



What AI Can Do For (and To) Web Accessibility



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Slide deck



Find these slides at <https://bit.ly/csun24ai>, or scan this QR code ([direct download](#))

In this session:

- AI & existing accessibility support
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 - [AI generated captions](#)
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- AI in personal lives of people with disabilities
 - [Computer vision](#)
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- AI making content accessible
 - [Pros and cons](#)

About the TPGi Knowledge Center

- Hans Hillen
 - Director of Knowledge Center
- Ricky Onsman
 - Technical Content Writer
- James Edwards
 - Technical consultant
- ?
 - Content Lead

AI & existing accessibility support

AI definition

- “Artificial Intelligence (AI) refers to the development of computer systems that can perform tasks that typically require human intelligence.”
 - – ChatGPT

AI technologies

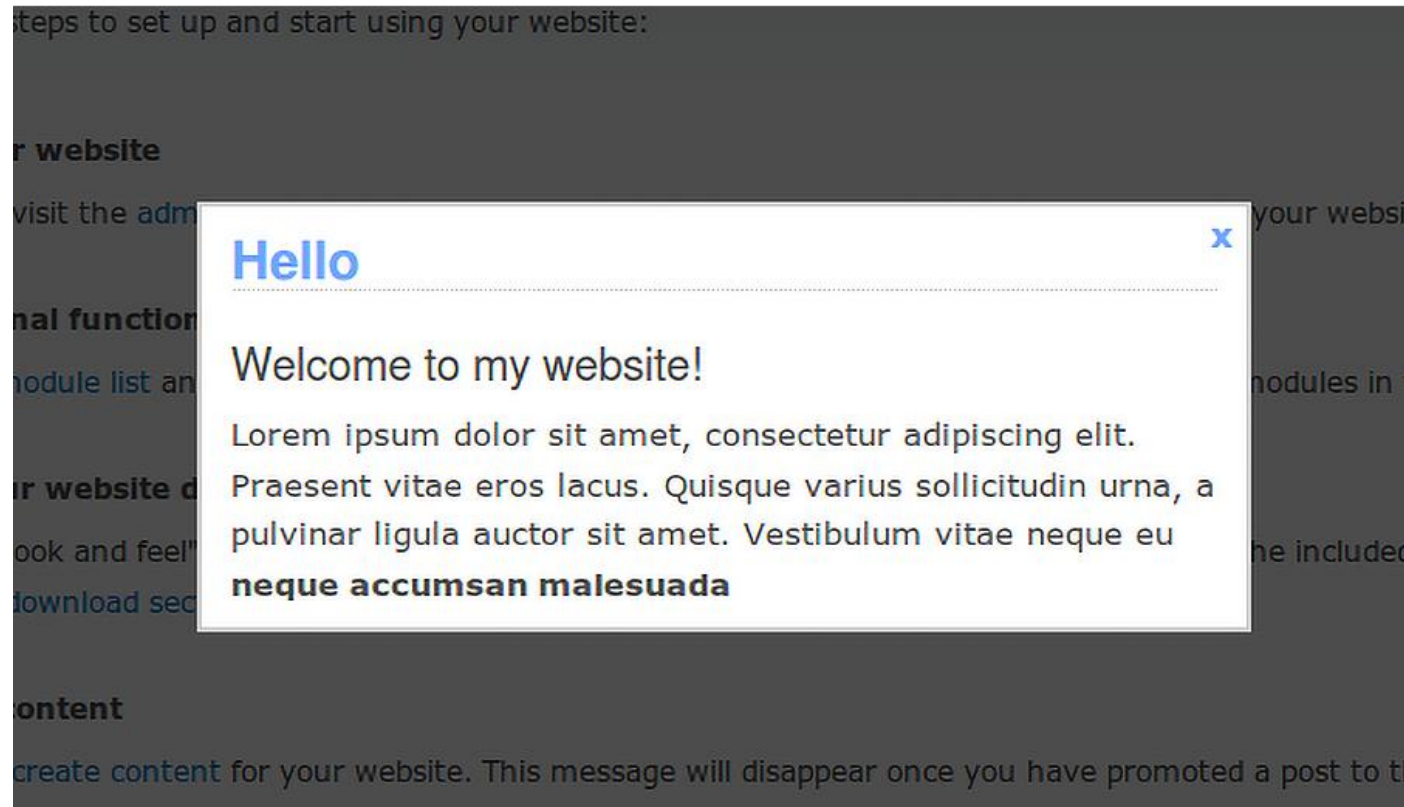
- **Machine Learning** uses structured data and algorithms to imitate the way humans learn
- **Natural Language Processing** allows computers to engage with humans in conversational language
- **Large Language Models** work off very large datasets to produce content humans can comprehend
- **Computer Vision** enables computers to analyze, recognize and describe images in human terms
- **Deep Learning** can learn from unstructured data, increasing scale, depth and complexity

Technology enhanced by AI

- Automatic Captioning
- Automatic Alt Text
- ChatBots
- Predictive Text
- User Interface Customization
- Text-to-Speech
- Speech-to-Text
- Overlays

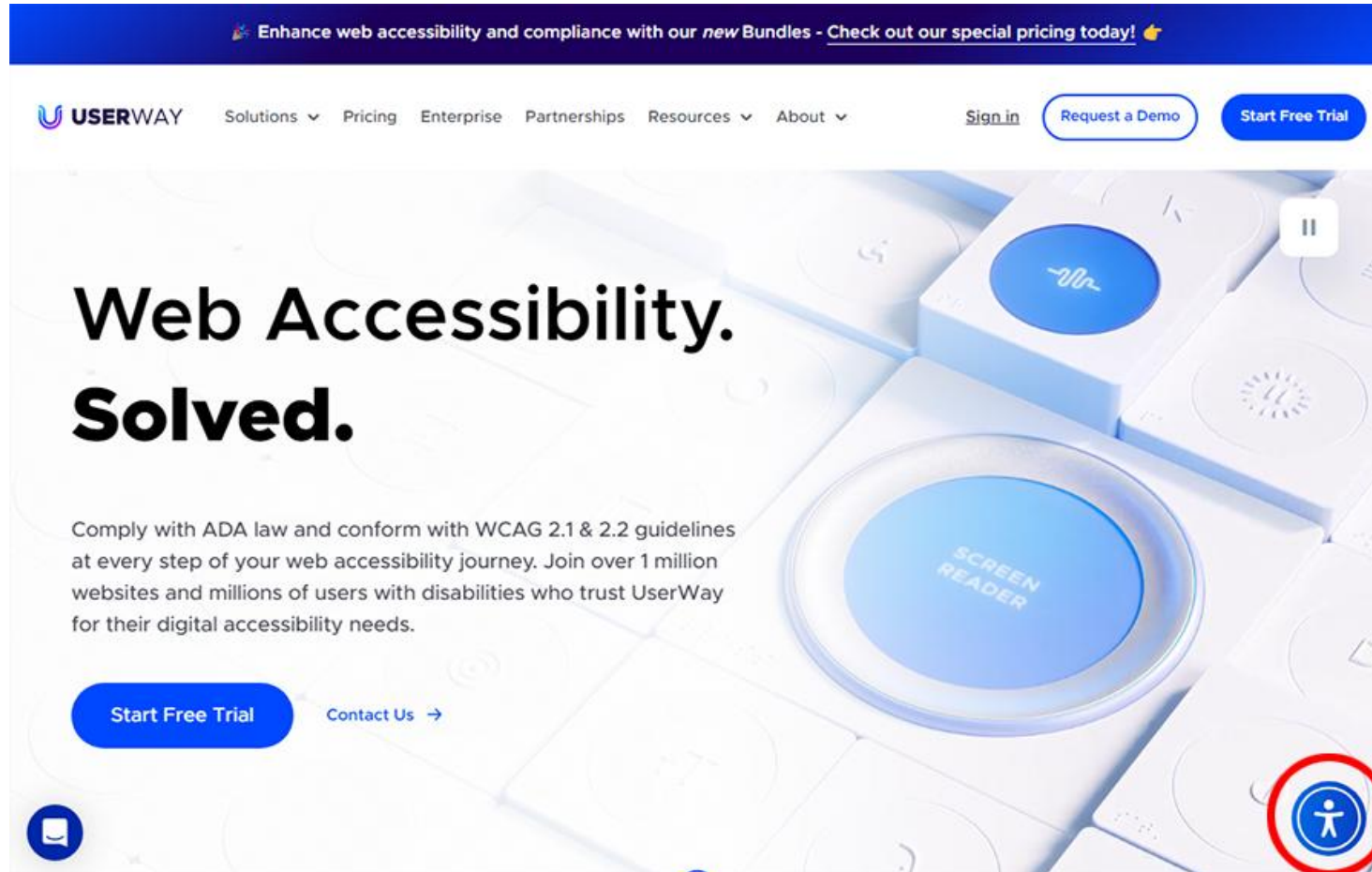
Overlays and AI

Overlays



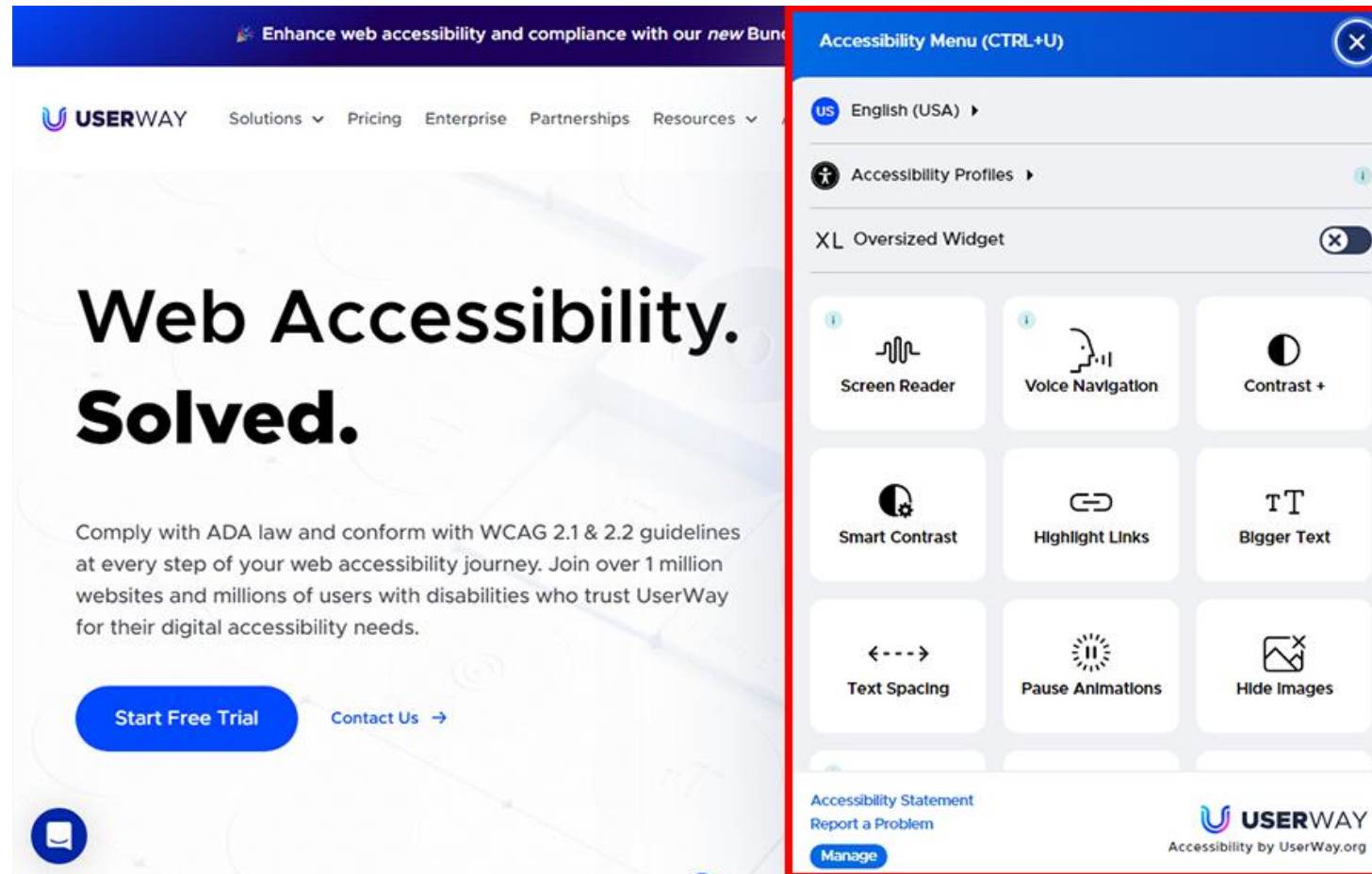
Screenshot of a pop-up dialog

Digital Accessibility Overlays I



Screenshot of Userway home page with overlay icon highlighted

Digital Accessibility Overlays II

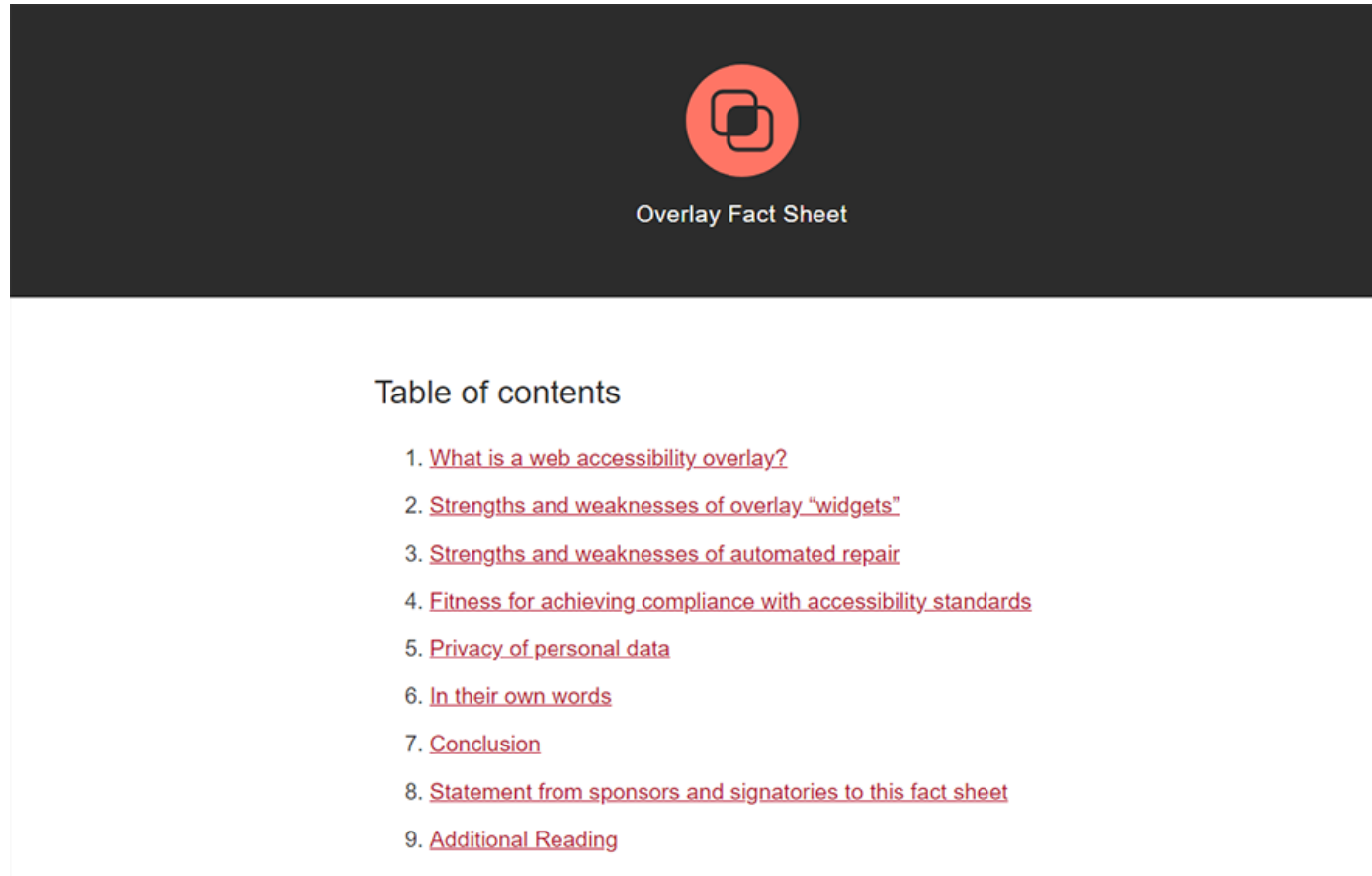


Screenshot of Userway home page with overlay expanded and highlighted

Overlay Criticisms

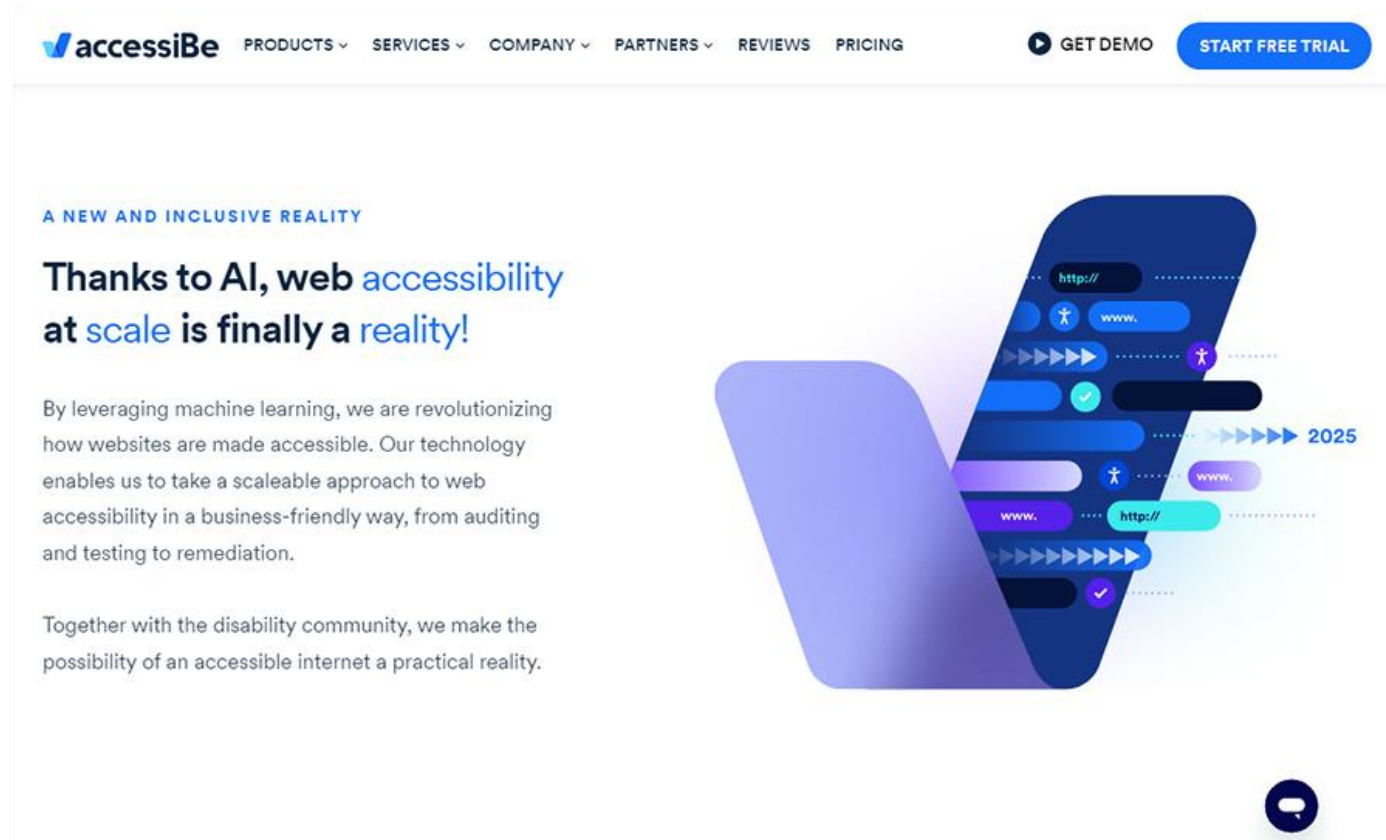
1. The modifications that overlays implement cannot guarantee full conformance with WCAG, because no automated tool can.
2. The modifications that overlays implement are often unreliable, ineffective, and / or create other accessibility issues than the ones they address.
3. The modifications that overlays make often interfere with assistive technologies and accessibility settings already in use.
4. The use of an overlay may create non-compliance with privacy regulations.

Overlay Fact Sheet



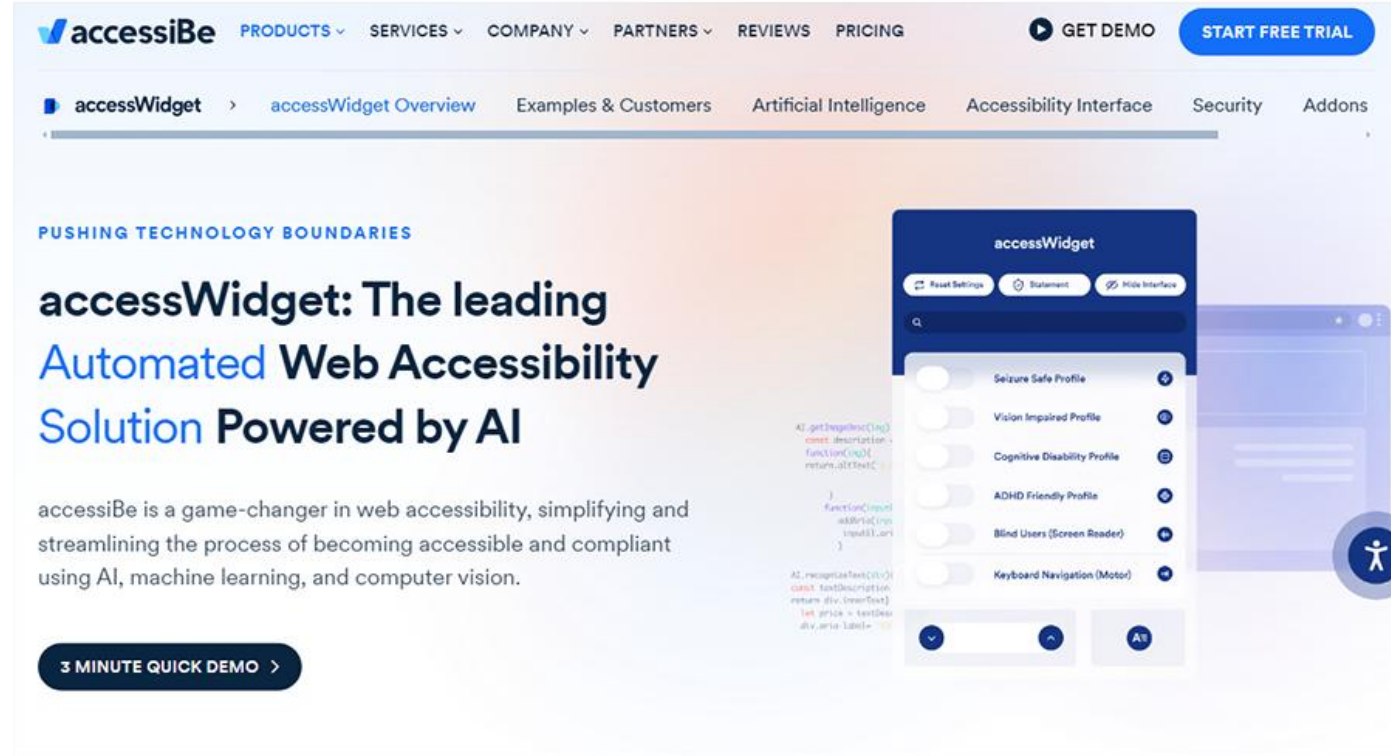
Screenshot of Overlay Fact Sheet home page

accessiBe



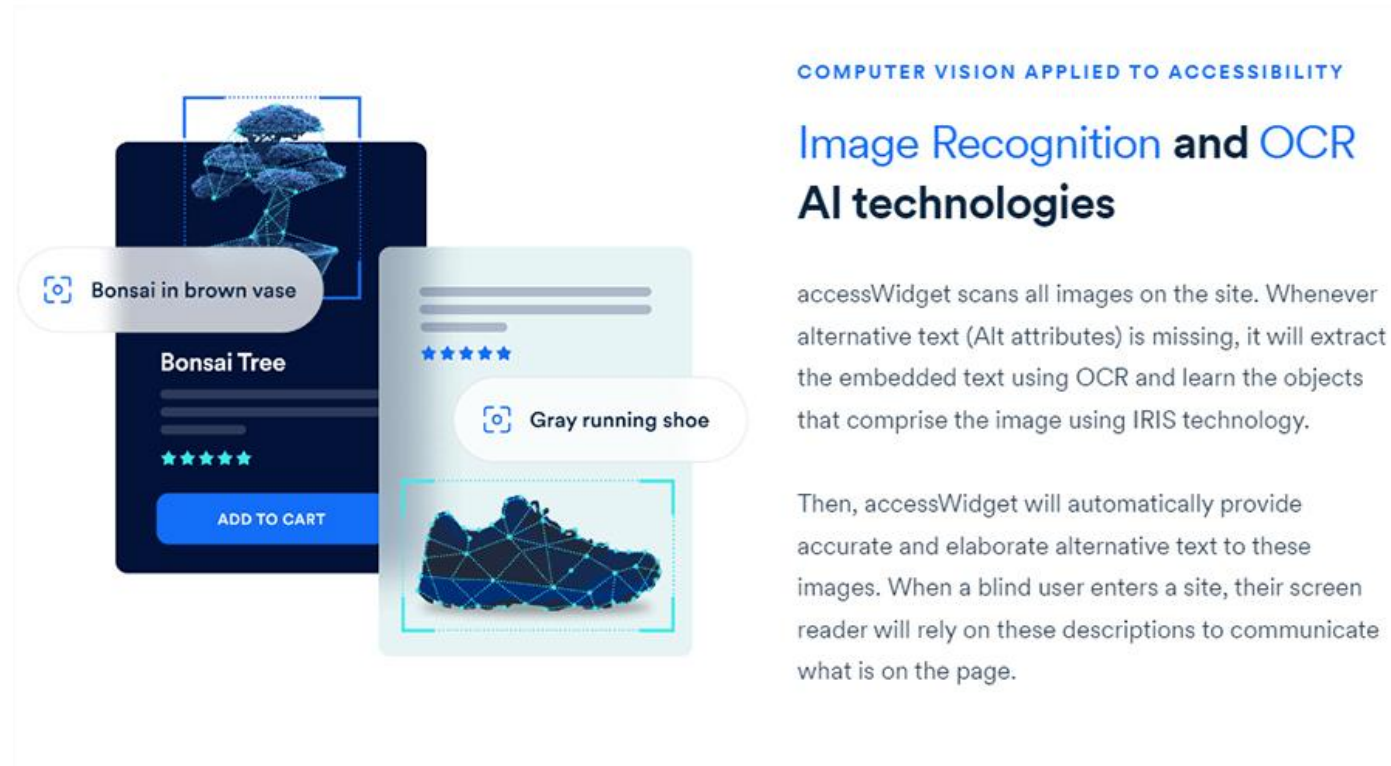
Screenshot of accessiBe home page

The accessiBe Claim



Screenshot of accessWidget landing page

How accessiBe uses AI



Website quote on role of AI in accessWidget

accessWidget in background

How accessWidget helps:

accessWidget makes websites navigable by keyboard. By using ARIA attributes and contextual understanding AI engine, accessWidget makes the necessary adjustments throughout the website's code. People with motor impairments can use the keys to do everything from closing popups and forms to opening drop downs and menus.

Illustration of widget

The accessWidget widget

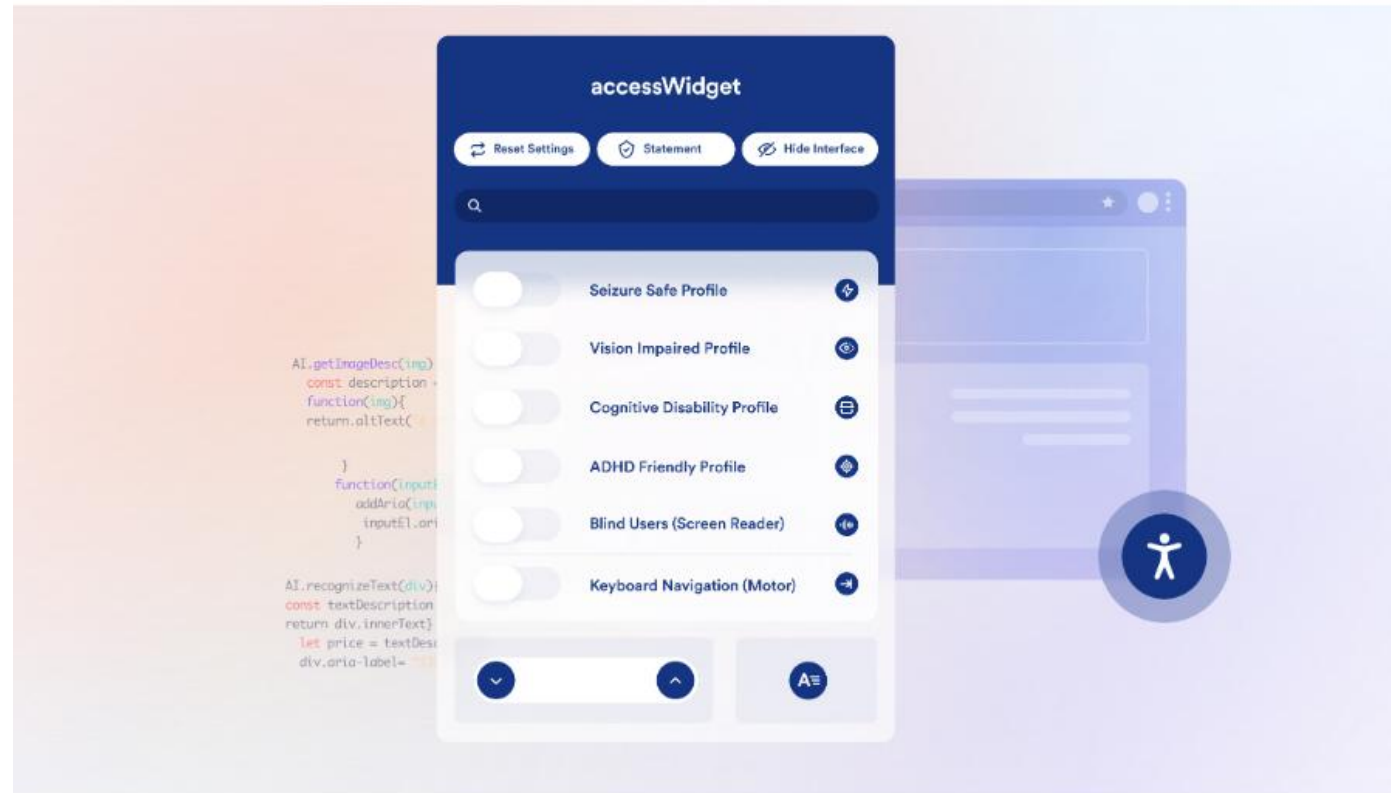


Illustration of widget

Automatic Captioning

Early Captions



A silent movie caption card that says "Bang!"

Open Captioned TV



a TV screen grab of The French Chef with captions - [WGBH](#)

Speech Recognition I



1950s speech recording and an early transcription device - [Beyond Design](#)

Speech Recognition II



1980s computerized speech recording - [Electronic Products](#)

Facebook Captioning



Screenshot Facebook captioning - [Meta](#)

YouTube Captioning (2)



“Sometimes the auto-captions are good. Sometimes they are not great, but they are better than nothing if you are hearing-impaired or don’t know the language.”

Ken Harrenstien - [New York Times](#)

Rocket Launch I



Screenshot of video of NASA rocket launch with Facebook Captioning - [Mashable](#)

Automatic v. Human



Rev offers the most accurate automatic transcription model in the world ... and its word error rate is about 14%. That means you can expect about 86% of your transcription to be accurate, on average. If you need higher accuracy rates, you might want to go with human transcription.

Quote from Rev - [Rev](#)

AI and Alt Text

AI alt text history I

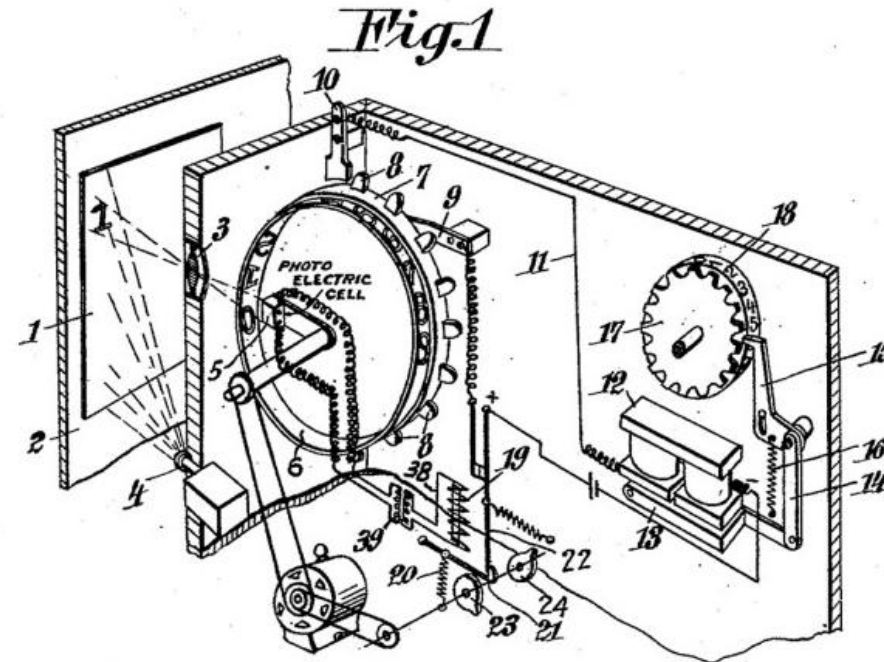
Dec. 31, 1935.

G. TAUSCHEK

2,026,329

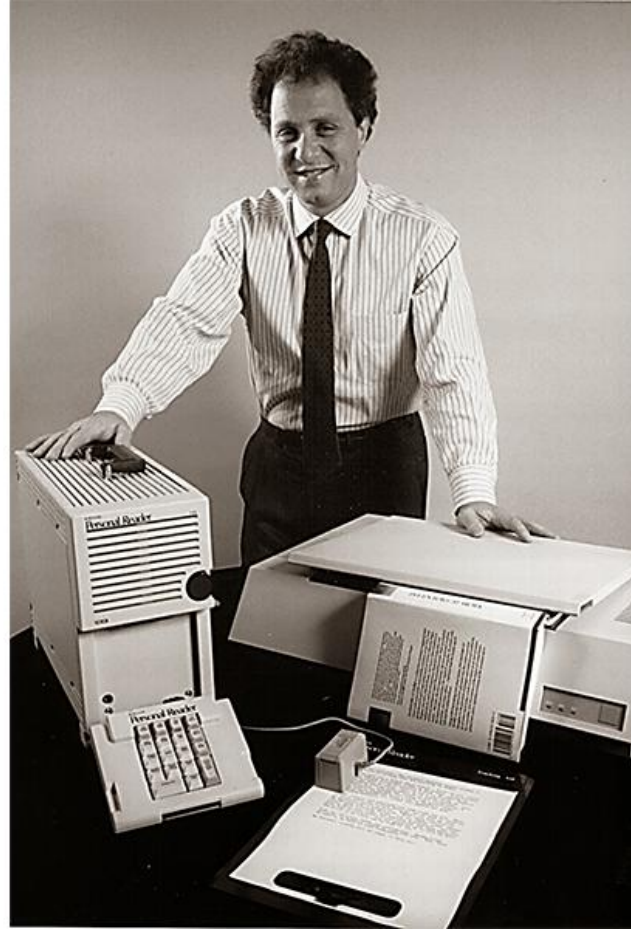
READING MACHINE

Filed May 27, 1929



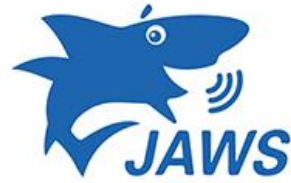
Drawing of 1935 patent application for reading machine – [Veryfi](#)

AI alt text history II



Ray Kurzweil and his reader – [Pedersen Recovery](#)

AI alt text history III



JAWS



NVDA



VoiceOver



TalkBack



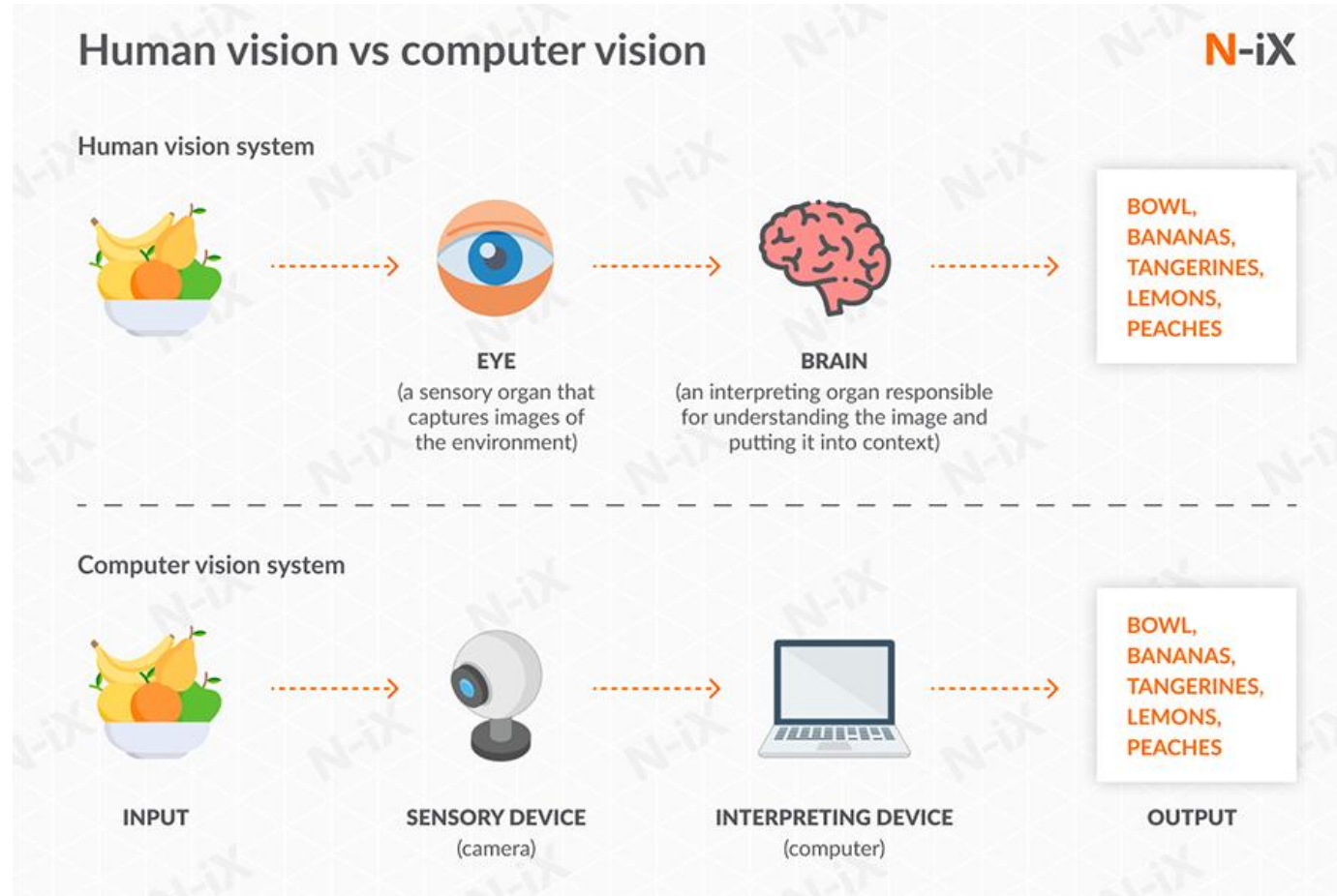
Narrator



Orca

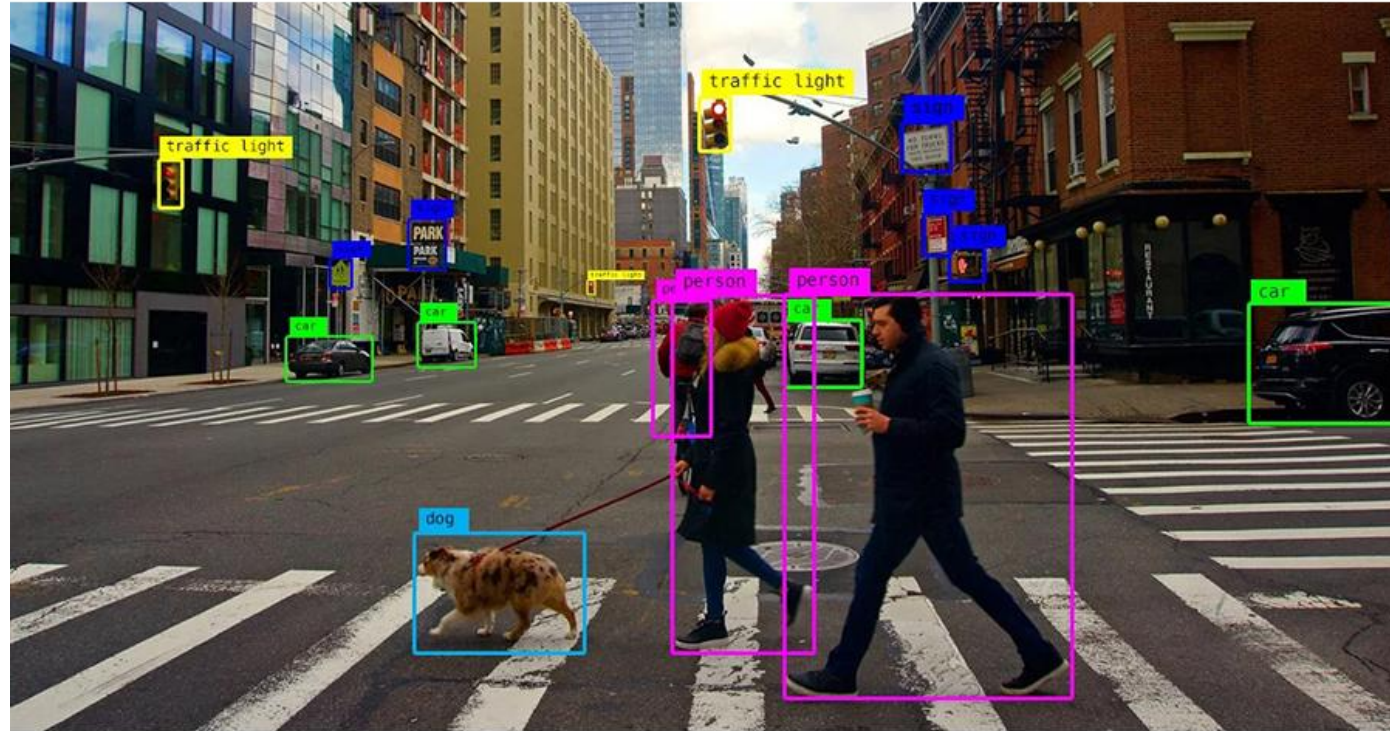
Logos of JAWS, NVDA, VoiceOver, TalkBack, Narrator, and Orca screen readers

Computer vision I



Comparison of human and computer visual systems – [N-ix](#)

Computer vision II



Example of computer vision image labeling – [Algotive](#)

Auto tagging I



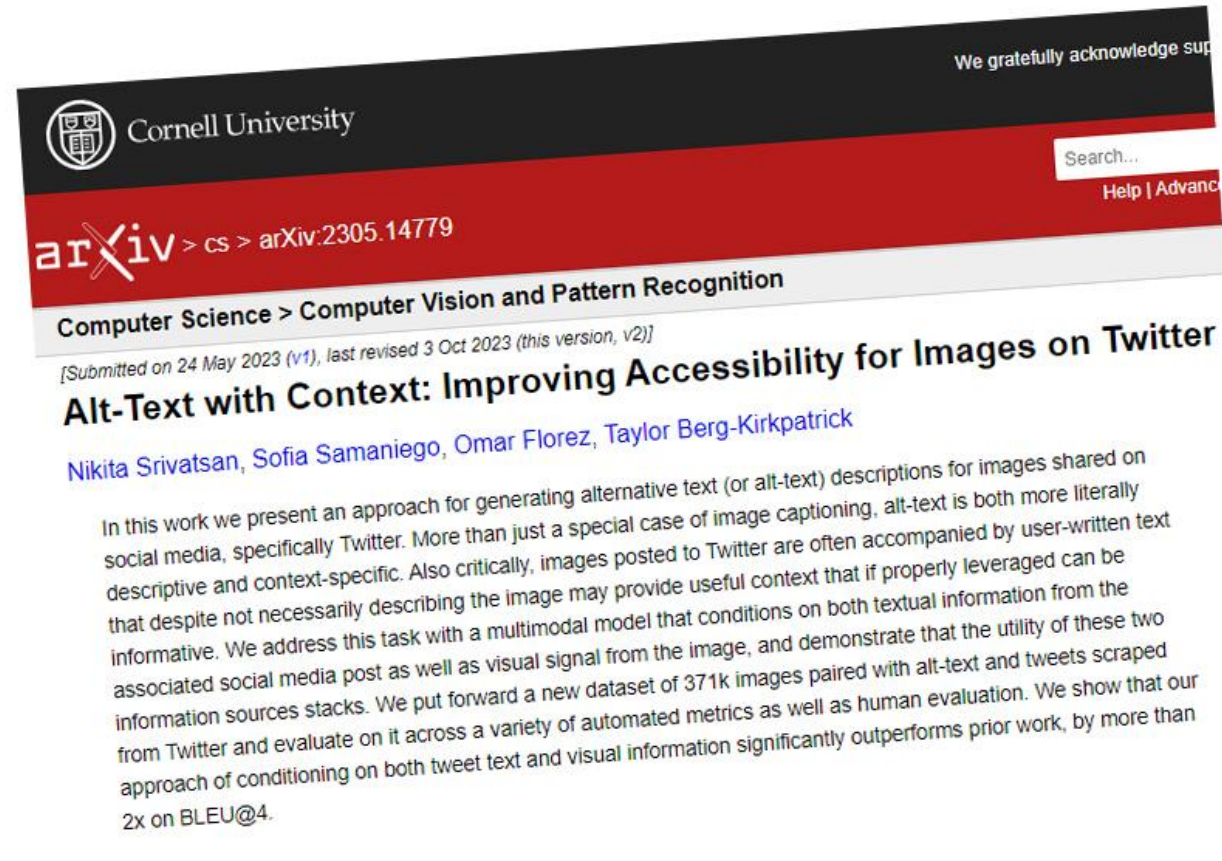
Screenshot of offensive Google autotagging – [Peta Pixels](#)

Auto tagging II



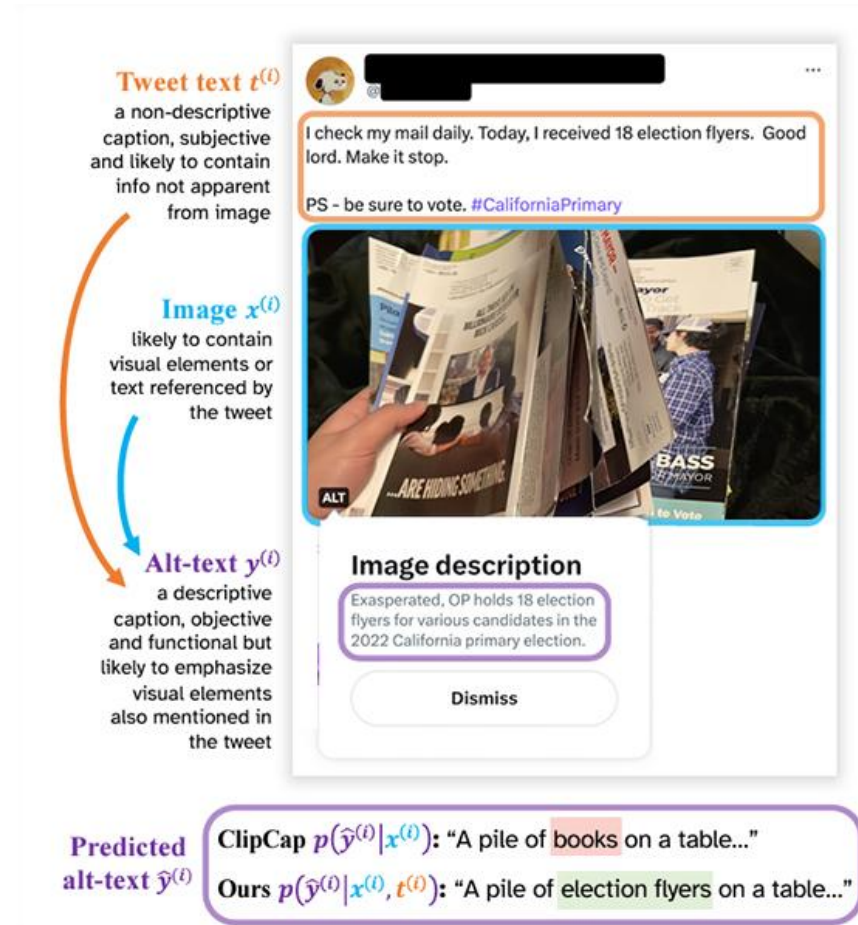
Door knob in the shape of a frog – [Facebook](#)

Context I



Screenshot of academic abstract - [Cornell University](#)

Context II




Screenshot of text generation logic - [Cornell University](https://www.cornell.edu/)

Human alt text

Edit Media [Add New Media File](#)

racehorse

Permalink: [https://www.foxsports.com/story/horse-racing-at-lingfield-1581166070](#)



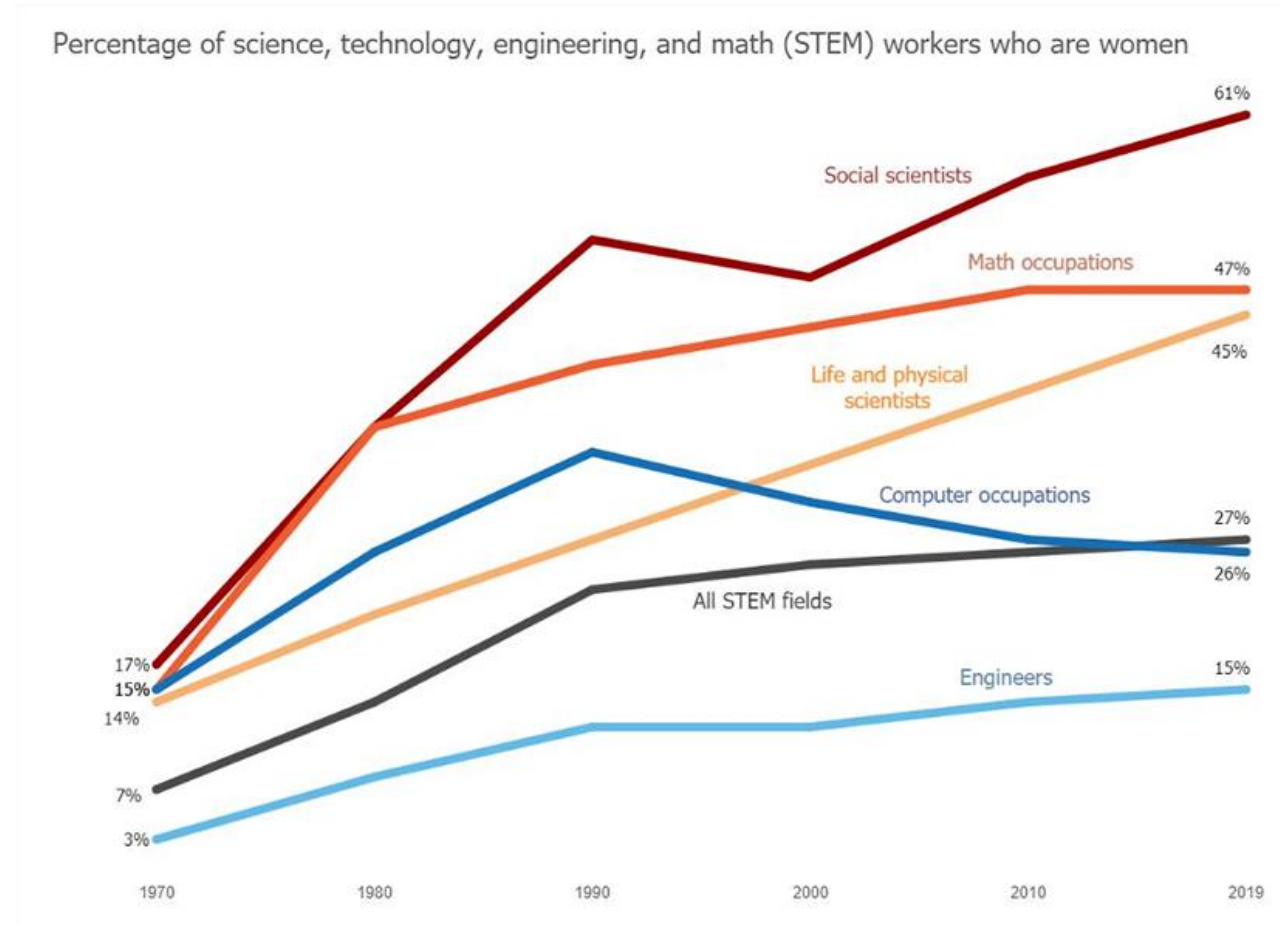
[Edit Image](#)

Alternative Text

A hapless racehorse being cruelly jammed into a too-small barrier stall against its will before being forced to race in circles while being whipped for human entertainment.

Racehorse entering a barrier stall

Complex images



Graph showing percentage of women in STEM jobs

AI in personal lives of people with disabilities

Examples of AI as personal disability aid

- Generative voice AI
 - Synthetic speech, but more natural and 'human sounding'
 - Text to speech, speech to speech
- AI powered hearing aids
- AI powered limbs
- Computer vision
- Personalized AI responses

Computer vision as disability aid

- Describes pictures to people who are blind or have low vision, and allow them to ask follow up questions.
- Why is it a game changer?
 - ‘perfect alt’: does not exist.
 - you will never know what every single user needs or wants to know about your image
- Let user decide:
 - level of detail
 - Specific interests
 - follow up questions / corrections

Be My AI

- Part of [Be My Eyes](#) app
- Uses ChatGPT4's computer vision
- Describe images from anywhere, not just camera:
 - Photos app
 - Messaging app
 - Website (iOS VO: double tap long press > 'Share' > 'Describe with Be My Eyes')
- Ask follow up questions
- Share chat transcript

Computer vision example: Learning more about an image



Seagull perched on a Pouwhenua

- “The picture shows a clear blue sky with a few trees in the background. In the foreground, there is an ornate, weathered stone carving resembling a Māori design, with a circular hole in the middle and a spiral pattern around it.
- Perched on top of the carving is a white bird with grey wings and a red beak, possibly a seagull. Behind it, on a similar stone post, is another similar bird.” ([chat log](#))

Computer vision example: getting it wrong



“How much battery percentage do I have left on my power bank?”

Computer vision in screen readers

- [PictureSmart AI for JAWS](#)
 - Added in [March 2024 release](#)
 - Descriptions provided by ChatGPT4 and Gemini
 - Choose short or long description
 - Follow up questions feature coming soon
- NVDA addons, such as [AI Content Describer](#)
 - Requires Open AI API key and payment

Personalized responses

We learn in different ways

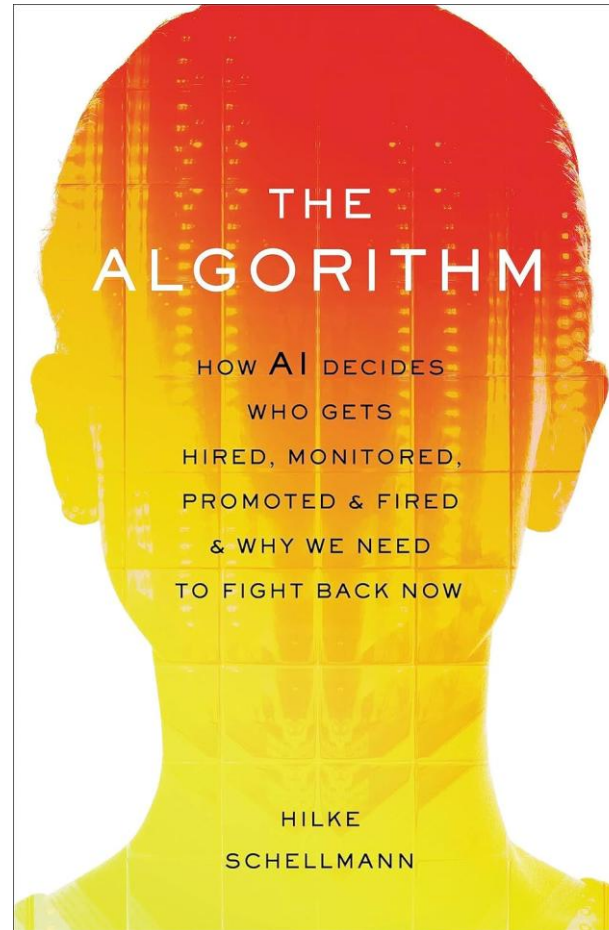
- Content should adapt to us rather than vice versa
- AI lets us personalize how information is presented to us
 - simplify language,
 - summarize it,
 - spend more time on certain presumed knowledge,
 - and so on.

Example: simplifying WCAG

- **Me:** “Can you explain WCAG success criterion 2.5.1?”
- **ChatGPT:** “... The main requirement is that all functionality that uses multipoint or path-based gestures for operation can also be operated with a single pointer without a path-based gesture...” etc.
- **Me:** “Can you explain it using less complex terminology, to someone who is confused by the term ‘pointer gestures’”
- **ChatGPT:** “... Imagine you’re on a website or using an app. Sometimes, you need to do things like spread two fingers apart on the screen to zoom in, or swipe with your finger to move through pictures. These are called “complex gestures” because they need specific finger movements or more than one finger.
- But what if someone finds it hard to make these gestures? Maybe they can’t move their fingers that way, or they only have one hand available. This is where the rule comes in. It says that websites and apps should let people do the same things without needing those complex gestures. For example...” – [Chat log](#)

AI as recruiter

AI in recruiting procedures



Recommended reading: [The Algorithm](#), by Hilke Schellmann

AI in recruiting procedures: risks for people with disabilities

- 1: General patterns vs. individual variances (one-size-fits-all approach)
- 2: Negative scores for disability-related factors
- 3: AI technology as 'black box'

Using AI to create accessible content

AI as accessibility 'expert'

- Most GPT chat flavors will handle basic accessibility related requests well
- ChatGPT 'passed' my job interview
- Ask it to:
 - explain accessibility concepts
 - find accessibility issues in your code and recommend fixes
 - Write accessible code
 - test plans
 - testing bookmarklets
 - JAWS scripts
 - etc.

GitHub Copilot: what can it do?

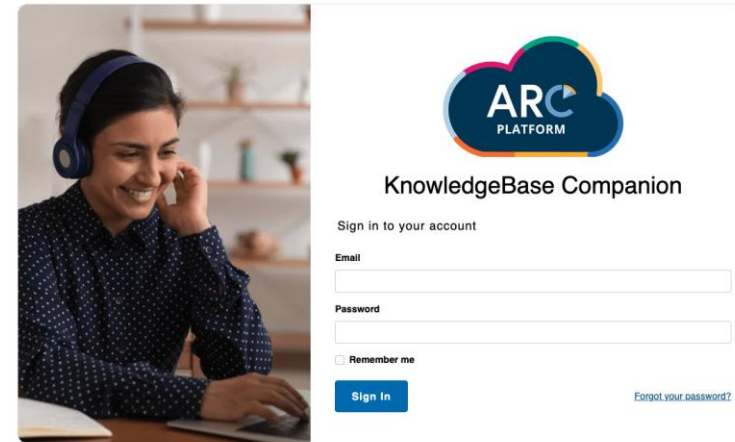
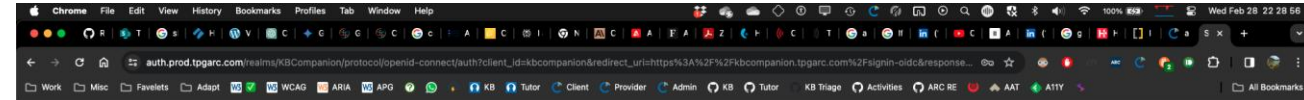
- Answer questions
- Explain what selected code does
- Fix selected code
- Recommend new code
- Learn from your coding habits and project context

Why you shouldn't fully outsource accessibility to an AI

- Most code out there is not accessible, so how could a model trained on it be?
- Good for smoothing over small knowledge gaps, not big ones
- Mistakes hard to catch due to eloquence and (over)confidence of response
- Human expertise still needed, or you'll crash

(Almost) everyone is experimenting with AI. So is TPGi

- We're exploring,
- Looking into possibilities:
 - Wealth of data for training: knowledge base, Tutor, engagement audit data, helpdesk tickets
 - ARC KnowledgeBase Companion
 - Using AI to perform automated rules and assist manual testers
- Keep an eye on our technical blog: tpgi.com/blog



ARC KB Companion

Wrap-up

Take away points about AI in A11Y

- It's all good, it's all bad, it's all ugly
- Can hugely improve independence for people with disabilities
- Can work against PWDs through exclusion or biases inherited from training data
- Can be a great teaching tool for creating accessible content in a more productive way
- 'Human in the loop' always needed

Questions?

Get in touch

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- TPGi technical blog: www.tpgi.com/technical
- TPGi Knowledge Center newsletter: email knowlege@tpgi.com