Accessibility Capstone

Richard Ladner
University of Washington

What We'll Do Today

- Capstone Administration
- Introductions
- Disabilities
- MobileAccessibility Project
- Ideas for Projects

Goal of Capstone

- Design, build, and test accessibility applications on the Android platform.
- Present results.
  - Code in the open source MobileAccessibility repository or other repository
  - Short paper
  - Poster and presentation

Teams

- Work will be done in teams to be determined in the next week.
- Initial practice projects will be done individually in first two weeks.
- Each team will have a mentor that will meet with team on a regular basis.
- Teams will meet with instructor and TA on a regular basis.

Instructors and Mentors

- Richard Ladner
- Shani Jayant (TA)
- Shiri Azenkot (Mentor)
- Shaun Kane (Mentor)

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Tentative Schedule

- 01/05/10 - Introduction to Mobile Accessibility Applications
- 01/07/10 - Introduction to Android Platform and Development Environment
- 01/12/10 - Project Assignments and Teams Assigned
- 01/14/10 - Team Meetings (TBA)
- 01/19/10 - Concept Presentations for feedback
- 01/21/10 - Team Meetings (TBA)
- 01/26/10 - Work plan presentations for feedback
- 01/28/10 - Team Meetings (TBA)
- 02/02/10 - Team Meetings (TBA)
  02/04/10 - Team Meetings (TBA)
- 02/09/10 - Team Meetings (TBA)
- 02/11/10 - Prototype presentations for feedback
- 02/16/10 - Team Meetings (TBA)
- 02/18/10 - Team Meetings (TBA)
- 02/23/10 - Team Meetings (TBA)
- 02/25/10 - Team Meetings (TBA)
- 03/02/10 - Team Meetings (TBA)
- 03/04/10 - Team Meetings (TBA)
- 03/09/10 - Final Project Demonstrations
- 03/11/10 - Poster Session

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Grading Criteria

- Functionality of the accessibility application(s) - Does it actually work as intended
- Quality of the code - Can the code be adopted by others as part of an open source effort
- Innovation - Is the application novel
- Impact - Does the application have impact on the lives of people with disabilities
- Quality of written report
- Quality of the poster and presentation
- Effort - Was the student's effort proportional to the overall team effort (A team is expected to have equal effort from each member)

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Web Page

- http://www.cs.washington.edu/education/courses/cse481h/CurrentQtr/

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Students

- Acuario, Christine Marie
- Behmer, Jason Michael
- Bouchet, Malik
- Escarez, Toby Leon
- Hollier, Janet Ruth
- Knox, Stillman Matthias
- Kwan, Steven
- Langley, Megan Moriko
- Oh, Moon Hwan
- Scotland, Joshua David
- Shen, Amanda Maria
- Yapit, Hussein

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Basic Data

- 650 million people world-wide are disabled
- 16% of US population to ages 15 to 64 is disabled.
- 10% of the workforce is disabled
- 5% of the STEM workforce is disabled
- 1% of PhDs in STEM are disabled

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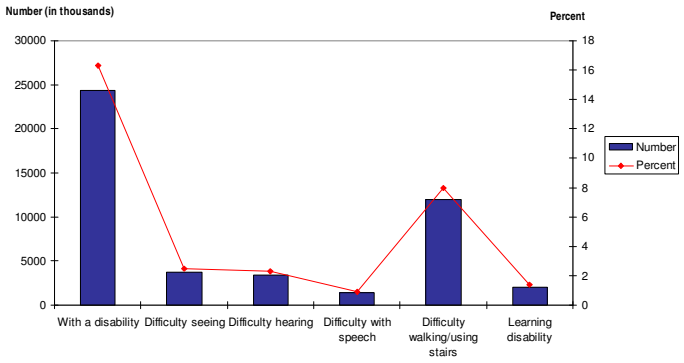
Demographics US Population



Source: U.S. Census Bureau, Survey of Income and Program Participation, 2002

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Disabilities

- Vision
  - Blind
  - Low-Vision
  - Color Blind
- Hearing
  - Deaf
  - Hard of Hearing
- Speech
  - Ability to speak
  - Stuttering
- Mobility
  - Ability to walk
  - Ability to use hands/arms
- Cognition
  - Dyslexia
  - Short-term memory loss
  - Dementia
- Multiple
  - Deaf-blindness

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Braille

- System to read text by feeling raised dots on paper (or on electronic displays). Invented in 1820s by Louis Braille, a French blind man.

a b c z

and the with mother

th ch gh

Position Numbers

Z 3 Mode characters: cap and num.

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Text-to-Speech (TTS)

- Invented in 1960s at Bell Labs
- One original motivation for blind people to have books read to them (Kurzweil)
- Screen Readers
- Quality Criteria
  - Naturalness
  - Understandability
  - Speed

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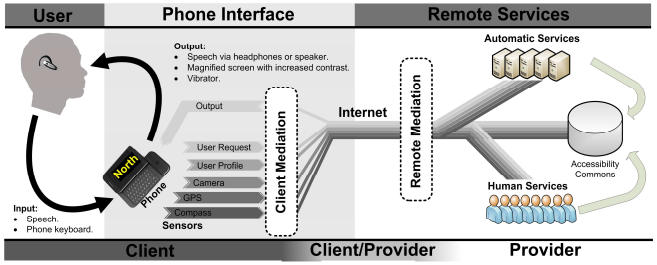
MobileAccessibility

Bridge to the world for blind, low-vision and deaf-blind people



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Platform

- Video camera
- Microphone
- GPS
- Compass
- Accelerometer
- Human input
  - Keyboard
  - Touch screen
  - speech

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Infrastructure

- Text to Speech API
- Eyes Free Shell

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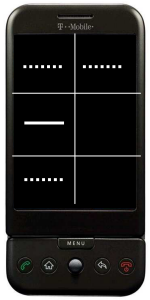
V-Braille

Making Braille accessible using the touch screen and vibrator



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Current MobileAccessibility Apps

- Color Detector (Camera, local)
- Location Finder (GPS, network)
- Compass (Compass, local)
- Bar Code Reader (Camera, network)

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Ideal Group

- http://www.ideal-group.org
- Speaking Pad V1.2.0: http://apps4android.org/speaking_pad.htm
- iAugComm V1.0.0: http://apps4android.org/iaugcomm.htm
- SMSpeaker V1.0: http://apps4android.org/smspeaker.htm
- Talking Caller ID V1.0.0: http://apps4android.org/Talking_Caller_ID.htm

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K-NFB Reader Mobile

- Optical Character Recognition
- Focalization
- GPS
- Cell Phone

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Bar Code Reader

SCAN GOSPEECH (MODEL SC100)

i.d. Mate II

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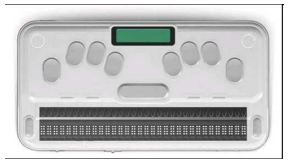
Braille Notetakers

BrailleNote



Braille Sense

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Braillenote with GPS

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DeafBlind Communicator

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MorseSMS for Deaf-Blind

- The program "reads" out incoming SMS in morse code for blind/deaf-blind people by vibrating
- Sending of SMS by typing in the letters in morse code (Dit/Dah)

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Vibrators

Alarm Clock

Fire Alarm

Multipurpose Vibrator

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Variety for Projects

- Six Projects (2 students per project)
- Variety of Disabilities
  - Blind
  - Low-vision
  - Deaf-blind
  - Deaf
  - Limited speech
  - Limited memory
- Variety of inputs
  - Buttons
  - Key Board
  - Touch Pad
  - Speech
- Variety of outputs
  - Visual Magnification
  - Speech
  - Vibration
  - Bluetooth to alt. device
- Variety of sensors
  - Microphone
  - Camera
  - GPS
  - Compass
  - Accelerometer
- Network
  - Web service
  - Mechanical Turk
  - Local

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Variety of Access Goals

- Everyday living in the home
- Transportation / mobility
- Education
- Communication
- Games

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Criteria for Projects

- Doable in one quarter
- Accessibility
  - Target group can use it
- Usability
  - Easy to learn
  - Easy to use
- Impact
  - Makes a difference
- Novelty
  - Not totally obvious

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Local Examples

- Color Detector
  - Blind, camera, speech output
- Color Coordinator
  - Color blind, camera
- Sound detector
  - Deaf-blind, microphone, vibration output
- Augmented Speech (Symbol to Speech)
  - Speech limited, touch screen, speech output

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Network Examples

- Location finder
  - Blind, GPS, speech output
  - Deaf-Blind, GPS, Braille output
- OneBusAway application
  - Deaf-Blind, Braille output
- OCR
  - Blind, camera, speech output
- Speech to Text – for face to face communication
  - Deaf, microphone, text output

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More Ideas

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