oradell Girl Scouts

Hackensack Meridian School of Medicine

AIM-CIL
Achieving Independence and Mobility Center for Independent Living

LIGA PEATONAL

scistarter
People-powered science.

EL COLEGIO DE MICHOACÁN

UNIVERSIDAD DEL AZUAY

Open Columbus

UNIVERSIDAD DE MONTERREY
HOMO HOMINIS IN MINISTERIO PERFICITUR

WSDOT

City of Amsterdam

UNIVERSIDAD AUTONOMA DE SINALOA

San Pedro Garza García
GOBIERNO MUNICIPAL

City of Burnaby

SFU
SIMON FRASER UNIVERSITY

amsterdam intelligence

MetropolitanPlanningCouncil
shaping a more equitable, sustainable and prosperous Chicago region since 1934

City of Newberg

PROGRESS CENTER for independent living

UNIVERSIDAD NACIONAL AUTONOMA DE MEXICO POR MI

Chicago Metropolitan Agency for Planning

RTA Regional Transportation Authority

PACIFIC NW TRANSPORTATION CONSORTIUM PACTRANS REGION 10

Bellevue School District

DC
UW Disability & D/deaf Cultural Center

UIC UNIVERSITY OF ILLINOIS CHICAGO

Universität Zürich UZH

Metropolitan Mayors Caucus

Vitruvius / give it strength make it useful deliver it beautifully

MS
National Multiple Sclerosis Society
Bergen Multiple Sclerosis Community Council

Teaneck High School

公民幫推
People Nudge

DENNY
Denny International Middle School

Tecnológico de Monterrey

Disability Rights WASHINGTON

Great Lakes ADA Center
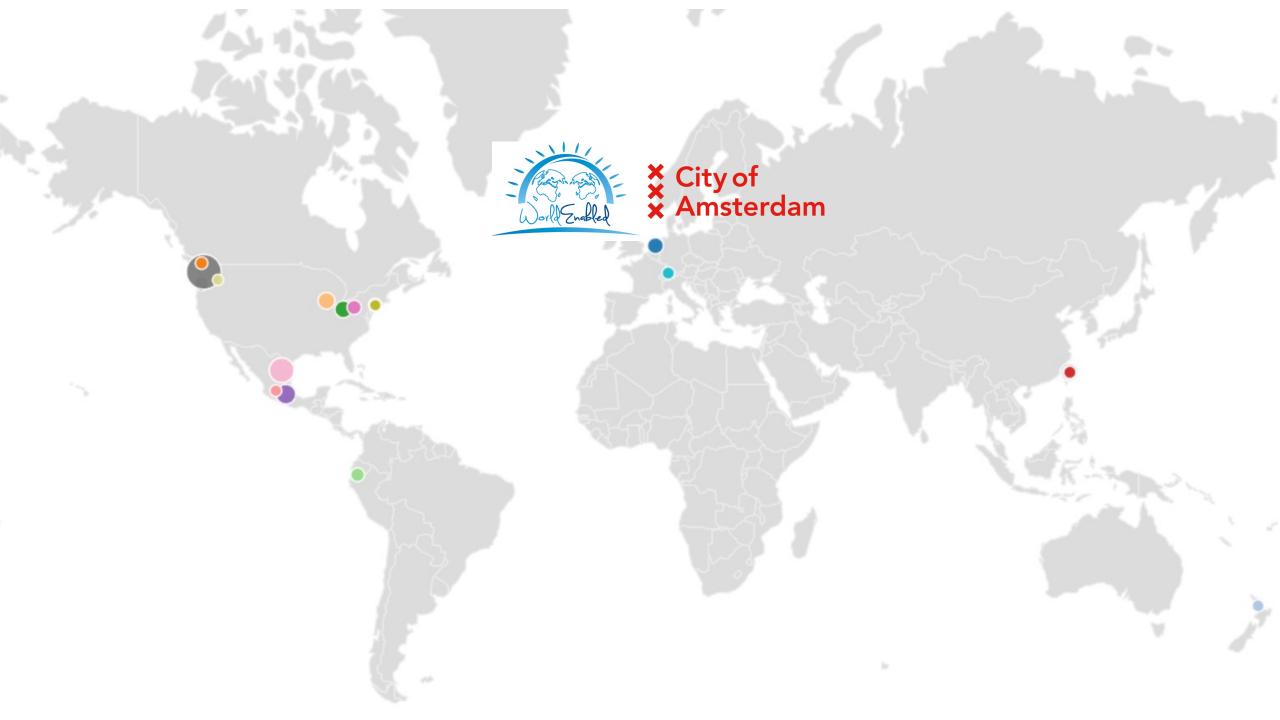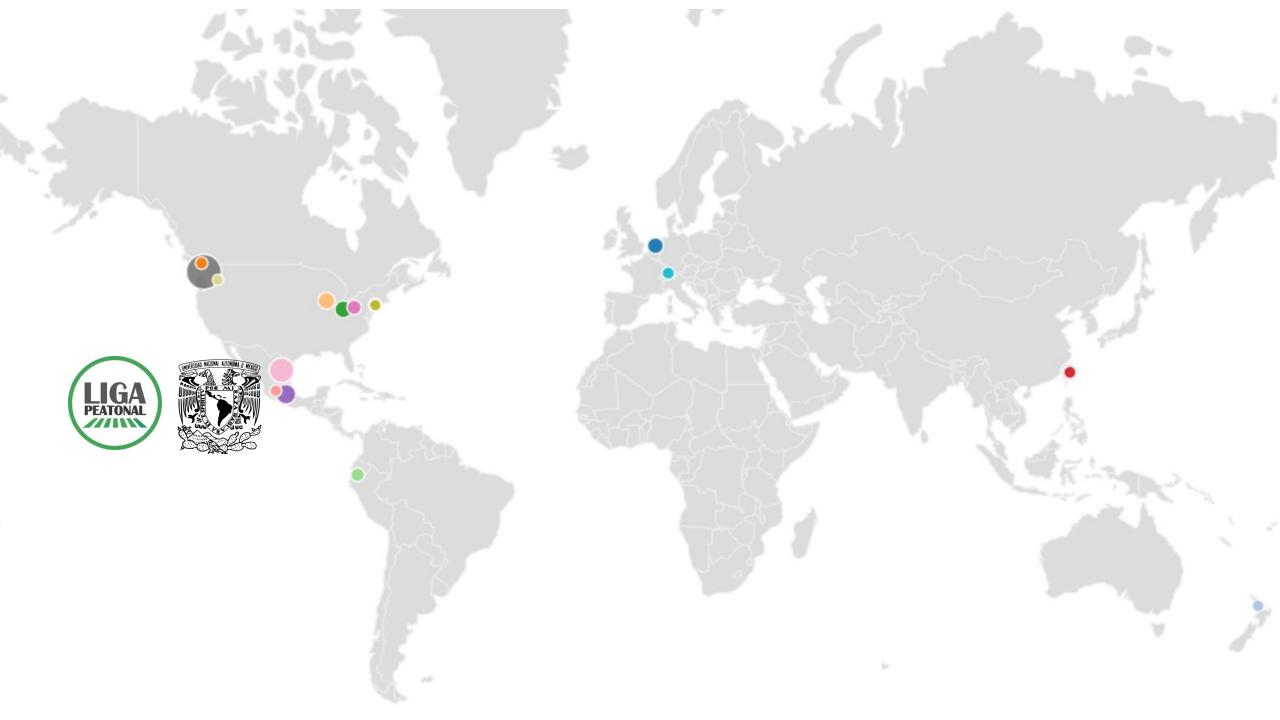A Member of the ADA National Network

WHAT CAN WE DO WITH ALL THIS DATA?

Enable new urban analytics

Triage and fix high-priority problem areas

Inform and evaluate policy

Track government progress

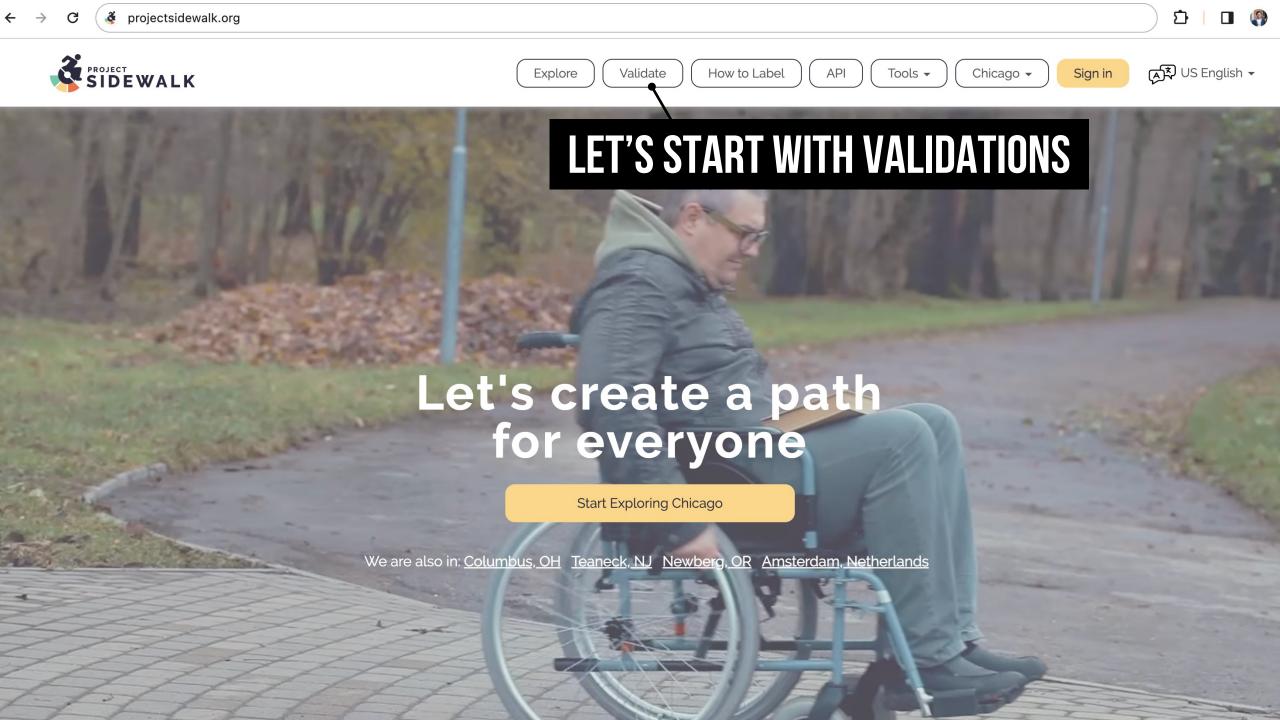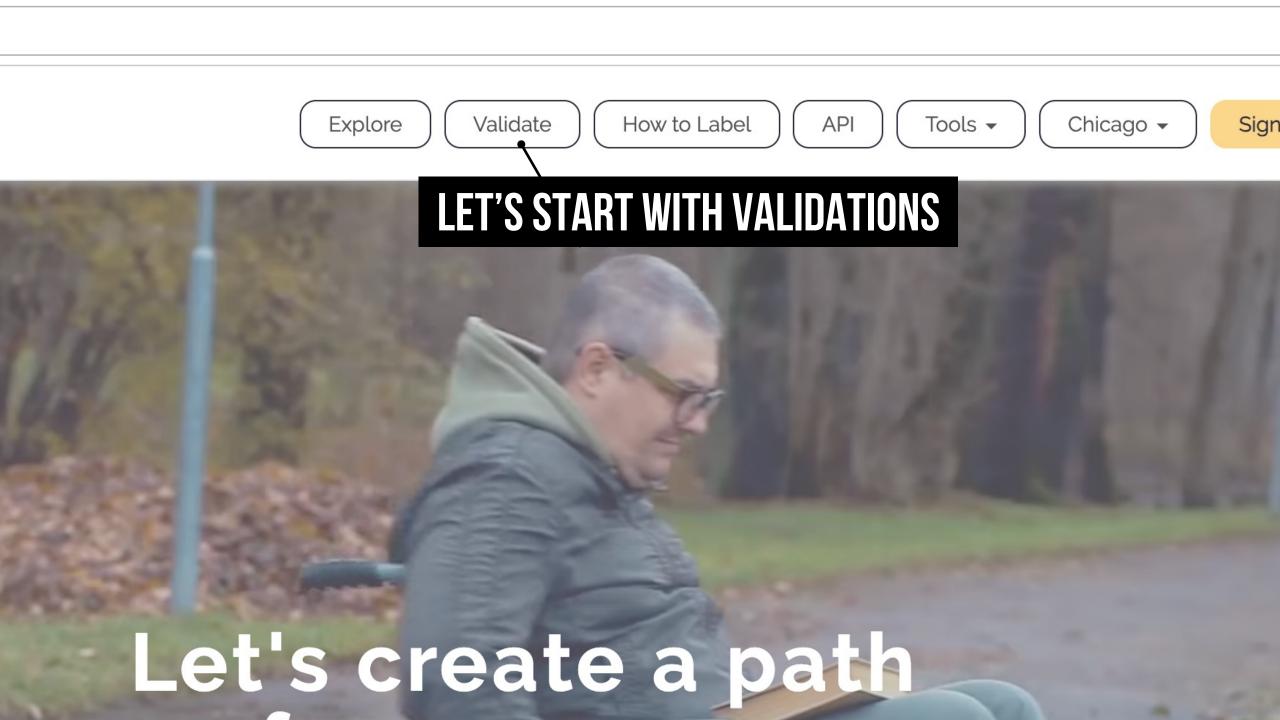Train machine learning algorithms

...

# LET'S TRY IT!

LET'S START WITH VALIDATIONS

Explore Validate How to Label API Tools ▾ Chicago ▾ Sign in 🗣 US English ▾

Let's create a path
for everyone

Start Exploring Chicago

We are also in: Columbus, OH Teaneck, NJ Newberg, OR Amsterdam, Netherlands

LET'S START WITH VALIDATIONS

Let's create a path

![Project Sidewalk logo] PROJECT **SIDEWALK**

Explore | How to Label | API | Tools ▾ | Chicago ▾ | **Sign in** | US E
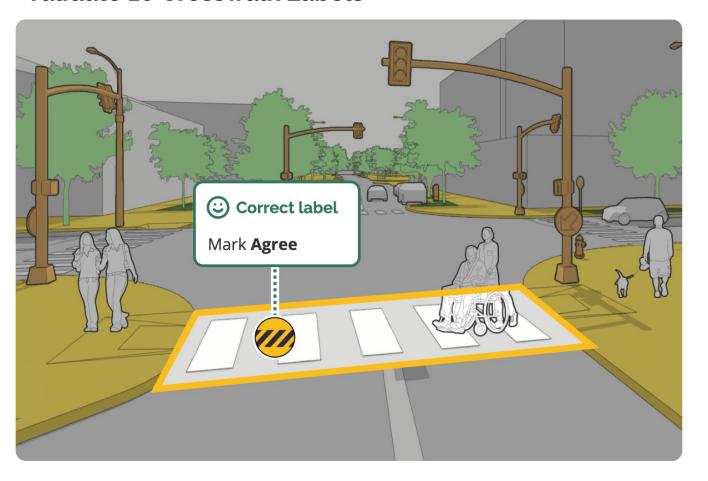
YOUR MISSION

Validate 10 Crosswalk Labels

☺ **Correct label**

Mark **Agree**

☺ **CORRECT EXAMPLE**

Crosswalk

A crosswalk is a legally defined space to cross a road.

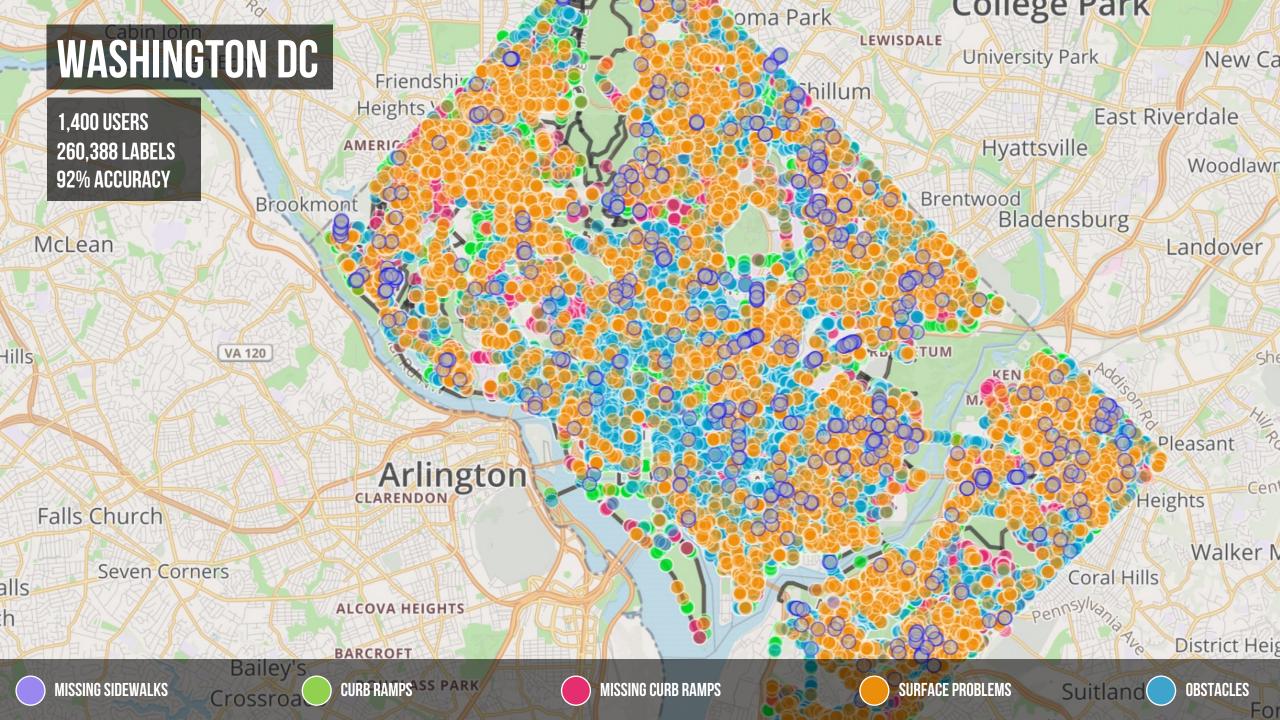Crosswalks are often indicated by **parallel dashed lines.**
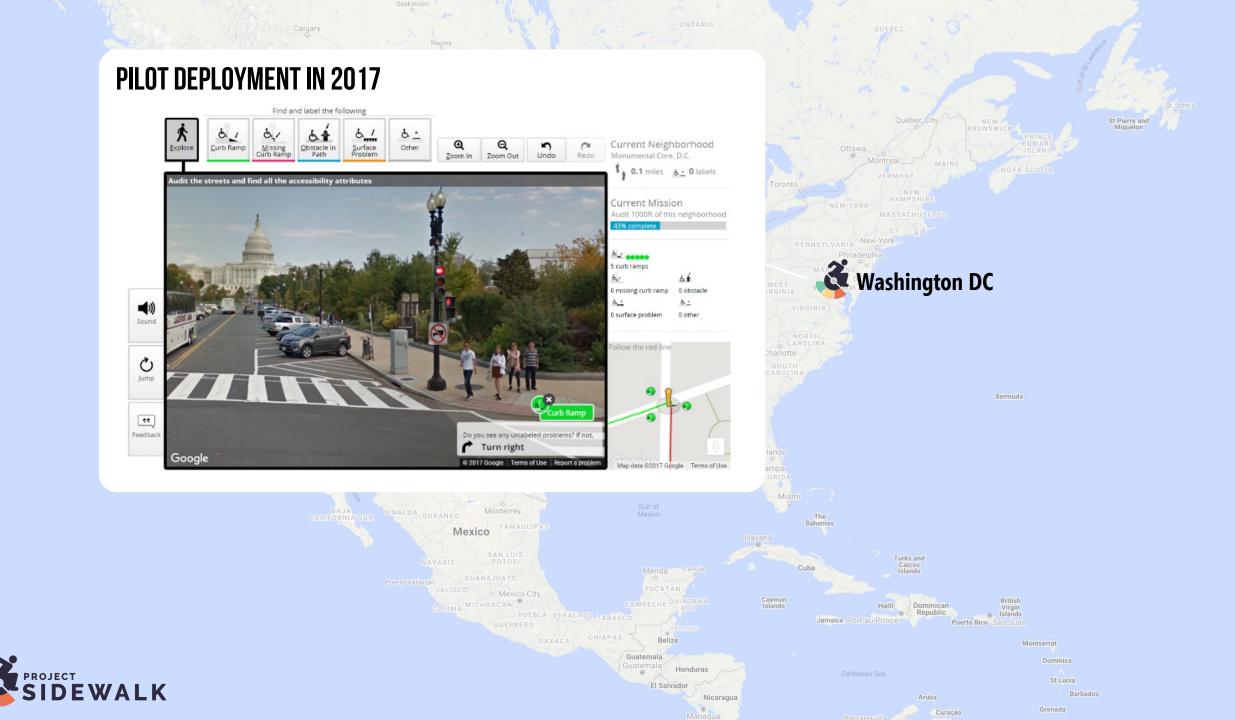
Start mission
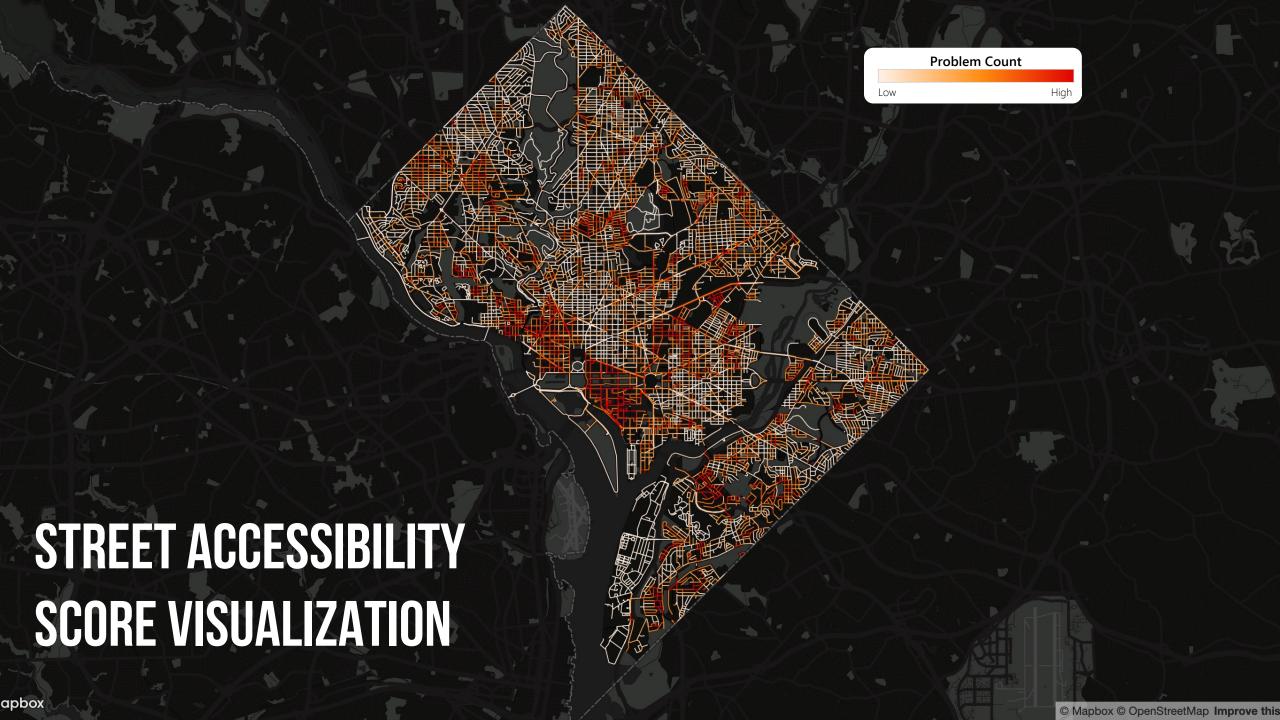
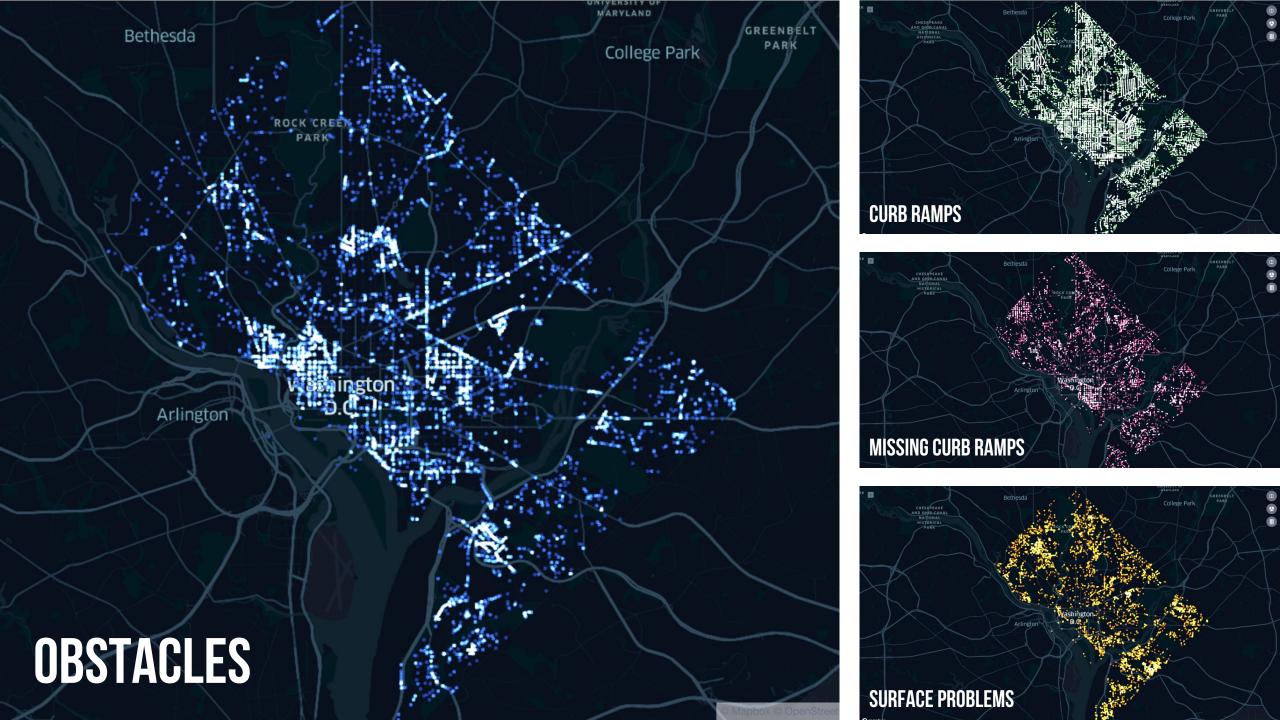# JON SWITCHES TO LIVE DEMO MODE

WHAT CAN WE DO WITH ALL THIS DATA?

Enable new urban analytics

Triage and fix high-priority problem areas

Inform and evaluate policy

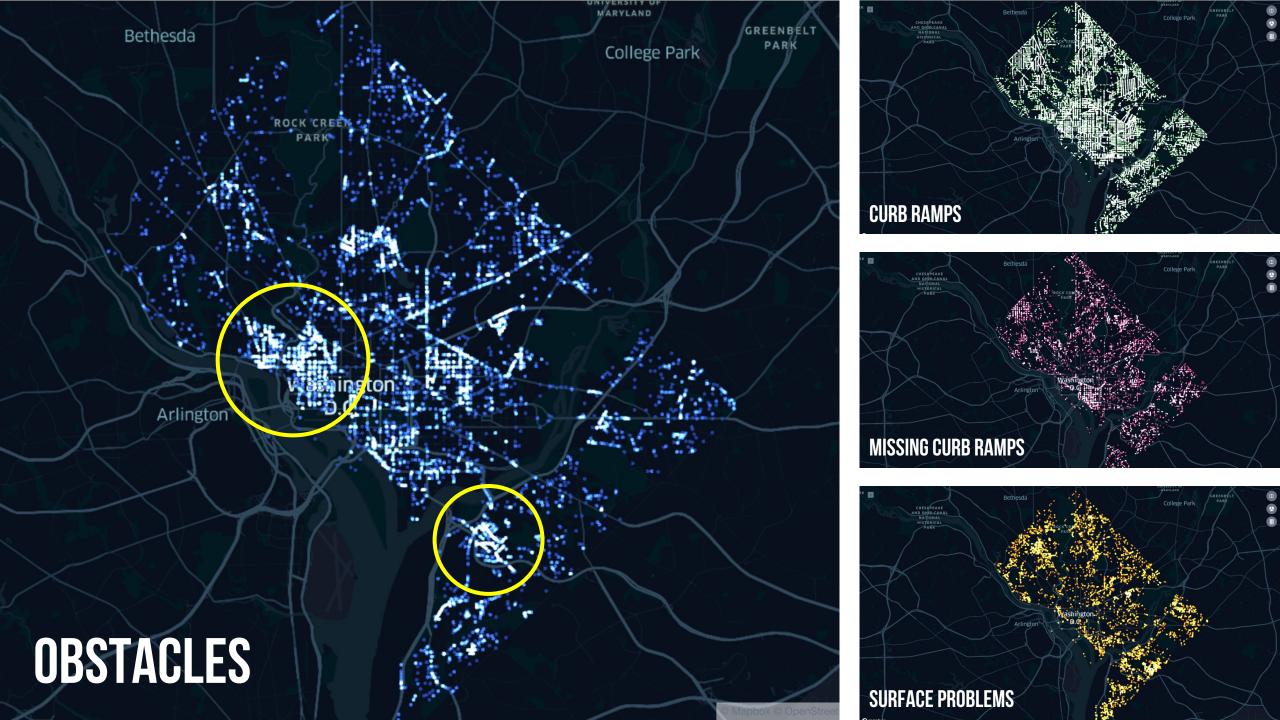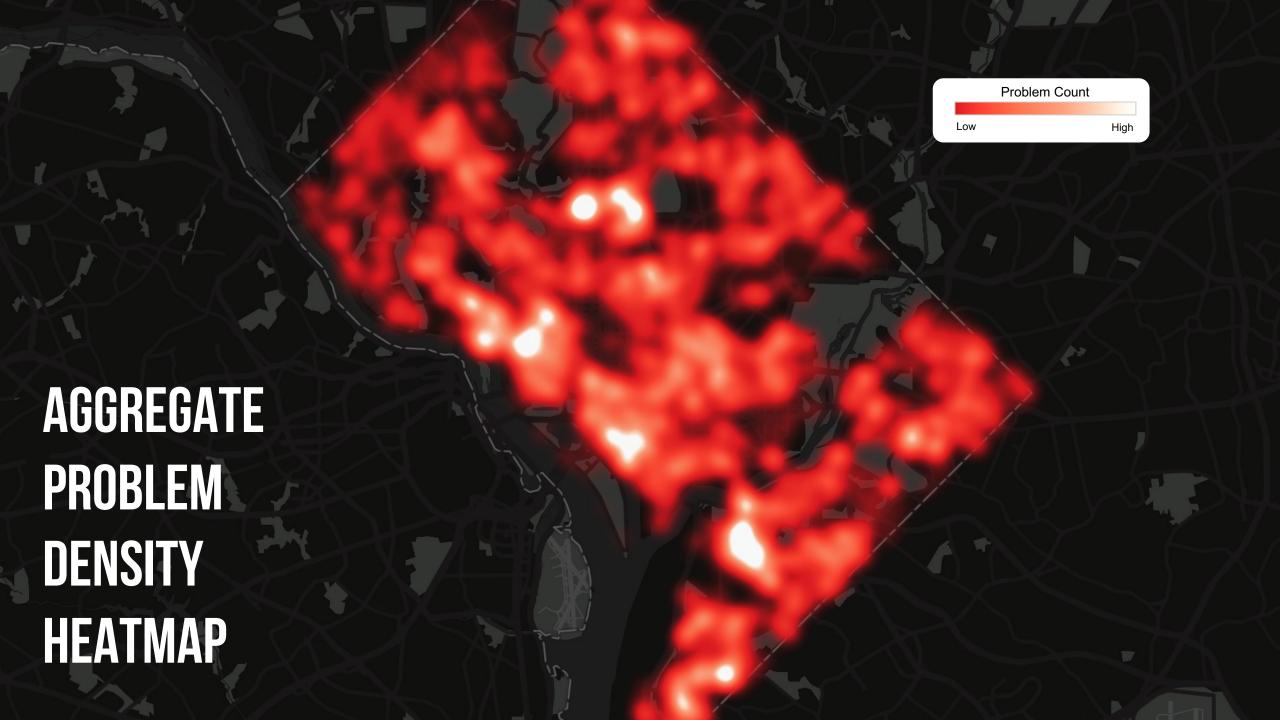Train machine learning algorithms

...

PILOT DEPLOYMENT IN 2017

Washington DC

WASHINGTON DC

1,400 USERS
260,388 LABELS
92% ACCURACY

MISSING SIDEWALKS   CURB RAMPS   MISSING CURB RAMPS   SURFACE PROBLEMS   OBSTACLES

STREET ACCESSIBILITY
SCORE VISUALIZATION

Problem Count

Low   High

© Mapbox © OpenStreetMap **Improve this**

OBSTACLES

CURB RAMPS

MISSING CURB RAMPS

SURFACE PROBLEMS

OBSTACLES

CURB RAMPS

MISSING CURB RAMPS

SURFACE PROBLEMS

AGGREGATE
PROBLEM
DENSITY
HEATMAP

Problem Count

Low   High

AGGREGATE PROBLEM DENSITY HEATMAP

Problem Count
Low — High

Anacostia
Lower socio-economic area
92% Black, 5% Non-Hispanic White, 3% Other

Problem Count

Low   High

Georgetown
Highly affluent, historic area
82% White, 8.7% Asian, 6.2% Black,

Anacostia
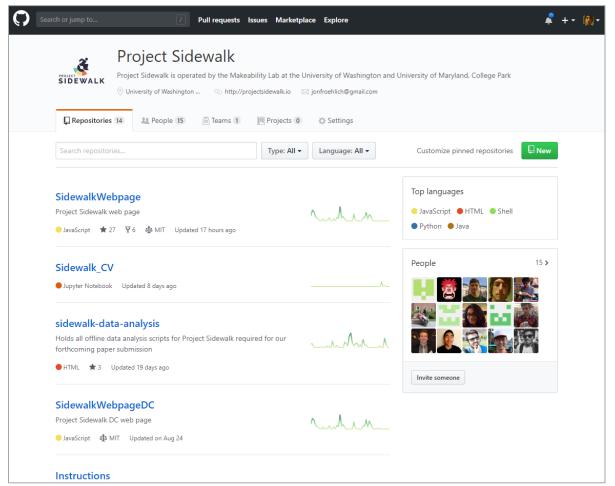Lower socio-economic area
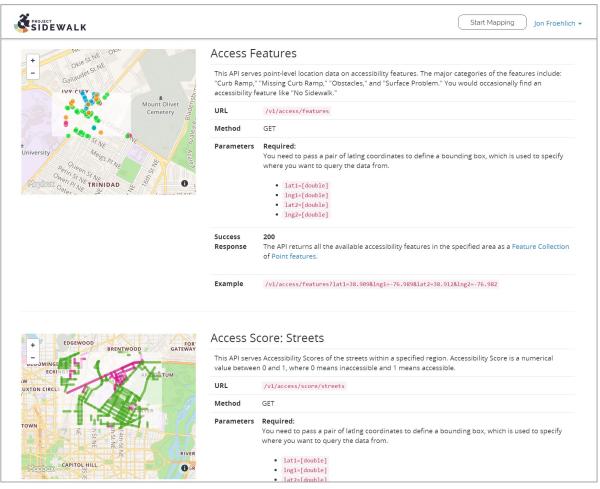92% Black, 5% Non-Hispanic White, 3% Other

This is the potential of **data-driven urban accessibility analytics** using Project Sidewalk data.

PROJECT SIDEWALK
ALL OUR CODE + DATA IS 100% OPEN SOURCE

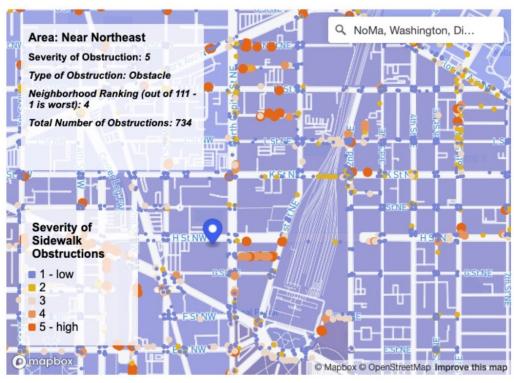https://github.com/ProjectSidewalk

http://projectsidewalk.io/api

A city is only as accessible as its sidewalks. This map shows DC's are often blocked.

WALKING   By **Barbara Moreno** (Guest Contributor)   September 10, 2019   💬 32

Area: Near Northeast

Severity of Obstruction: 5

Type of Obstruction: Obstacle

Neighborhood Ranking (out of 111 - 1 is worst): 4

Total Number of Obstructions: 734

🔍 NoMa, Washington, Di...

Severity of Sidewalk Obstructions

■ 1 - low
■ 2
■ 3
■ 4
■ 5 - high

© Mapbox © OpenStreetMap **Improve this map**

A snapshot of sidewalk obstructions on NoMa's streets. by the author.

When Washingtonians like myself look for new apartments, we pay close attention to the walk score of a neighborhood. Any score upwards of 90 on a hundred point scale marks an area as a "walker's paradise," meaning major needs such as grocery stores and transit are within walking distance. However, what is *not* factored into the walkability score is the actual condition of the sidewalks.
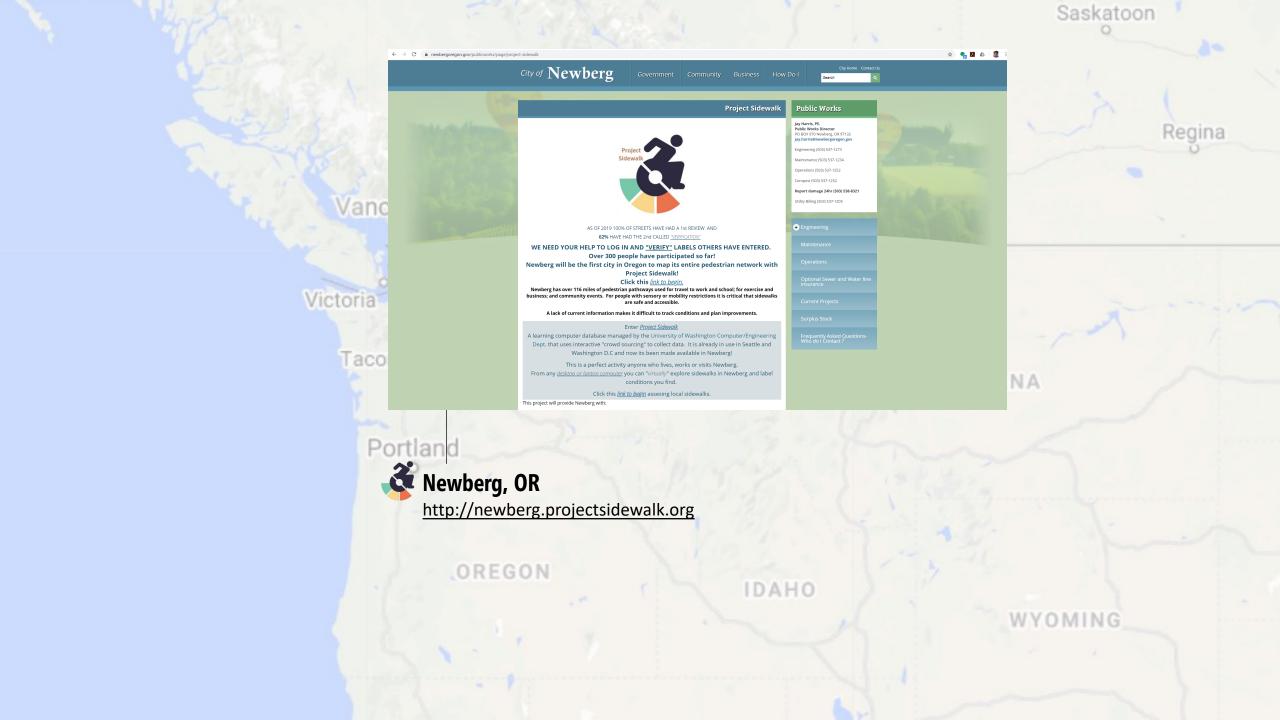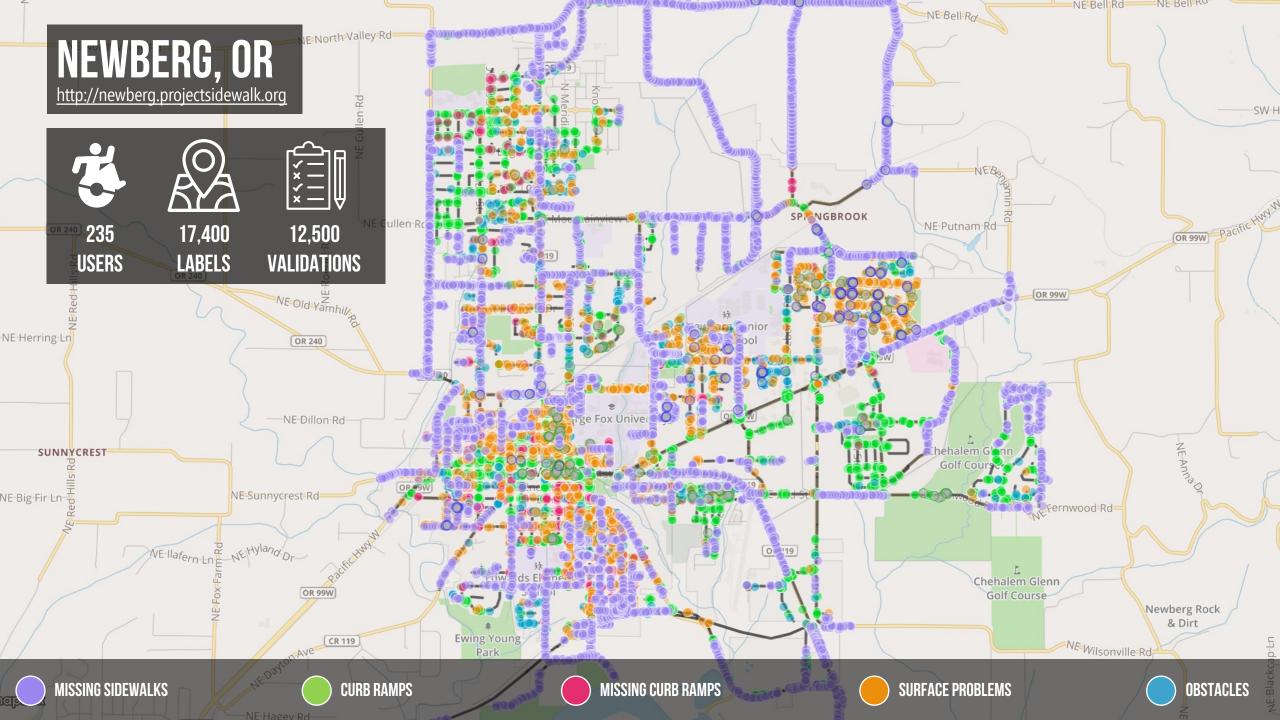
These efforts are **making a difference**.
Transforming **policy**.
Informing **urban design**.
Creating better, more **equitable transit networks**.
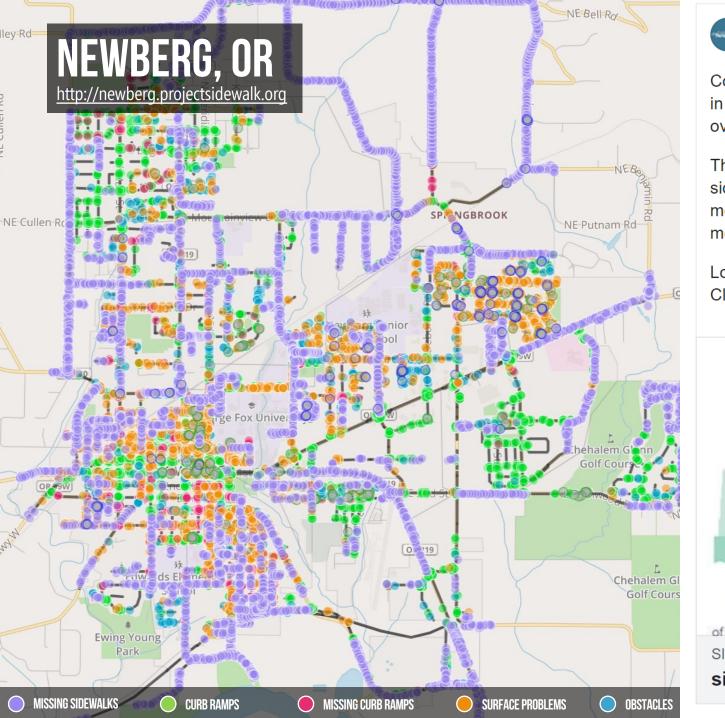
Newberg, OR

http://newberg.projectsidewalk.org

NEWBERG, OR
http://newberg.projectsidewalk.org

235 USERS

17,400 LABELS

12,500 VALIDATIONS

MISSING SIDEWALKS

CURB RAMPS

MISSING CURB RAMPS

SURFACE PROBLEMS

OBSTACLES

NEWBERG, OR
http://newberg.projectsidewalk.org

● MISSING SIDEWALKS   ● CURB RAMPS   ● MISSING CURB RAMPS   ● SURFACE PROBLEMS   ● OBSTACLES
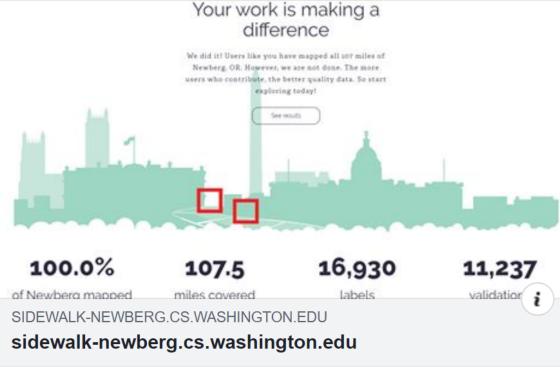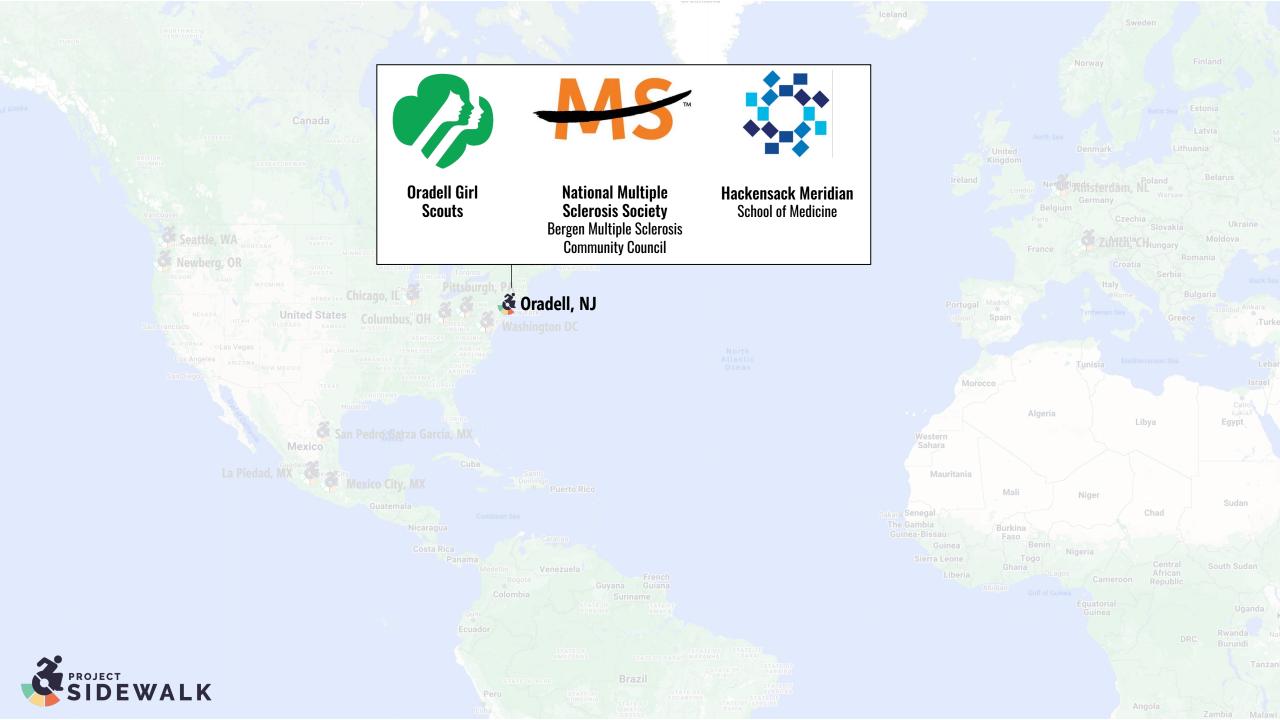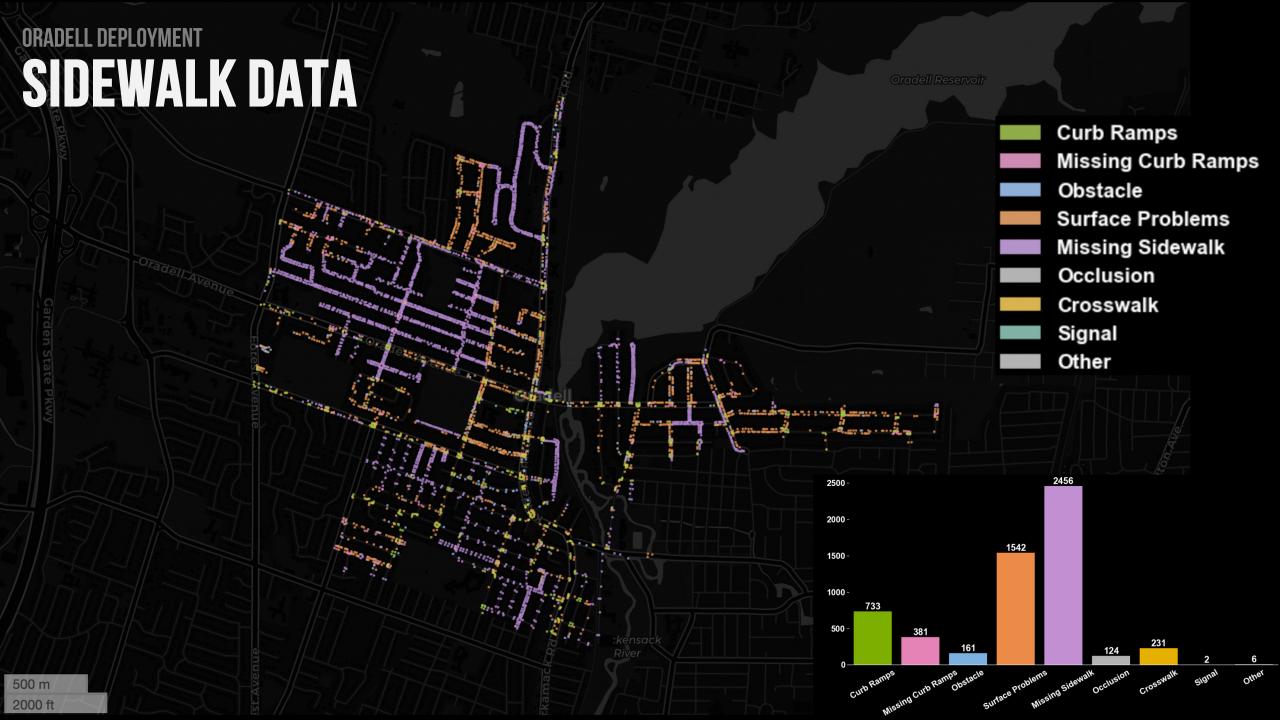
City of Newberg
January 30 at 9:29 AM · 🌐

Congratulations and THANK YOU to the citizens of Newberg for putting in the work to map 100% of Newberg through Project Sidewalk. That's over 107 miles covered with 264 local users who contributed to the data.

This information will be used to identify areas in Newberg that need sidewalks, need sidewalk repairs, and need to be updated to become more accessible. Through your efforts, Newberg can become a safer, more accessible community.

Looking to help? Verifications are still needed for the collected data. Click the link below to learn more.

Your work is making a difference

We did it! Users like you have mapped all 107 miles of Newberg, OR. However, we are not done. The more users who contribute, the better quality data. So start exploring today!

See results

100.0%	107.5	16,930	11,237
of Newberg mapped	miles covered	labels	validation

SIDEWALK-NEWBERG.CS.WASHINGTON.EDU
sidewalk-newberg.cs.washington.edu

Oradell Girl
Scouts

National Multiple
Sclerosis Society
Bergen Multiple Sclerosis
Community Council

Hackensack Meridian
School of Medicine

Oradell, NJ

ORADELL DEPLOYMENT

SIDEWALK DATA

Legend:
- Curb Ramps
- Missing Curb Ramps
- Obstacle
- Surface Problems
- Missing Sidewalk
- Occlusion
- Crosswalk
- Signal
- Other

Bar chart values:
- Curb Ramps: 733
- Missing Curb Ramps: 381
- Obstacle: 161
- Surface Problems: 1542
- Missing Sidewalk: 2456
- Occlusion: 124
- Crosswalk: 231
- Signal: 2
- Other: 6

Surface Problems
1,542 labels

Missing Sidewalks
2,456 labels

ORADELL DEPLOYMENT
TAG ANALYSIS

Surface Problem Tags	Count	% of Surface Tags	Avg Severity (SD)
height difference	**1455**	**29.0%**	**1.96 (0.99)**
cracks	**1256**	**25.0%**	**1.71 (0.79)**
uneven/slanted	**1031**	**21.0%**	**2.34 (1.02)**
grass	547	11.0%	1.46 (0.63)
very broken	235	5.0%	2.44 (1.04)
bumpy	177	4.0%	2.25 (0.92)
n/a	90	2.0%	2.00 (1.02)
narrow sidewalk	88	2.0%	2.59 (0.93)
brick/cobblestone	74	1.0%	1.95 (0.72)
sand/gravel	47	1.0%	2.26 (0.94)
construction	2	0.0%	4.00 (n/a)
street has no sidewalks	1	0.0%	3.00 (n/a)

Surface Problem

HEIGHT DIFFERENCE

Labeled: May 6, 2022, 5:14 PM   Image Date: Mar 2022

Severity   **Tags**

☺ ☺ ☹ ☹ ☹   [height difference] [uneven/slanted]

Temporary   **Description**

No   No description

HIGH SEVERITY (≥ 4) SURFACE PROBLEMS

Initial Presentation to Oradell City Council
Mar 2022

Second Mapathon (Hybrid)
Aug 2022

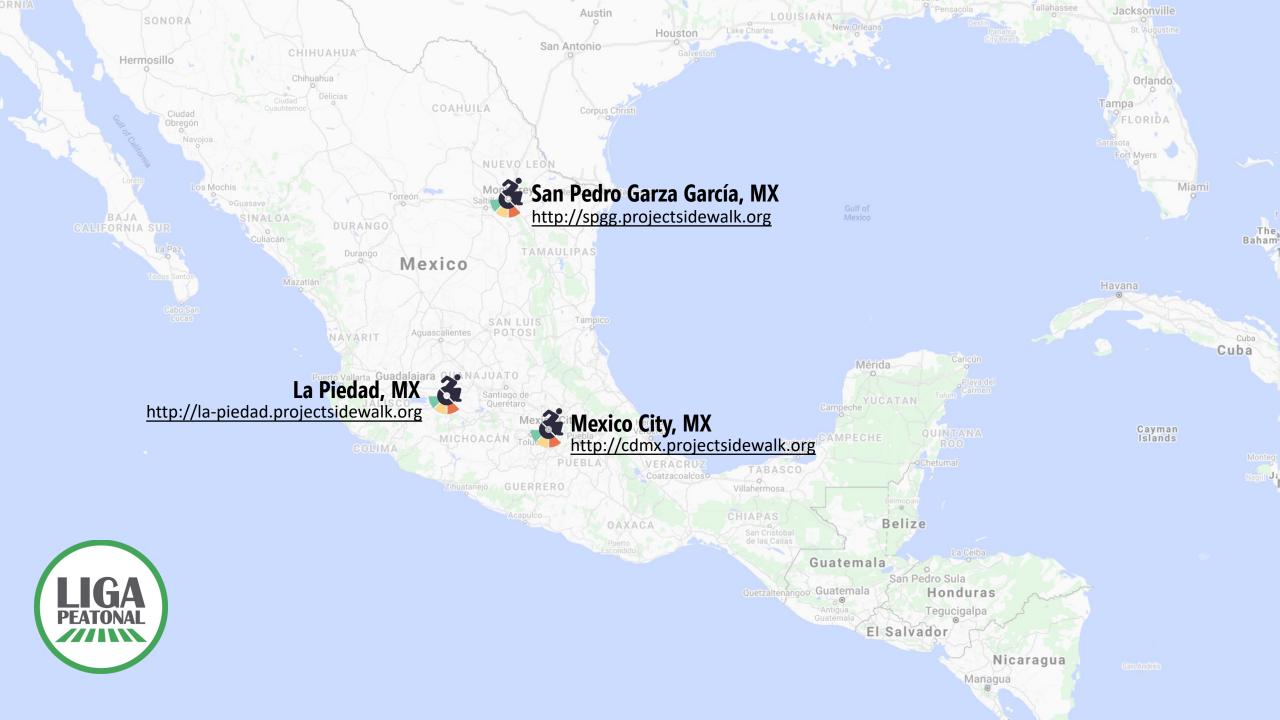## Presentation to City Council
Feb 2023

First Mapathon (Hybrid)
Apr 2022

Girl Scout Data Analysis
Oct 2022

San Pedro Garza García, MX
http://spgg.projectsidewalk.org

La Piedad, MX
http://la-piedad.projectsidewalk.org

Mexico City, MX
http://cdmx.projectsidewalk.org

LIGA PEATONAL

Creemos un camino para todas las personas

Comienza a explorar SPGG

También estamos en: Seattle, WA   Columbus, OH   Mexico City, MX   Newberg, OR

Cómo puedes ayudar

Explora virtualmente las calles de la ciudad para

Volver a tomar el tutorial | Comienza a validar | Cómo etiquetar | Ayuda | Datos ▾ | Iniciar sesión
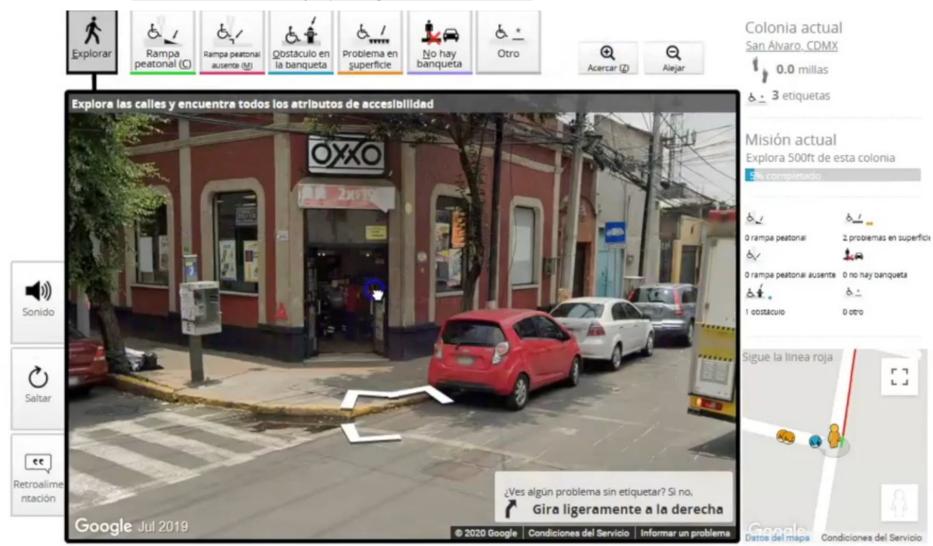
Explorar | Rampa peatonal (C) | Rampa peatonal ausente (M) | Obstáculo en la banqueta | Problema en superficie | No hay banqueta | Otro

Acercar (Z) | Alejar

Colonia actual
San Álvaro, CDMX
0.0 millas
3 etiquetas

Misión actual
Explora 500ft de esta colonia
5% completado

0 rampa peatonal   2 problemas en superficie
0 rampa peatonal ausente   0 no hay banqueta
1 obstáculo   0 otro

Sigue la línea roja

Explora las calles y encuentra todos los atributos de accesibilidad

Sonido

Saltar

Retroalimentación

OXXO

¿Ves algún problema sin etiquetar? Si no,
Gira ligeramente a la derecha

Google Jul 2019
© 2020 Google | Condiciones del Servicio | Informar un problema

Google Datos del mapa | Condiciones del Servicio

Project Sidewalk está diseñado y operado por el Makeability Lab de la Universidad de Washington
Versión 6.8.3 | Última actualización: 2020-05-26 05:12:24.755231

San Pedro
Garza
García

GOBIERNO MUNICIPAL

San Pedro Garza García, Nuevo León a 26 de octubre del 2020

To whom it may concern,

San Pedro Garza García (SPGG), a municipality with approx. 125,000 inhabitants, is one of the most urbanized municipalities in the Monterrey Metropolitan Area, the 3rd largest metropolitan area in Mexico.

The Municipal Institute for Urban Planning (IMPLANG) of San Pedro Garza García is an institute that works towards the positive development of our community through the development of urban master plans, urban development programs and social projects.

One of the priorities of the IMPLANG is the implementation of public policy oriented towards the improvement of pedestrian infrastructure and accessibility in order to improve road safety, increase the levels of inclusion and to incentivize non-motorized trips in the city. Our work is strongly based on the principles of transparency, citizen participation processes and data based decisions.

Since mid-August 2020, we have been using Project Sidewalk's tool to audit our municipality's sidewalks and crosswalks in a collaborative manner. This citizen participation process provides us with the opportunity to obtain data that will be essential for improving SPGG's urban accessibility. With Project Sidewalk we will be able to know the current status of the pedestrian infrastructure of the municipality, what are the main problems to be solved, how many there are and their location. The results will be used to propose public policies that address the main problems identified and that contribute to meeting the goals set in the Municipal Development Plan and also for the development of a new Pedestrian Master Plan for our municipality.

It is worth mentioning that Project Sidewalk is also serving as an educational tool for students of the architecture school at the Universidad Tecnológico de Monterrey (ITESM) and high school students at the Universidad de Monterrey (UDEM).

We look forward to supporting the Project Sidewalk team towards the goals outlined in their proposal, which will further strengthen our collaboration and help advance sidewalk accessibility in our Municipality.

SINCERELY

ARQ. JAVIER LEAL NAVARRO
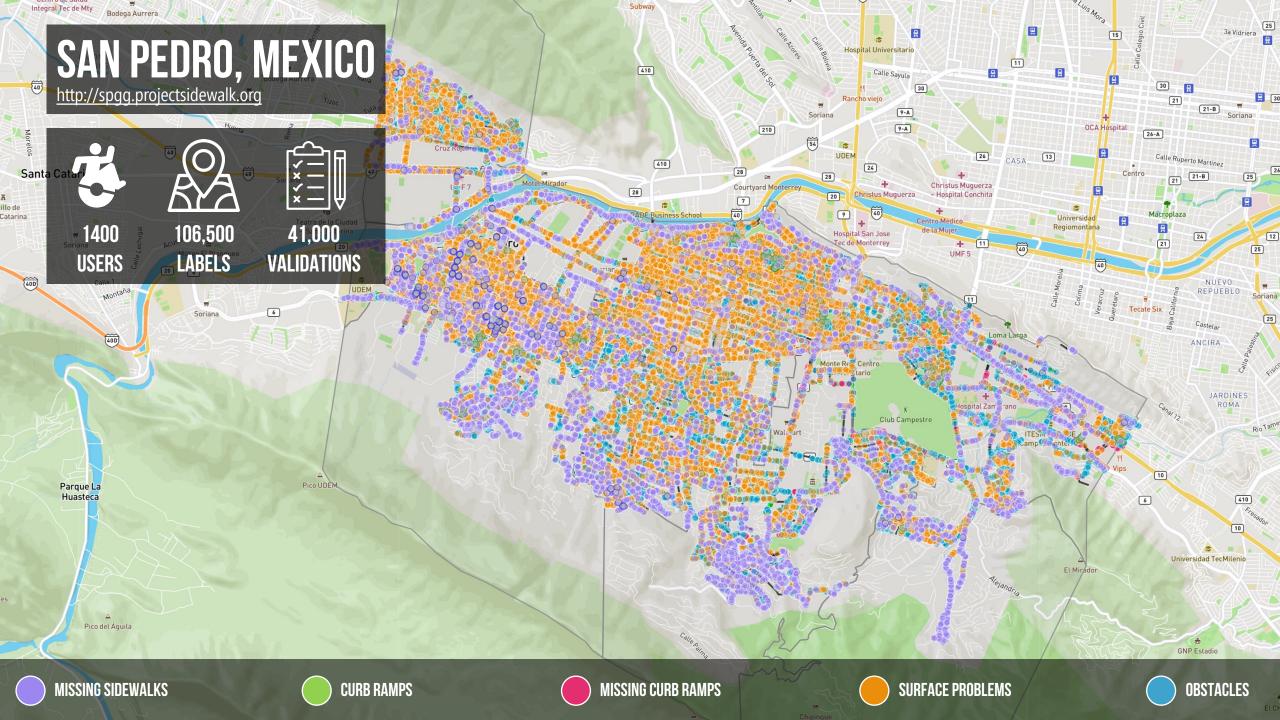HEAD OF THE DEPARTMENT
INSTITUTO MUNICIPAL DE PLANEACIÓN Y GESTIÓN URBANA

INSTITUTO MUNICIPAL DE PLANEACIÓN Y GESTIÓN URBANA
Libertad s/n, Centro, Edificio Polivalente, Planta Alta
San Pedro Garza García, Nuevo León. C. P.66200
Tels. (81) 2127-2929
www.sanpedro.gob.mx

"Project Sidewalk provides us with data that is **essential to improving San Pedro's urban accessibility**. With Project Sidewalk, we **know the main problems** to be solved, how many problems there are, and their location... The results will be used to inform a **new Pedestrian Master Plan** for our municipality.

San Pedro Garza García

GOBIERNO MUNICIPAL

SAN PEDRO, MEXICO

1400 USERS

106,500 LABELS

41,000 VALIDATIONS

MISSING SIDEWALKS   CURB RAMPS   MISSING CURB RAMPS   SURFACE PROBLEMS   OBSTACLES

CURB RAMPS
SEVERITY RATING 5
http://sidewalkgallery.io/

Narrow + obstacle

Not enough landing space

Points into traffic

Narrow

No friction/tactile strip

Not level with street

Steep + obstacle

Steep

Poor design

Find and label the following

Explore | Curb Ramp | Missing Curb Ramp | Obstacle in Path | Surface Problem | No Sidewalk | Other

Zoom In | Zoom Out

Current Neighborhood
Cosmopolita, CDMX
👣 **0.3** miles   ♿ **69** labels

Explore the streets and find all the accessibility attributes
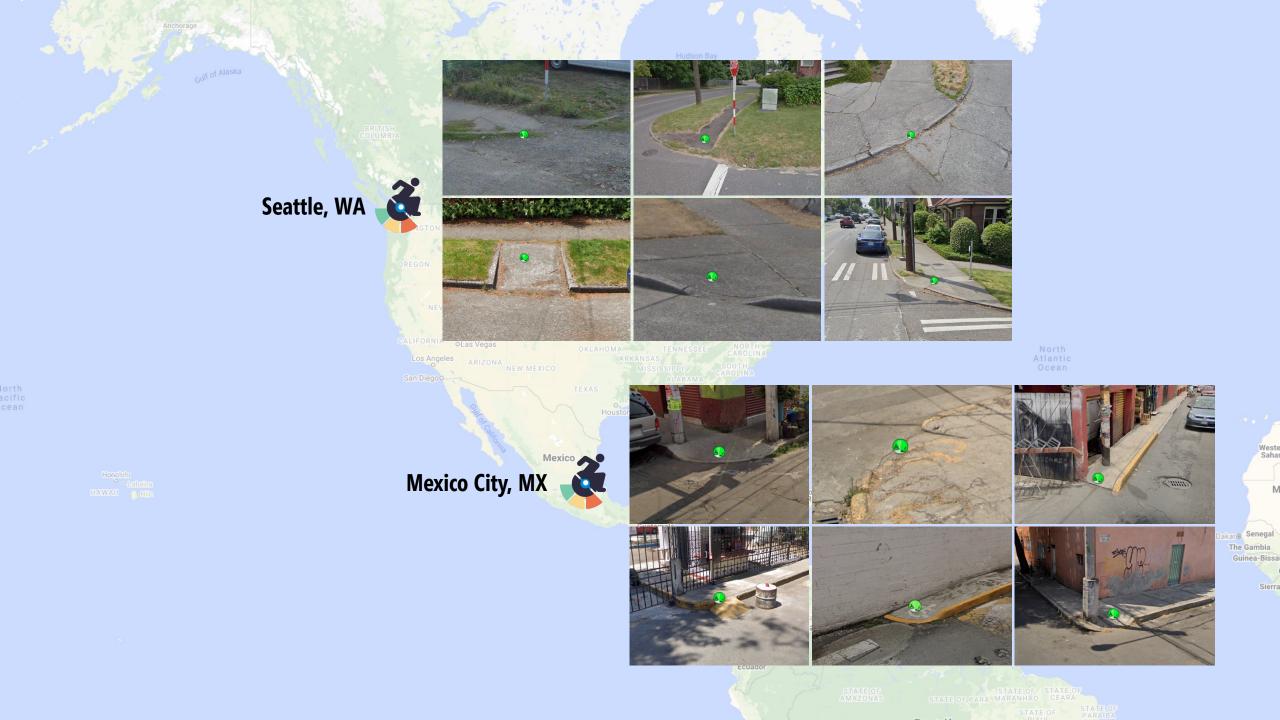
NEW CURB RAMP IS NOT ACCESSIBLE.
CAN ONLY BE ENTERED FROM ONE DIRECTION

Current Mission
Explore 750 ft of this

0 missing curb ramp   0 no sidewalk

1 obstacle   0 other

Sound

Jump

Feedback

Passable 1 2 3 4 5 Not Passable

Can only be entered from one direction. Has a stee

Add Tags: narrow | points into traffic | missing friction strip | steep
not enough landing space

☐ Temporary (e.g., construction)   OK

Do you see any unlabeled problems? If not,
↰ **Turn slightly left**

Follow the red line

Google   © 2020 Google | Terms of Use | Report a problem   Map data ©2020 INEGI | Terms of Use

Seattle, WA

Mexico City, MX

Where does **AI** come in?

DEPLOYMENTS

20 CITIES, 10K MILES, 1.5M DATA POINTS

13K USERS

913K LABELS

609K VALIDATIONS

ONLINE MAP IMAGERY

+

REMOTE CROWDSOURCING INTERFACES
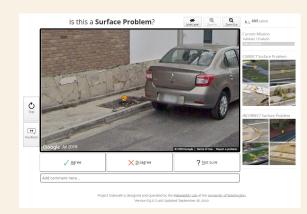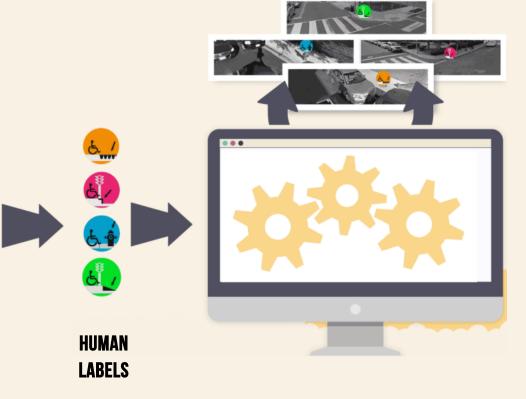
Labeling missions

Validation missions

HUMAN LABELS

MACHINE LEARNING

PROJECT SIDEWALK
HTTP://PROJECTSIDEWALK.IO

ONLINE MAP

REMOTE CROWDSOURCING

MACHINE LEARNING
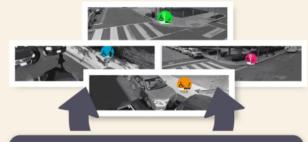
HOW CAN WE USE AI TO IMPROVE DATA QUALITY & INCREASE ASSESSMENT SPEED?

Labeling missions

Is this a **Surface Problem**?

✓ Agree   ✗ Disagree   ? Not sure

Validation missions

HUMAN LABELS

PROJECT SIDEWALK
HTTP://PROJECTSIDEWALK.IO
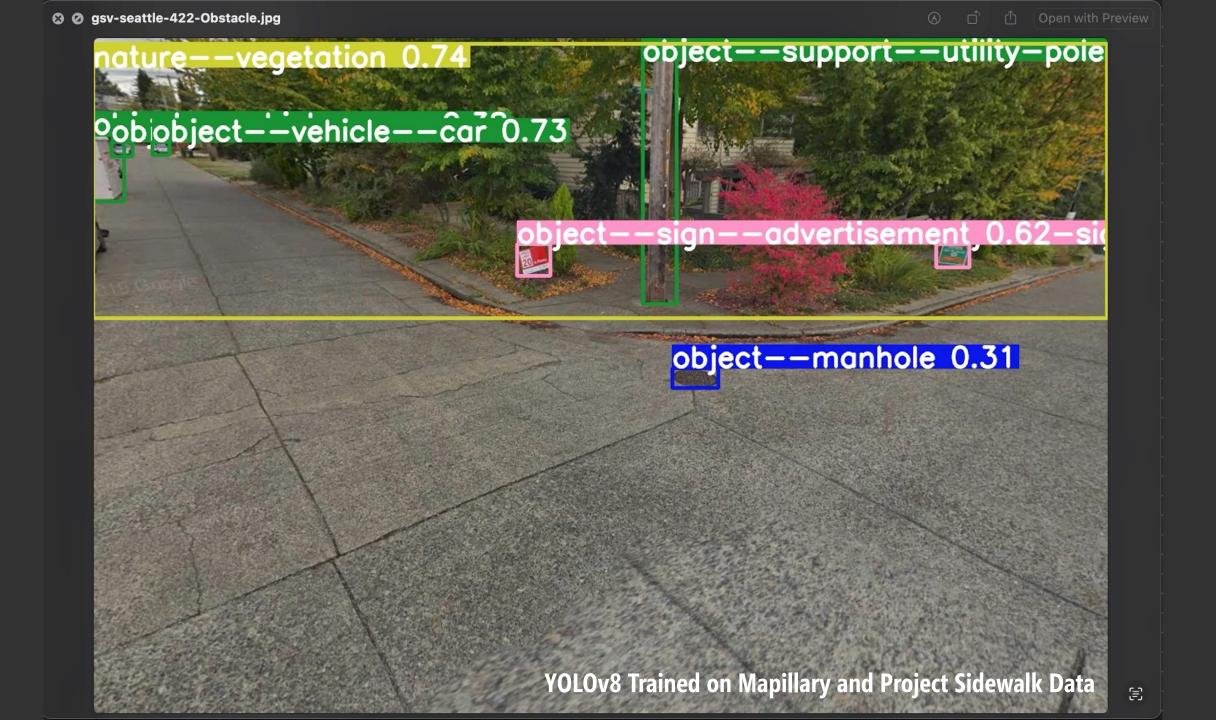
Explore | How to Label | API | Tools ▾ | Seattle ▾ | **Sign in** | US English ▾
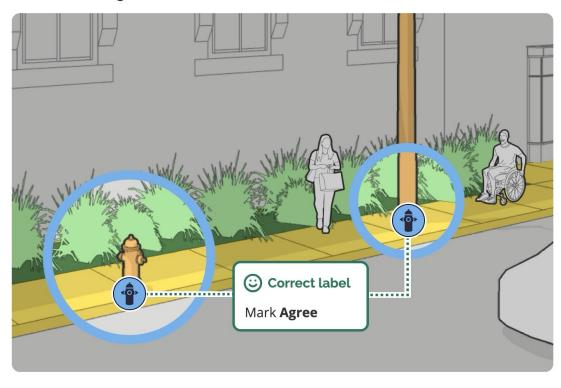
YOUR MISSION

Validate 65 Obstacle in Path Labels

☺ **CORRECT EXAMPLE**

Obstacle in Path

Obstacles are barriers that impede **pedestrian pathways** for people using wheelchairs, walkers, or other mobility aids.

Not all fire hydrants, poles, and signs are obstacles—only those that clearly obstruct pedestrian paths.

Start mission

Fig. 1. An overview of LabelAId system: (1) a novel ML-based pipeline for detecting labeling mistakes, which is efficiently trained to infer label correctness based on user behavior and domain knowledge; (2) a real-time ML model and UI that tracks worker behavior and intervenes when an inferred mistake is occurring. LabelAId improves data quality and worker expertise by providing just-in-time feedback during crowdsource labeling.

Crowdsourcing platforms have transformed distributed problem-solving, yet quality control remains a persistent challenge. Traditional quality control measures, such as pre-screening workers and refining instructions, often focus solely on optimizing economic output. This paper explores just-in-time AI interventions to enhance both labeling quality and domain-specific knowledge among crowdworkers. We introduce LabelAId, an advanced inference model combining *Programmatic Weak Supervision* (PWS) with *FT-Transformers* to infer label correctness based on user behavior and domain knowledge. Our technical evaluation reveals that our LabelAId pipeline consistently outperforms state-of-the-art ML baselines, improving mistake inference accuracy by 36.7% with 50 downstream samples. We then implemented LabelAId into Project Sidewalk, an open-source crowdsourcing platform for urban accessibility. A between-subjects study with 34 participants demonstrates that LabelAId significantly enhances label precision without compromising efficiency while also increasing labeler confidence.

CCS Concepts: • **Do Not Use This Code → Generate the Correct Terms for Your Paper**; *Generate the Correct Terms for Your Paper*; Generate the Correct Terms for Your Paper; Generate the Correct Terms for Your Paper.

Additional Key Words and Phrases: Do, Not, Us, This, Code, Put, the, Correct, Terms, for, Your, Paper

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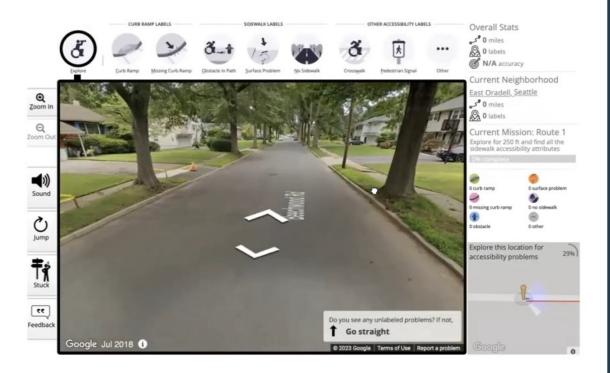
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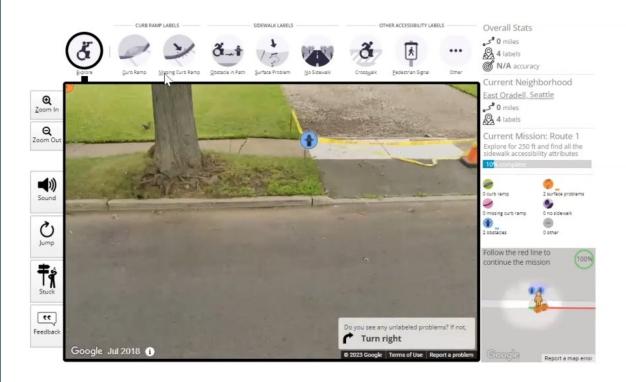
OVERARCHING RESEARCH QUESTIONS

How can we use AI to infer **when humans are making mistakes** and intervene?

How to **design those interventions**?

original Project Sidewalk

Project Sidewalk with LabelAld

BusStopCV: A Real-time AI Assistant for Labeling Bus Stop Accessibility Features in Streetscape Imagery

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Figure 1: The BusStopCV human+AI data collection workflow: a real-time YOLOv8 CV model automatically detects bus stop features such as shelters and benches in streetscape imagery (left). Users can verify detections via lightweight click interactions (middle) or manually label features not detected by the model (right). Verified bounding boxes turn from dashed to solid lines. See demonstration video in supplementary materials.

ABSTRACT

Public transportation provides vital connectivity to people with disabilities, facilitating access to work, education, and health services. While modern navigation applications provide a suite of information about transit options—including real-time updates about bus or train arrivals—they lack data about the accessibility of the transit stops themselves. Bus stop features such as seatings, shelters, and landing areas are critical, but few cities provide this information. In this demo paper, we introduce BusStopCV, a Human+AI web prototype for scalably collecting data on bus stop features using real-time computer vision and human labeling. We describe BusStopCV's design, custom training with the YOLOv8 model, and an evaluation of 100 randomly selected bus stops in Seattle, WA. Our findings demonstrate the potential of BusStopCV and highlight opportunities for future work.

KEYWORDS

urban accessibility, bus stops, accessible transit systems, computer vision, crowdsourcing

1   INTRODUCTION

Public transportation systems provide many benefits, such as mitigating traffic congestion [9], reducing pollution [9], enhancing economic growth [6], and improving health and well-being [16]; however, significant barriers continue to limit how people with disabilities use public transportation [26]. While a city's entire transit system requires careful assessment—from getting on a train or bus to finding accessible and safe seating—the transit stop itself is often overlooked, perceived as a mere waiting point instead of an integral part of mobility [1].

Modern navigation tools such as Google Maps [8] and Apple Maps [4] offer real-time bus information but fall short in providing data on essential bus stop accessibility features like seating availability, shelter provisioning, conditions of the landing area, and sidewalk connectivity [5]. Some cities publish open data about bus stop features; however, this practice is bespoke and limited by data collection costs and a lack of data standards [5]. In this demo paper, we introduce a new human+AI approach [3] to semi-automatically gather data on bus stops using real-time computer vision (CV) and

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OVERARCHING RESEARCH QUESTION

With advances in AI, how can we completely reconfigure the labeling flow in Crowd+AI streetscape labeling?

BusStopCV: A real-time AI assistant for labeling bus stop accessibility features in streetscape imagery

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DISCUSSION

What are some **potential tensions** with relying on AI for data collection and/or validation?

How could we **address** those tensions?

Should AI be used to assess transit infrastructure?

What would be **necessary to make it deployable** in your organization or city?

projectsidewalk.org

Discussion #3

What are some **potential tensions** with relying on AI for data collection and/or validation?
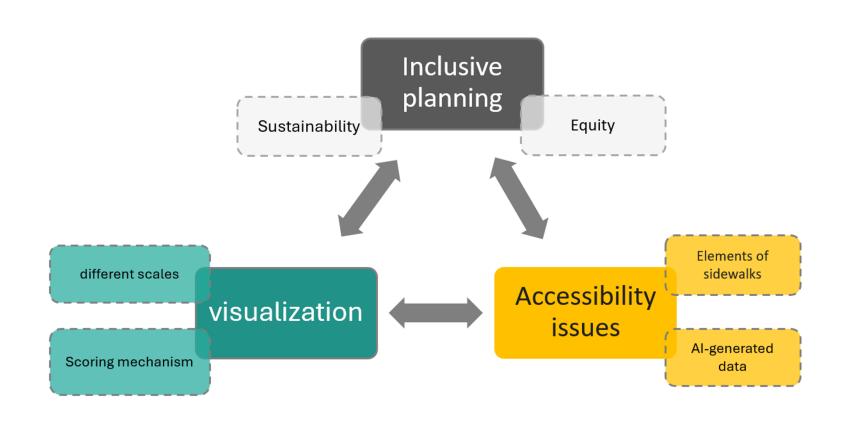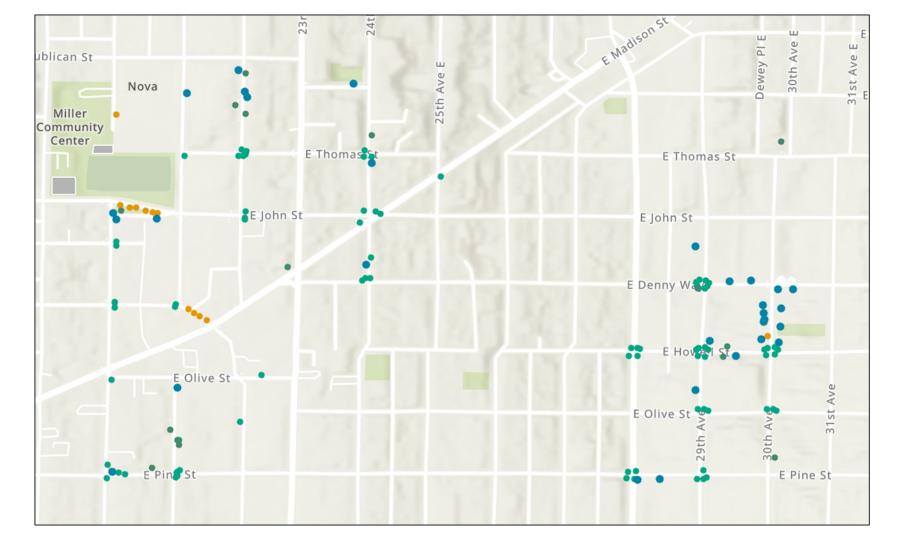
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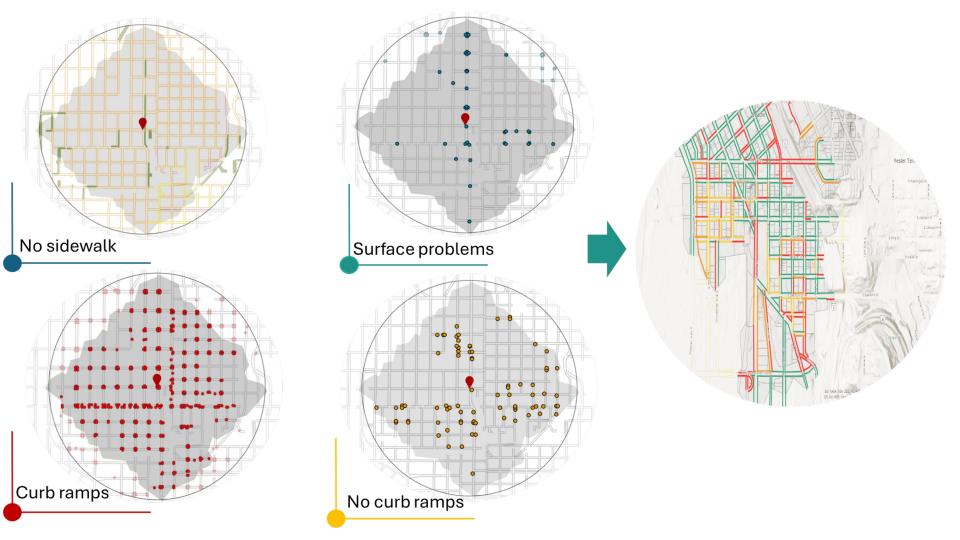
Visualization tools for community planner
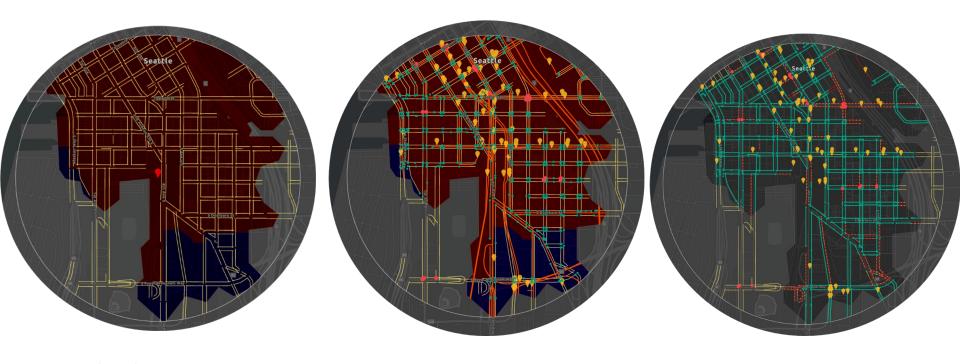
Minoo Abrishami

Developing metrics

Metric	Direct of impact on Sidewalk Score	Assigning weights
Street speed limit beside the sidewalks	Increasing this degrades the Sidewalk Score	0.5
Number of crosswalks for each sidewalk	Increasing this improves the Sidewalk Score	0.65
Number of signs for each sidewalk	Increasing this improves Sidewalk Score	0.76
Number of curb ramps for each sidewalk	Increasing this improves the Sidewalk Score	0.87
Number of stairways in each sidewalk	Increasing this degrades the Sidewalk Score	0.45
Sidewalk Width	Increasing this improves the Sidewalk Score	0.54
Obstacles, obstructed pathways, temporary barriers, or temporary barriers	Increasing this degrades the Sidewalk Score	0.61
Connections with public transit	Increasing this improves the Sidewalk Score	0.47

No sidewalk

Surface problems
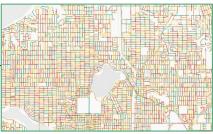
Curb ramps

No curb ramps

Land use
sociodemographics

Sidewalk elements

Network profile

Maps of system-wide transportation accessibility provides spatial view of issues

Scorecard and metrics give overview of status and progress

AI automatically identifies accessible infrastructure from Google Street view

Discussion #4

- How could visualizations be used to prioritize infrastructure improvements?
- What visualizations would be most useful for convincing policymakers?
- What kinds of metrics or analytics would be most useful for your efforts?

Action Planning Activity

Action planning to incorporate new tools locally

- When walk out what will you do
- How can you tie these efforts to linking existing and upcoming planning efforts for health, safety and environment

Thank you!