Accessibility

different disabilities

testing, legal requirements

user interface features

curb cuts

Abilities

- How are your abilities different from other people?
- How will your abilities change in the future?
- How do your abilities change in different environments?

Abilities

- The “average person” is just a statistical ideal
  - No one person is “average”
- Individual performance and capabilities vary significantly
- Each one of us has permanent and/or temporary disabilities
  - arise due to nature of our environment or our health
  - What forms of temporary disabilities are there?

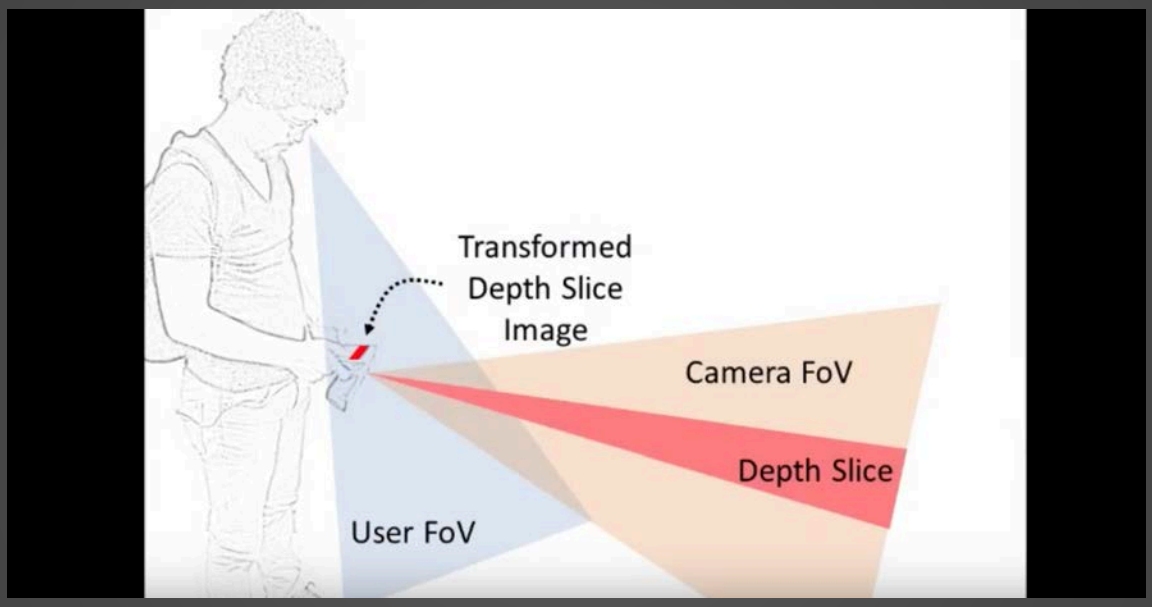
Temporary Disabilities

- Sick, injured
  - Temporarily impaired cognitive capabilities
  - Temporary loss of motor capabilities
- Driving a car
  - Limited attentional bandwidth
- Making dinner at home while attending to children
  - Limited attentional bandwidth
- Underwater diving
  - Impaired sight, hearing, mobility
- Using an ATM late at night in an unfamiliar surrounding

Padded lampposts for distracted texters being tested in London

BY JOSHUA TOPOLSKY MARCH 6TH 2008, AT 5:39:00 AM ET 0

According to a recent report, human beings are becoming so incredibly stupid that they require cushioned lamppost bases so that when they run into them they don't mess up their



CrashAlert (Hincapié-Ramos and Irani, 2013)
- https://youtu.be/HN_F-coZqt8?t=44s

Tapping Performance when Walking

- Task: tap with stylus on targets of varying sizes and distances
- Conditions:
  - Sitting
  - Treadmill: slow
  - Treadmill: fast
  - Obstacle course (self-paced)
- Measures:
  - Pointing speed
  - Errors

Lin et al. How do people tap when walking? An empirical investigation of nomadic data entry. International Journal of Human-Computer Studies pp. 759-769

Fig. 1. Demonstration of someone walking on the treadmill while doing target selection task.

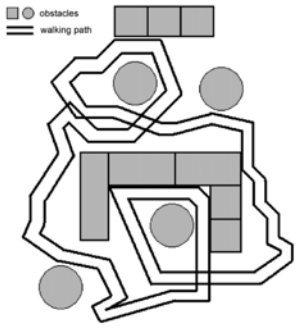
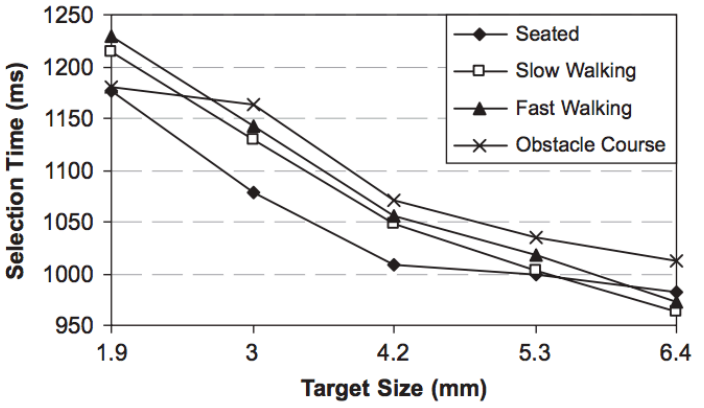
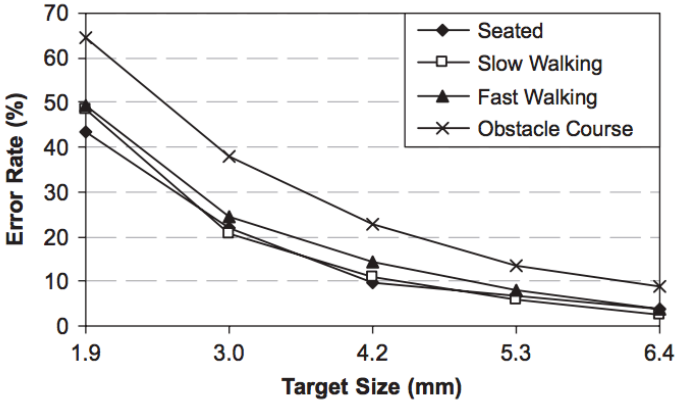
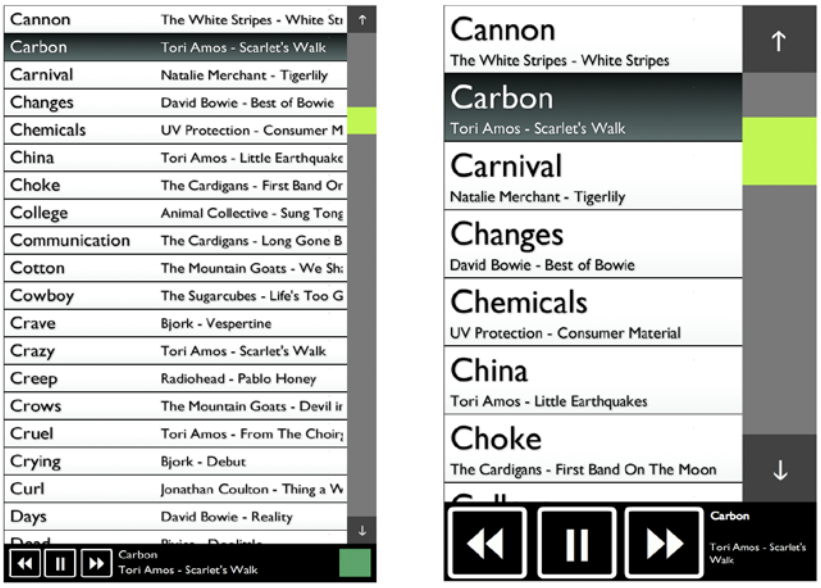


Fig. 2. Diagram of the obstacle course path used to create the attention-intensive walking condition.







Sitting UI Walking UI

Kane et al. Getting off the treadmill: evaluating walking user interfaces for mobile devices in public spaces. MobileHCI '08: Proceedings of the 10th international conference on Human computer interaction with mobile devices and services (2008)

People with Disabilities

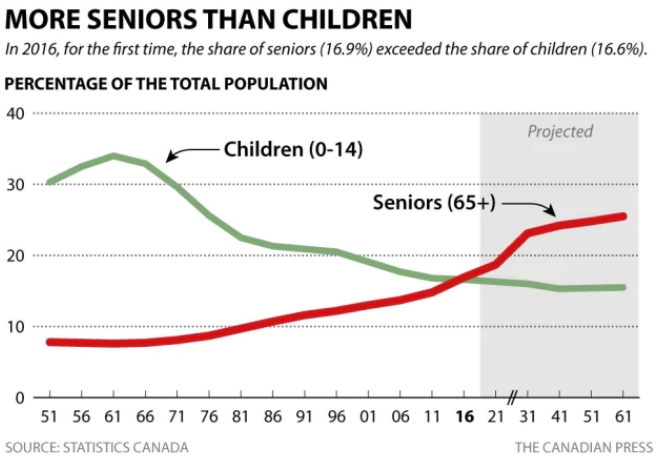
- A disability is a functional limitation or restriction of an individual's ability to perform an activity

Table 1
Prevalence of disability by type, Canada, 2012

Disability type	%
Pain	9.7
Flexibility	7.6
Mobility	7.2
Mental/psychological	3.9
Dexterity	3.5
Hearing	3.2
Seeing	2.7
Memory	2.3
Learning	2.3
Developmental	0.6
Unknown	0.3

Aging Population

- Canadian seniors now outnumber children (2016 census)
- Affects of aging
  - Reduced motor coordination (fine/gross motor skills)
  - Visual and hearing impairments
  - Loss of memory



MIT AgeLab's Age Gain Now Empathy System
- https://youtu.be/czuww9rp5f4

Legal Obligations

- Canada
  - Currently, no federal accessibility legislation pertaining to IT
  - Web Standards for the Government of Canada often used http://www.tbs-sct.gc.ca/pol/doc-eng.aspx?id=23601
- Ontario
  - Designated public sector organizations and large organizations shall make their internet websites and web content conform with the World Wide Web Consortium Web Content Accessibility Guidelines (WCAG) 2.0, initially at Level A by January 2014 and increasing to Level AA by January 2021
- United States' Disabilities and Rehabilitation Acts (Section 508)
  - All government facilities, services, and communications must be accessible to individuals with disabilities

Lawsuit over web site accessibility for the blind becomes class action

By Nate Anderson | Last updated October 3, 2007 1:34 PM

A lawsuit brought in 2006 by a blind student at the University of California-Berkeley has now morphed into a class action case against US retailer Target. A federal judge has just certified a nationwide class in the case, which alleges that Target's web site is not fully accessible to the blind. It's a case that could help establish the ways in which the Americans With Disabilities Act applies to the Internet, and it has already generated a ruling that, in California at least, commercial web sites must be accessible.

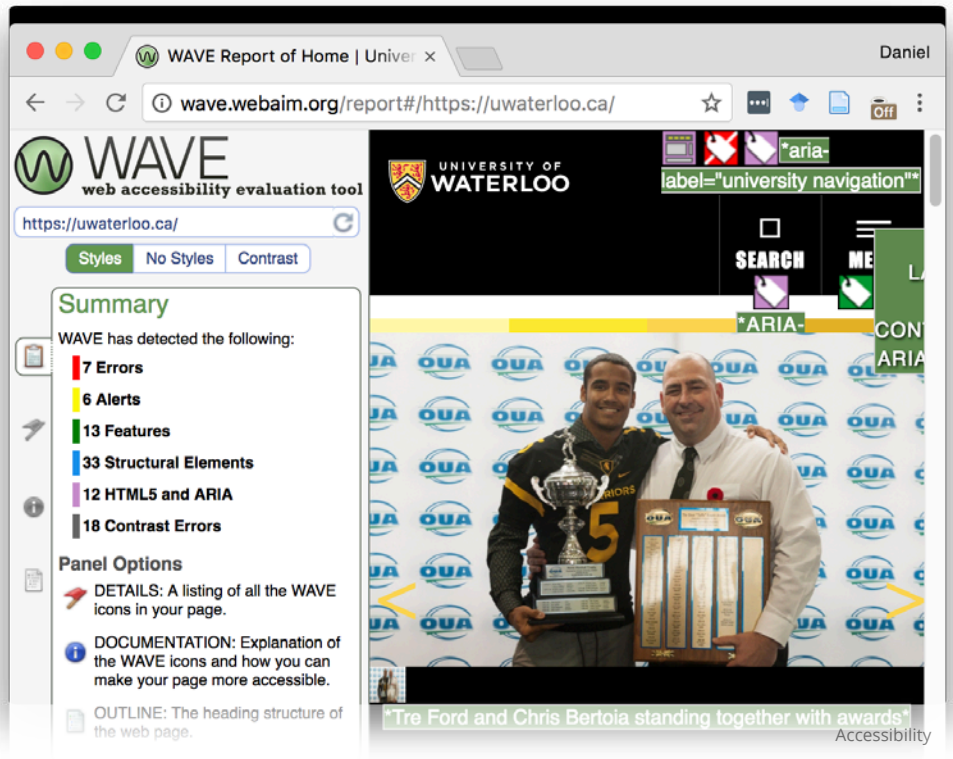
The case focuses on the alleged lack of descriptive "alt" tags in Target's HTML, making the site difficult to navigate with screen reading software. The use of image maps is also claimed to make the site inaccessible.

Public locations in the real world have long been required to abide by the ADA, but the law was written in the days before the Web, and it remains unclear how it should be applied to web sites. One of the lawyers from Disability Rights Advocates, which is handling the case, sees inaccessibility as a simple issue of discrimination, online or off.

"Target Corporation has led a battle against blind consumers in a key area of modern life: the Internet economy," said Larry Paradis in a statement after the

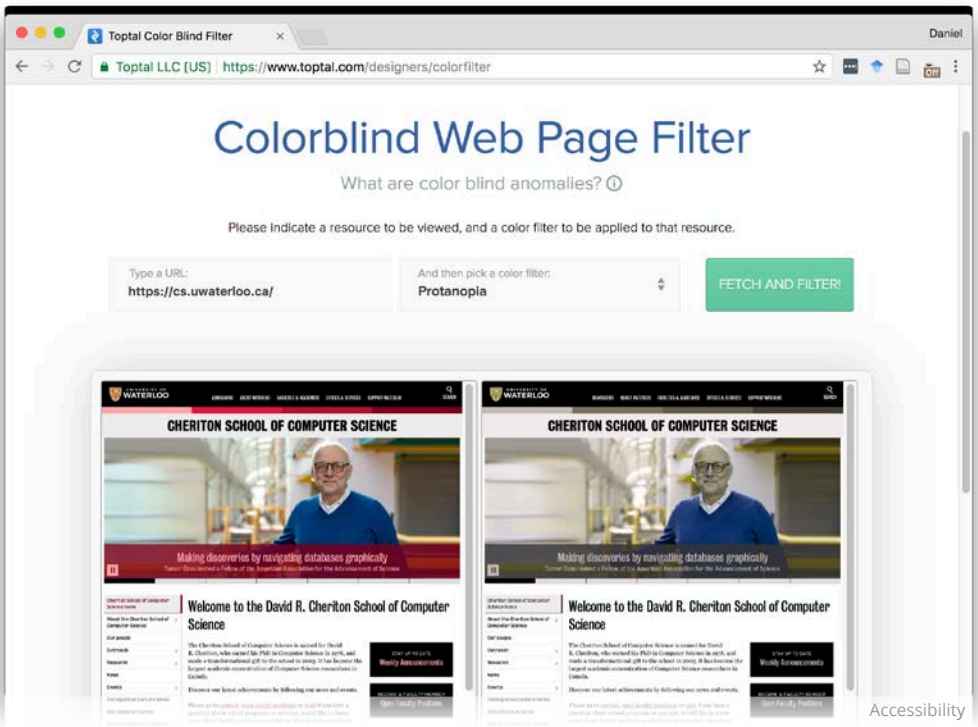
Web Accessibility Evaluation Tool

http://wave.webaim.org/report#/uwaterloo.ca



Colourblind Web Page Filter

https://www.toptal.com/designers/colorfilter

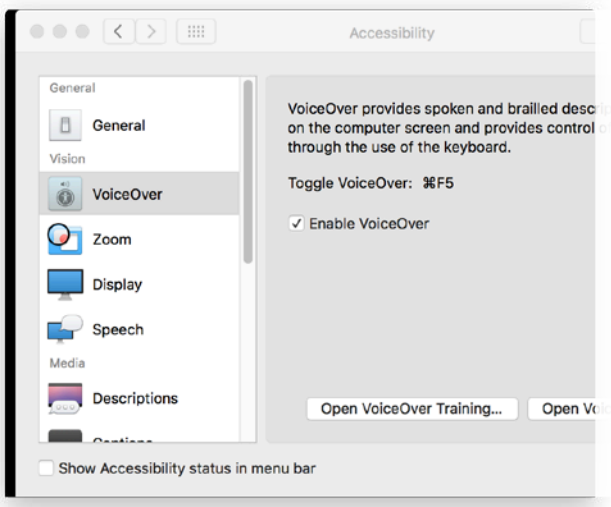


Accessible User Interfaces

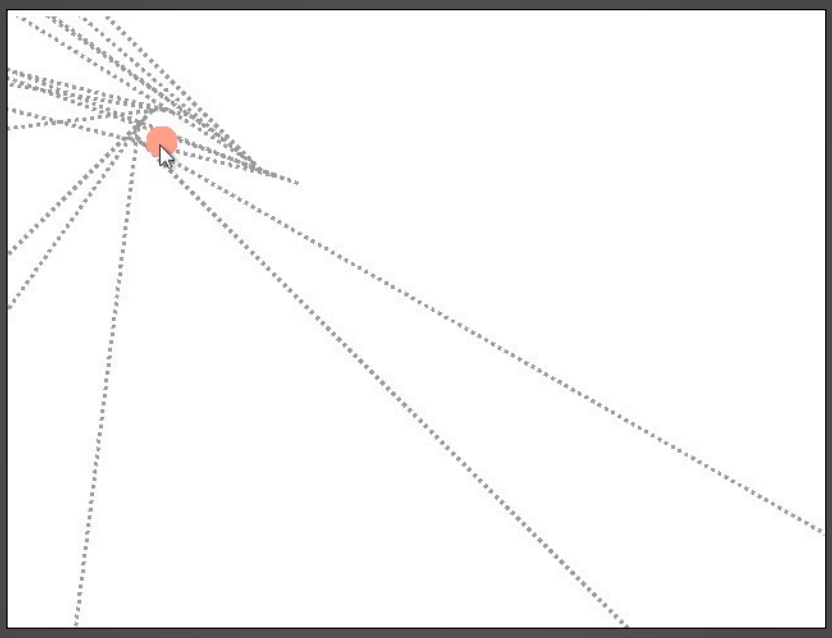
- GUI toolkits like Java, Cocoa, and those for MS Windows provide hooks to integrate with accessibility functions
- Toolkits provide features that allow you to provide additional information about your interface, individual components, and the functions they serve
  - This information allows accessibility software to expose your interface to users using different output modalities (e.g., screen readers)
  - Also allows accessibility software to control your software using alternative input methodologies (e.g., voice command)

Operating System Support

- Typical support includes ability to:
  - control interface using only keyboard
  - magnify portions of screen
  - increase contrast of screen
  - increase cursor size
  - Built-in screen readers



How Blind People Use Twitter & You Tube on the iPhone
- http://youtu.be/c0nvdiRdehw



Wobbrock et al. Angle Mouse (2009)
- https://youtu.be/O4ahGmHenps

Curb Cut Phenomenon

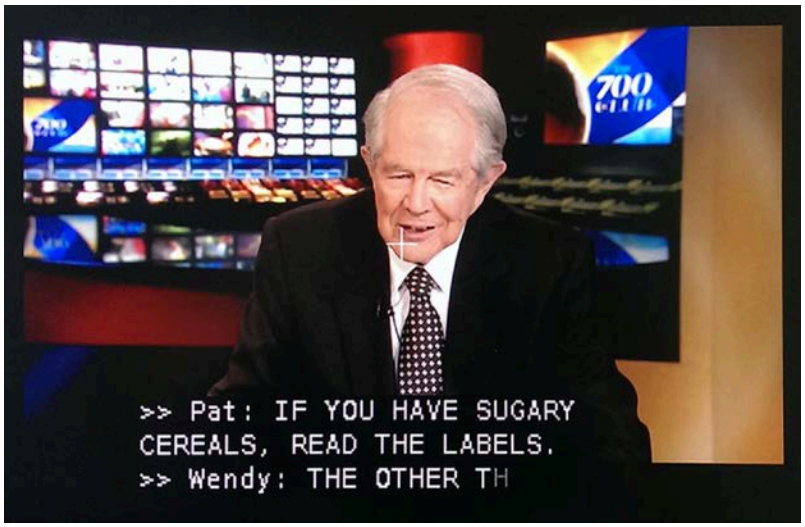
- A design for people with impairments which benefits everyone
- Named for sidewalks redesigned for wheelchair users that also became easier for strollers, bicycles, skateboards, luggage, etc.

Curb Cut Example: Cassette Tape

- Cassette tapes were developed for a limited-market, and then *widely* adopted because of their portability
  - Developed as an alternative to reel-to-reel tape so visually impaired individuals could use books on tape more easily
  - Engineers didn't think average user would buy it because of inferior audio quality

Television Closed Captioning

- Text to describe to all significant audio content to hearing impaired viewers
  - What other uses does it provide?



Summary

It is important to design user interfaces to be not only usable, but accessible, such that the technology can reach more people, and have an impact across more situations.