The Billion-User Blind Spot: Who, What, and How of Digital Accessibility

Sean Keegan

Stanford Office of Digital Accessibility

Stanford | University IT

When is an accessibility issue a “feature request” versus a “bug”?

The Who

(not  *or*  *)*

Who is impacted?

73+ million

Adults with disabilities in United States

About 28%

More than 1 in 4 people

31% registered

of Stanford students with the OAE

19% receiving services

of Stanford students

Data from CDC Disability and Health Data System - 2022

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ROI

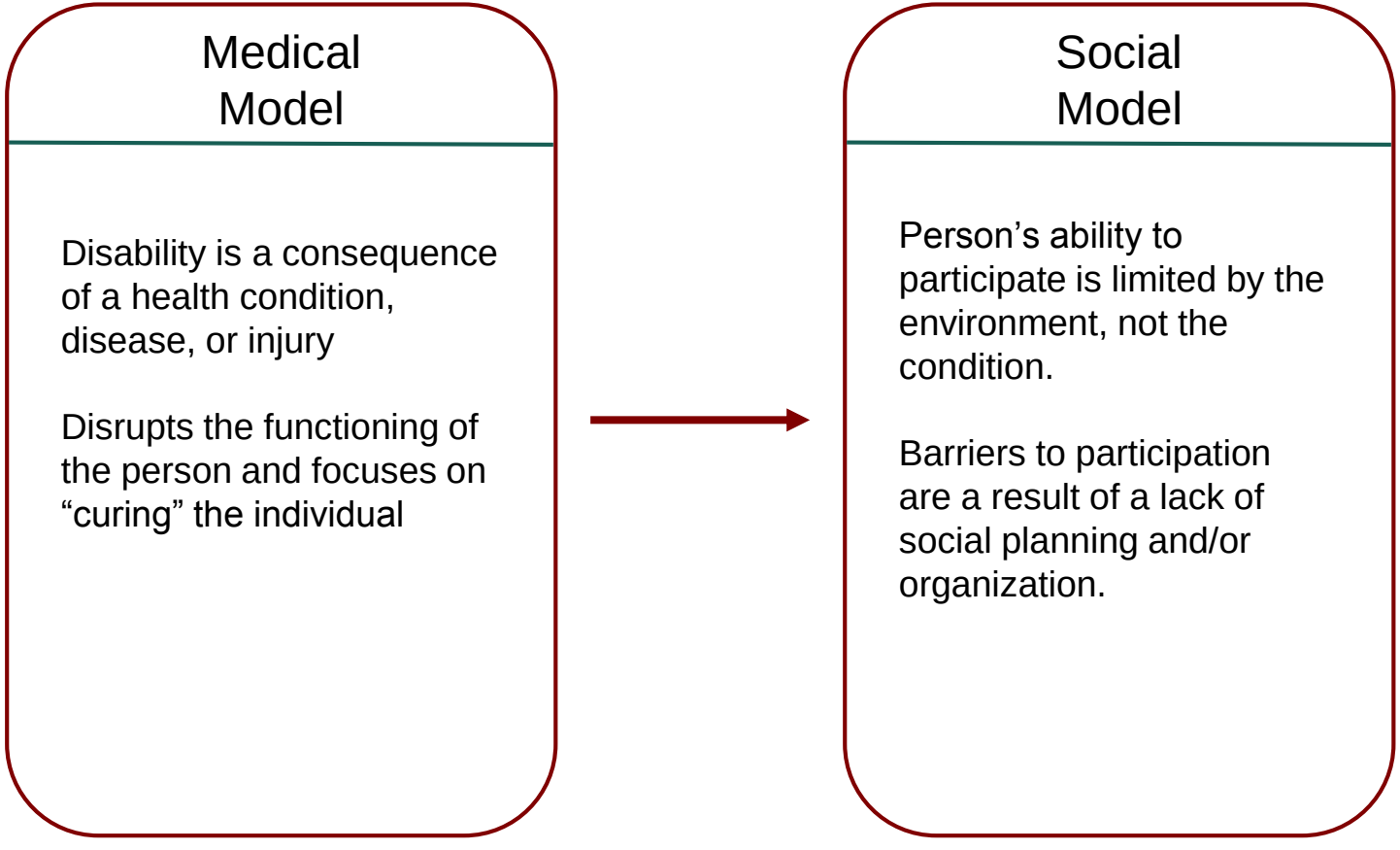
The “missed opportunity cost” perspective

- Again - about 1 in 4 adults
- Approximately 35% are of working age (16-64)
  - Discretionary income was calculated at $21 billion
  - Greater amount compared to other minority groups
- People with disabilities are “the third largest market segment in the United States” - *from U.S. Office of Disability Employment Policy*
- The “market size more than doubles when considering family members, caregivers, and others who prioritize goods and services that are inclusive of people with disabilities.”

“A Hidden Market: The Purchasing Power of Working-Age Adults With Disabilities” April, 2018.
https://www.air.org/resource/hidden-market-purchasing-power-working-age-adults-disabilities

The What

Change in Perspective



Defining “Accessible”

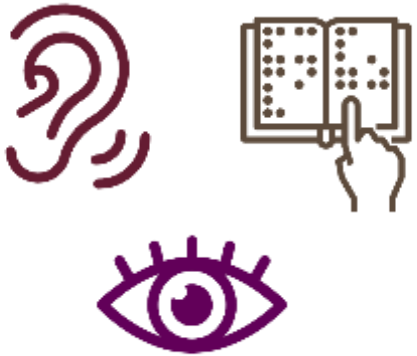
A person with a disability is afforded the opportunity to **acquire the same information, engage in the same interactions, and enjoy the same services** as a person without a disability in an equally effective and equally integrated manner, **with substantially equivalent ease of use**.

South Carolina Technical College System - OCR Compliance Review No. 11-11-6002

WCAG: Web Content Accessibility Guidelines

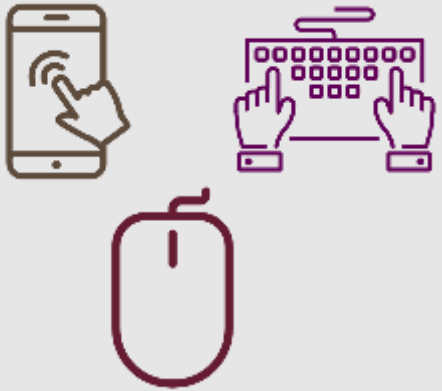
Perceivable

- Information and user interface components are presentable to users in ways they can perceive.



Operable

- User interface components and navigation must be operable.



From "Accessibility Principles", W3C Web Accessibility Initiative

WCAG: Web Content Accessibility Guidelines

(cont.)

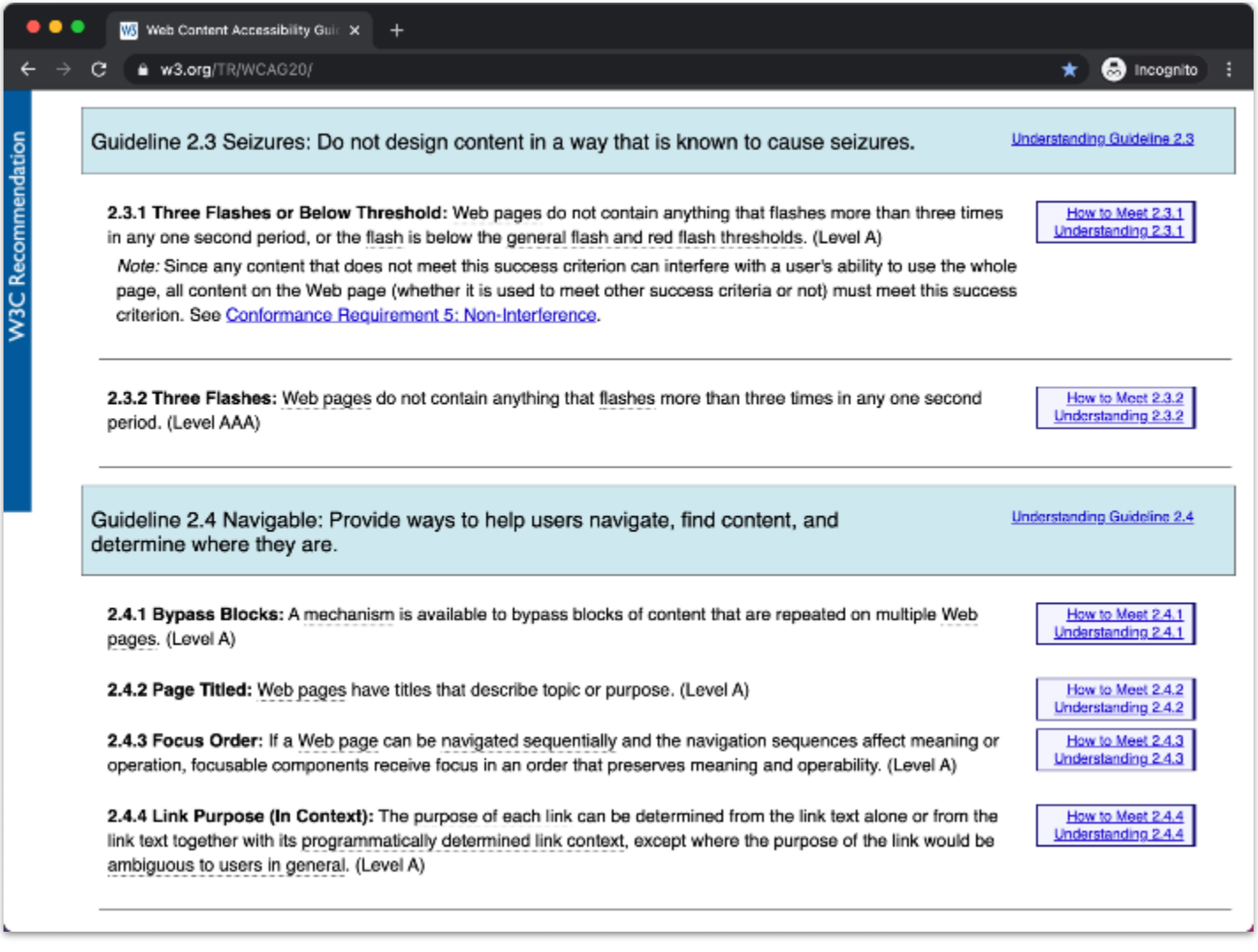
Understandable

- Information and operation of user interface must be understandable.

Robust

- Content must be robust enough that it can be interpreted reliably by a wide variety of user agents, including assistive technologies.

From "Accessibility Principles", W3C Web Accessibility Initiative



Guidelines provide testable Success Criteria. These are:

- Measurable
- Repeatable
- “Technology agnostic”

How do people with disabilities access digital content?

Alternate keyboard and mouse options

BIGTrack 2 trackball mouse
(with switch buttons)

CharaCorder 2
chorded keyboard

Screen Readers

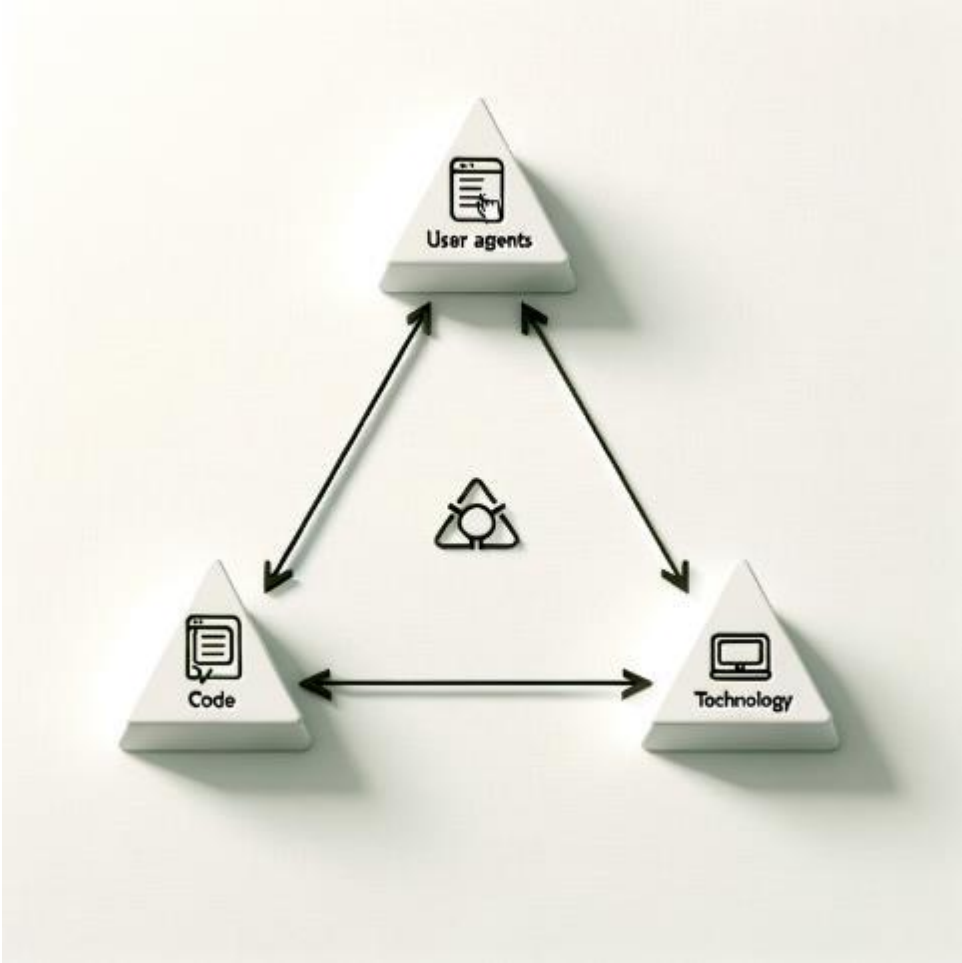
- Windows OS
  - JAWS ($)
  - NVDA (Free)
- Mac and iOS
  - VoiceOver (Built in)
- Android
  - Accessibility Suite (TalkBack)
- Braille Readers

Getting it to work

Web browsers must create an Accessibility Tree for assistive technologies to parse

Assistive technologies must be interoperable with the browser's Accessibility Tree

Code must be accessible by including semantic meaning and other relevant information of elements (e.g., name, role, state, description)



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Activity 1

(https://focus.hteumeuleu.com/)

Activity 1 - Keyboard Accessibility

What to do

1. Get into groups of 2 to 3
2. Go to Hocus :Focus game
3. Using only the keyboard, proceed through the various levels

Questions

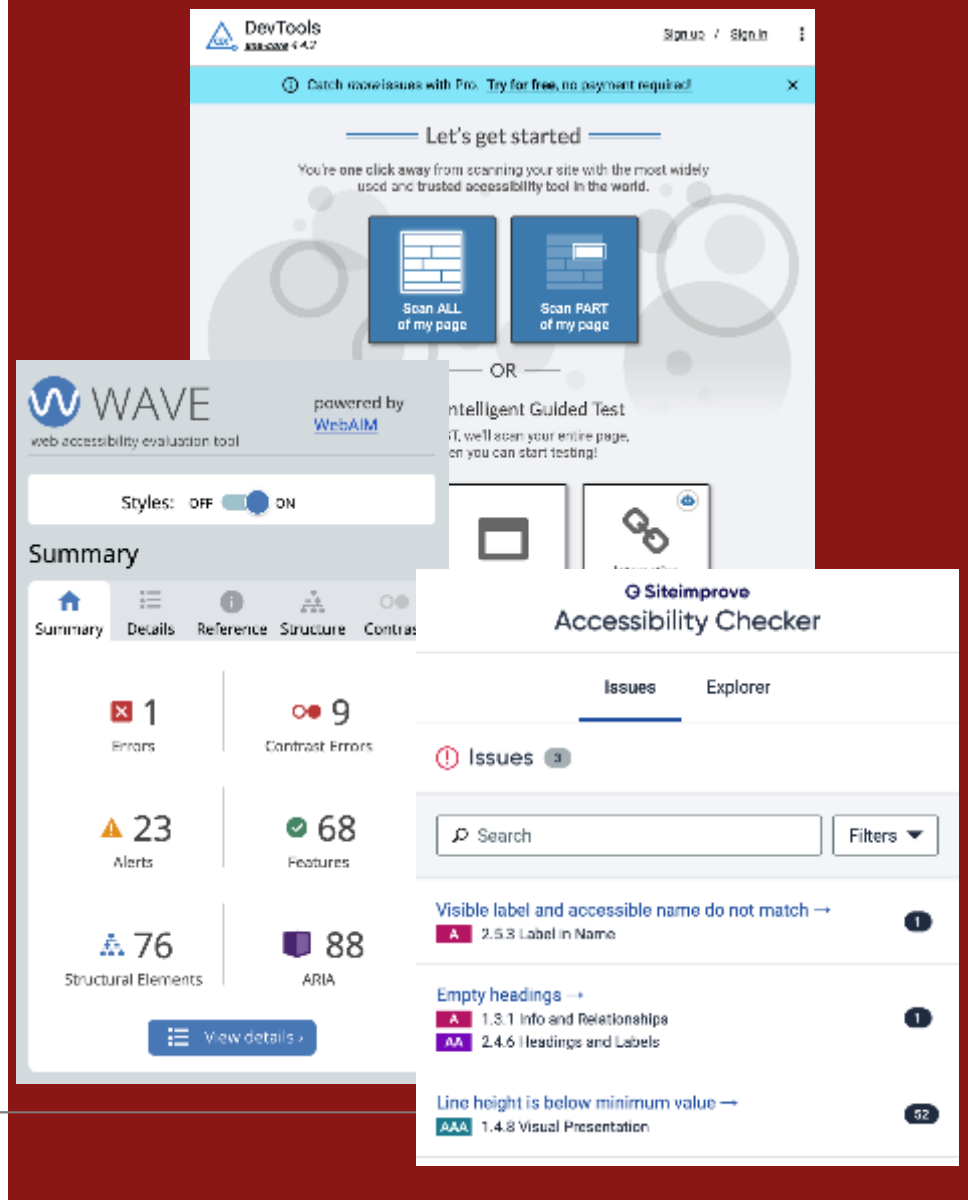
- What issues did you experience when navigating with a keyboard?
- What were some of the (intentional) failures in the design?

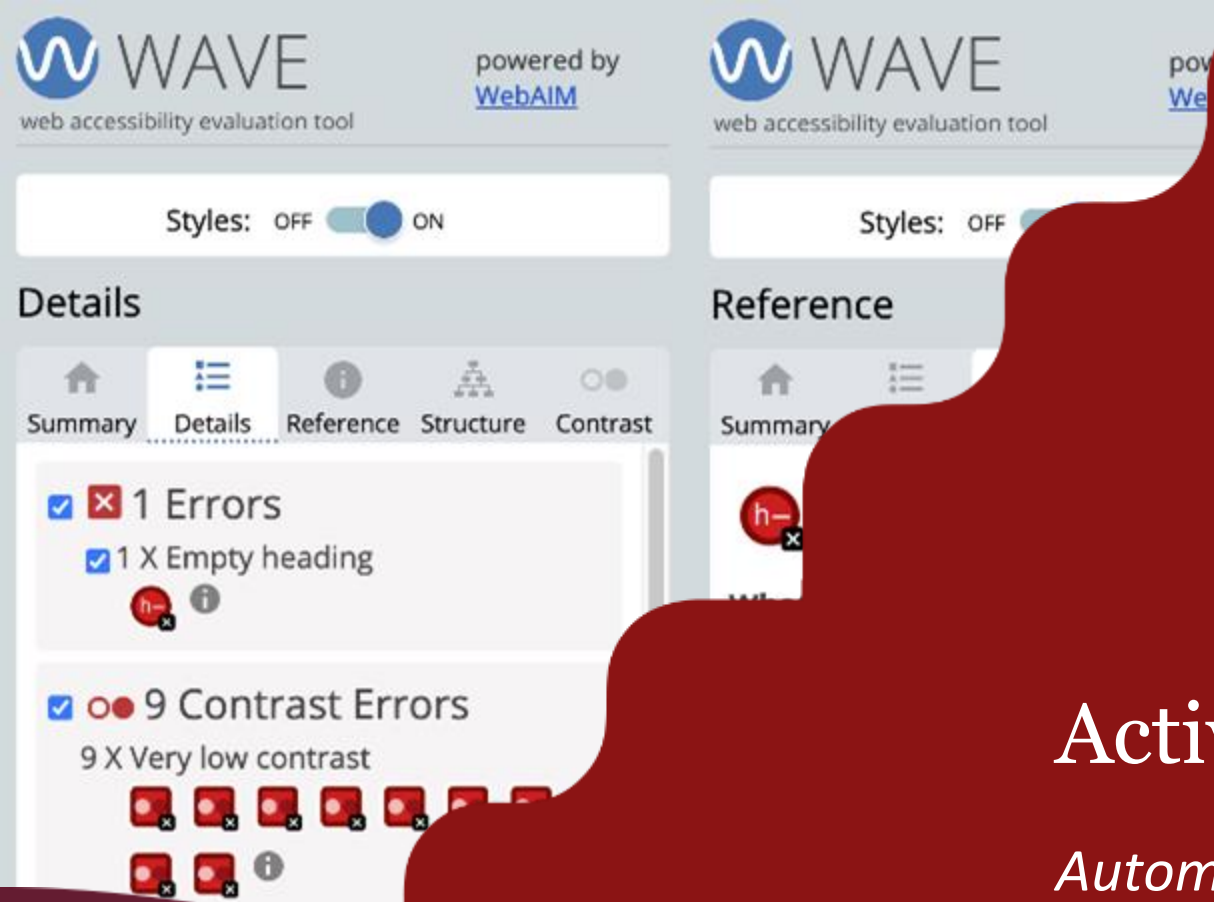
How to ensure accessibility for digital content?

Automated Testing

Browser-based Tools

- Quick and Easy
- Catch the low-hanging programmatic errors
- Limited tests - captures approx 35% of issues.
- Potential false positives and negatives
- False sense of security





Activity

Automated testing

Activity 2 - Automated Testing

What to do

1. Get into a **new group** of 2 to 3
2. Download and install one of the following tools:
   a. axe DevTools
   b. WAVE
   c. Siteimprove Accessibility Checker
3. Visit at least two websites and run automated tests.

Questions

- How many issues were identified?
- Were the results helpful?
- What “view” helped you identify the actual accessibility issue?
- How does an automated check connect to a real user's experience?

Manual Testing

Testing every page of a site is not realistic

Choose representative pages or UI elements:

- Critical pathways through the site or app
- High-traffic pages
- Interactive elements

Avoid testing with a screen-reader first - they often try to “fix” accessibility issues that can still affect many other users.

Manual Testing

Have a workflow for conducting manual tests

- Accessibility Quick Checks Guide
- Quick Checks - Google Doc Version

Other workflows:

- Section 508 - Trusted Tester
- DWP Accessibility Manual

How will AI tools impact accessibility?

Image recognition & description

Write an ALT text for this image

A picturesque view of three distinct residential houses on a steep incline. The buildings showcase a variety of architectural styles, with the center house painted in light blue and featuring elegant balconies. The left house is gray with a decorative facade, while the right house is cream-colored with intricate detailing. Lush greenery surrounds the properties, and the street is visible with a gentle slope. The sky is clear and blue, enhancing the vibrant appearance of the homes.

Write an ALT text for this image in the context of parking in San Francisco

A steeply sloped street in San Francisco showcasing three distinct residential houses, emphasizing the city's unique parking challenges. The houses are varied in architectural style, with the central blue house featuring steps leading up to the front door, indicating limited parking space. The left house has a garage partially visible, while the right house's driveway is also visible but appears narrow. Lush greenery frames the homes, typical of San Francisco's hilly landscape, highlighting the need for creative parking solutions in the area.

Write an ALT text for this image that is 150 characters or less

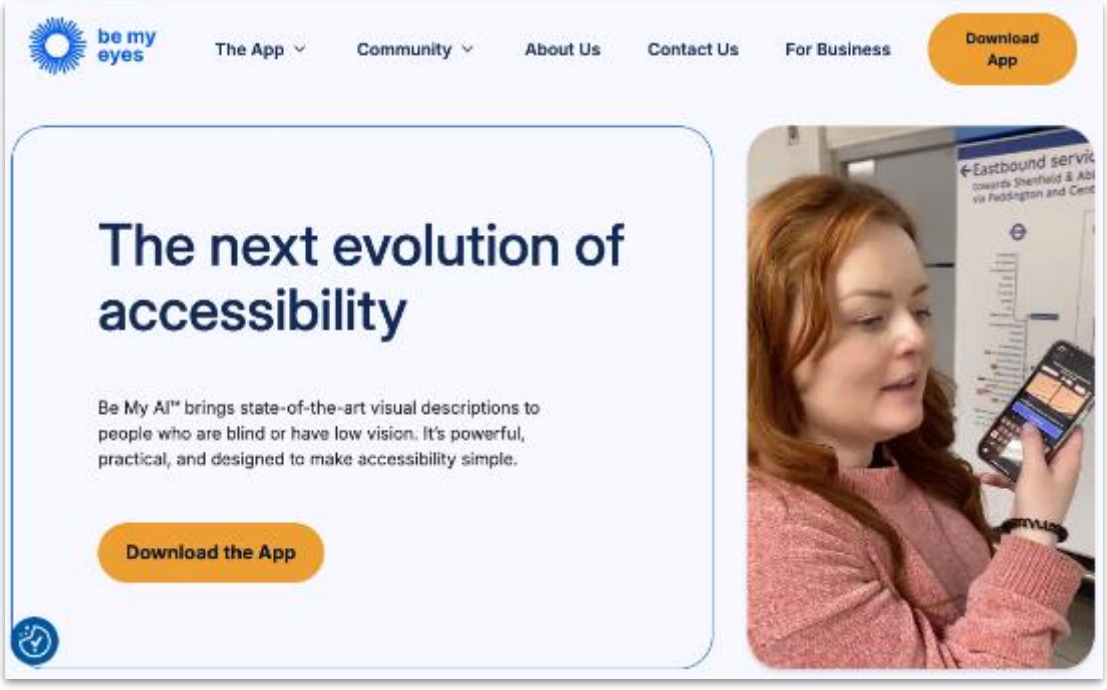
Three stylish homes on a steep street, showcasing unique architectural designs and lush greenery surrounding the entrances. Clear blue sky above.

145 Characters

Image recognition in real life places

Be My AI is a mobile app that uses the camera to capture images and upload that to AI-models.

This results in a short description that the user can then request further details about the image.



Code development

A11y LLM Eval

All Models were tested against 3 test cases. Each test case was tested 100 times. This results in **300** total samples being evaluated per model.

Model	Rank	WCAG Pass Rate*	Avg Total WCAG Failures	Avg Axe WCAG Failures	Avg Assertion WCAG Failures	Avg Best Practice Failures
GPT-5 Mini	1	31%	4.98	4.26	0.72	3.12
GPT-5	2	29%	5.94	5.37	0.57	3.15
GPT-5 Codex	3	25%	6.55	6.01	0.53	2.18
GPT-5 Nano	4	20%	4.71	4.08	0.63	2.87
Gemini 2.5 Flash	5	1%	8.54	6.86	1.68	2.97
Gemini 2.5 Flash Lite	6	1%	7.42	5.11	2.31	7.05
Grok 4 Fast Non-Reasoning	7	0%	4.70	2.44	2.26	6.87
Claude Sonnet 4.5	8	0%	6.41	3.68	2.73	8.00
DeepSeek V3.1	9	0%	6.80	4.59	2.21	3.54
Claude Haiku 4.5	10	0%	12.66	10.08	2.58	15.25

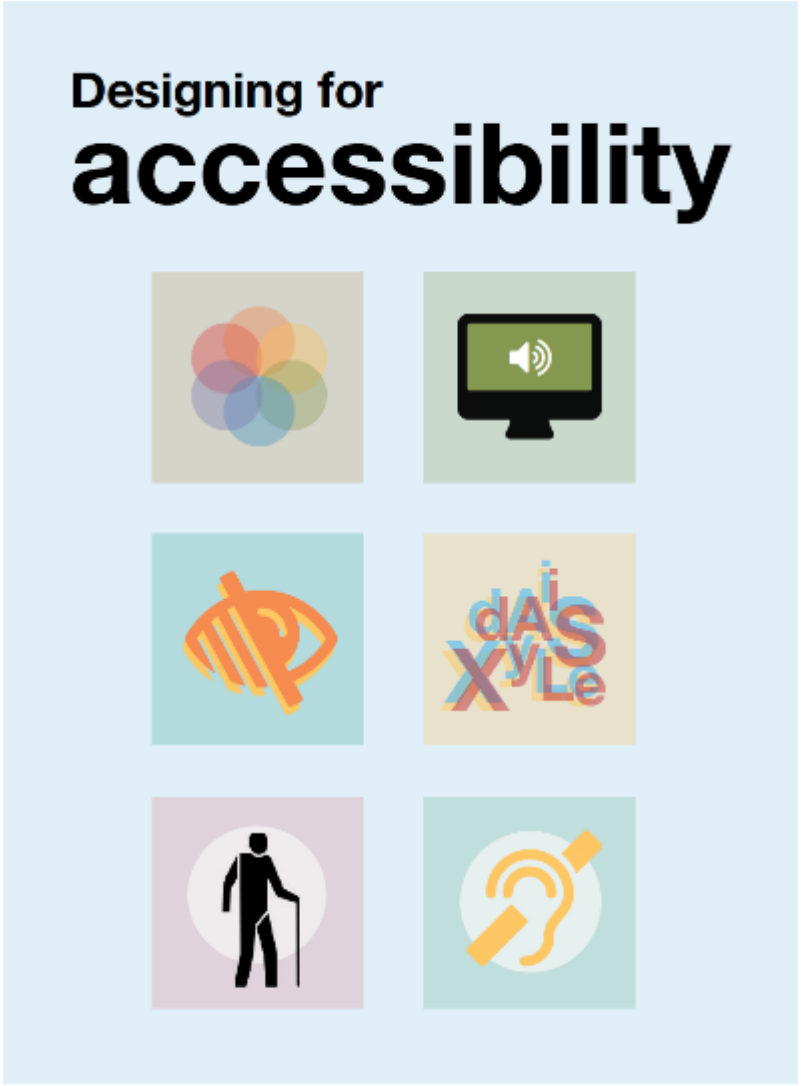
Media content

Video captions

Do you have captions? Are they accurate?

Audio description

Audio description for videos (AD)



Designing for Accessibility

UK Home Office

- *Autism spectrum*
- *Screen readers*
- *Low vision*
- *Dyslexia*
- *Physical or motor disabilities*
- *Deaf or hard of hearing*
- *Anxiety*

When is an accessibility issue a “feature request” versus a “bug”?

Thank You