MobileAccessibility

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What We'll Do Tonight

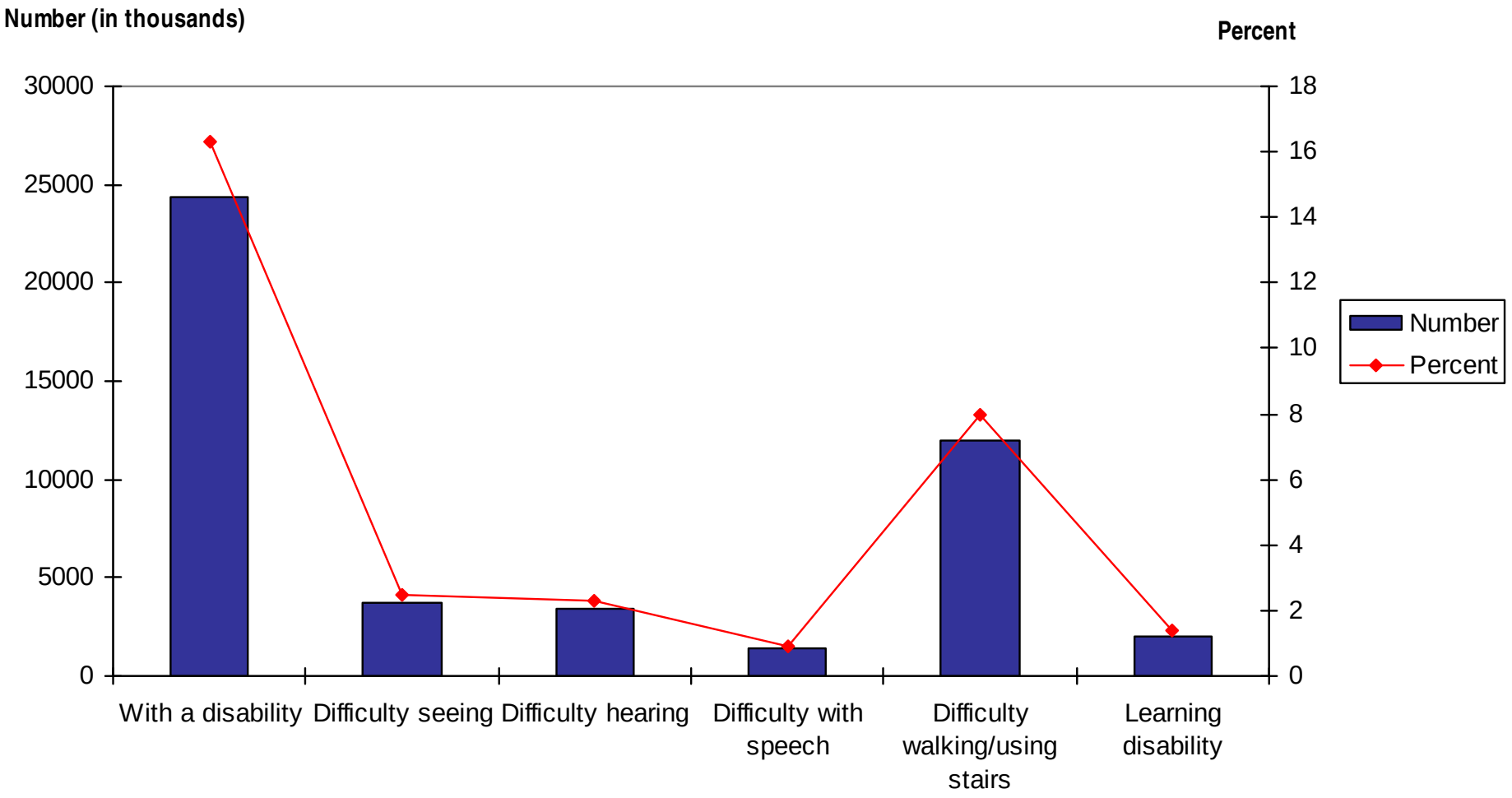
- Disabilities
- Technology Trends
- MobileAccessibility Project
- Other Mobile Projects

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

*STEM = Science, Technology, Engineering, Mathematics

Demographics US Population



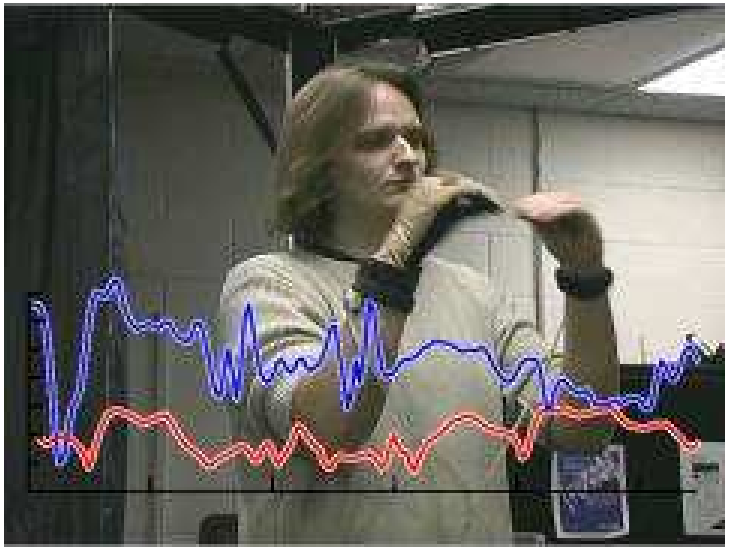
Source: U.S. Census Bureau, Survey of Income and Program Participation, 2002

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

Models of Disability

- **Medical Model**
  - Disabled people are patients who need treatment and/or cure.
- **Education Model**
  - Disabled youth need special education.
- **Rehabilitation Model**
  - Disabled people need assistive technology and training for employment and everyday life.
- **Legal Model**
  - Disabled people are citizens who have rights and responsibilities like other citizens. Access to public buildings, voting, television, telephone, and education are some of those rights.
- **Social Model**
  - Disabled people are part of the diversity of life, not necessarily in need of treatment and cure. They do need access when possible.



ROB BODMAN

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Personal Texting by Deaf People

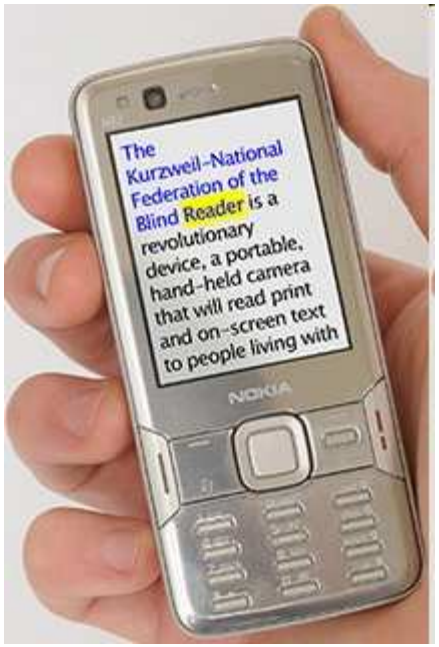
TTY used by deaf people
in their homes
circa 1970

Modern TTY with
built-in acoustic modem

SMS texting

Optical Character Recognition for Blind People

Kurzweil Machine
Circa 1976



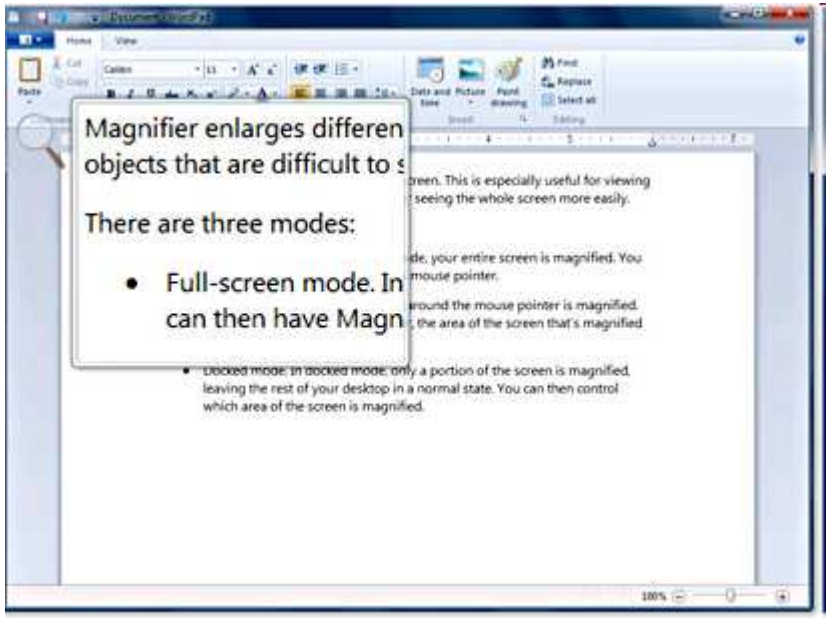
KNFB Reader Mobile

Speech Recognition for Hands Free Access

Ray Kurzweil introduced the first commercial large-vocabulary speech recognition software in 1987

Mobile Speech Recognition

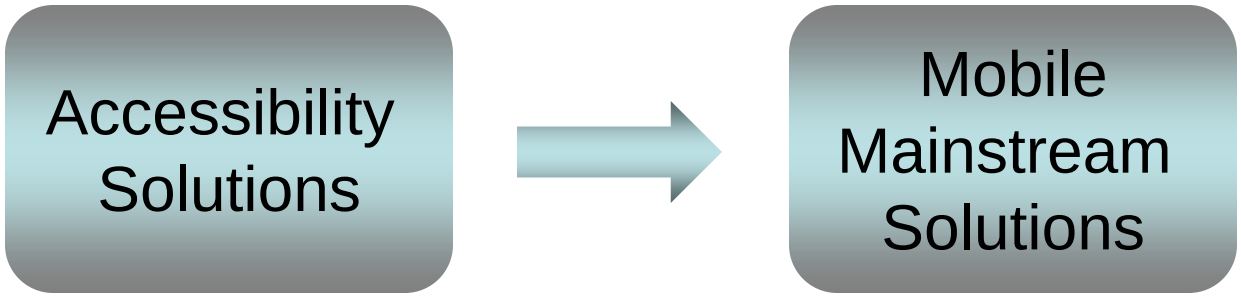
Built-in Accessibility



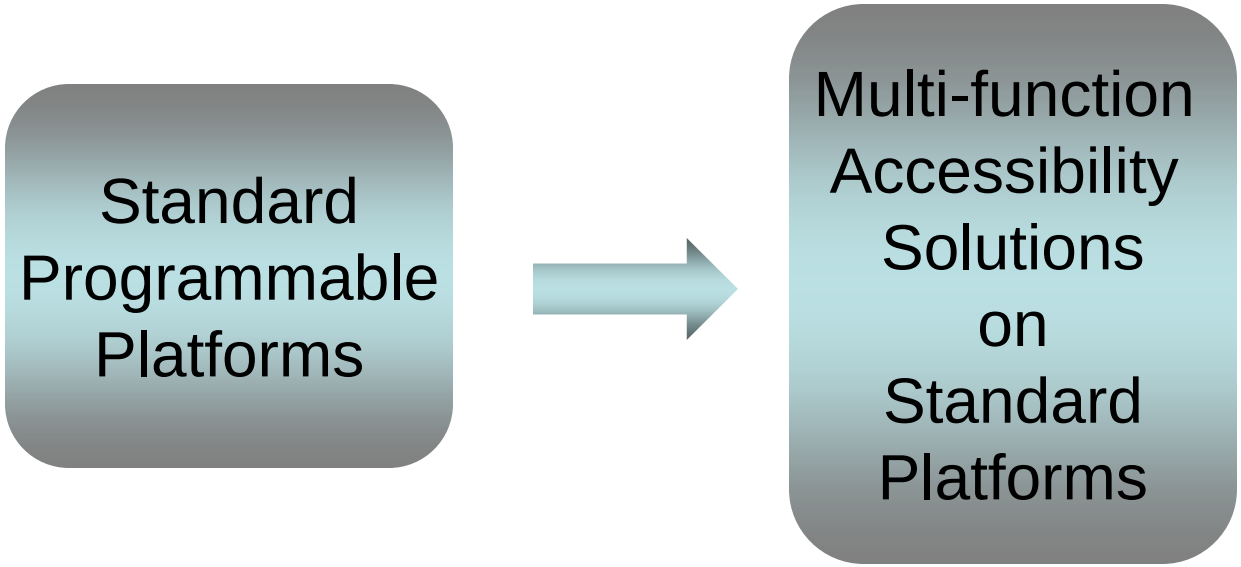
Windows 7 Magnifier

iPhone VoiceOver

Trend



New Trend



Laptops, notebooks, phones,… are programmable!!

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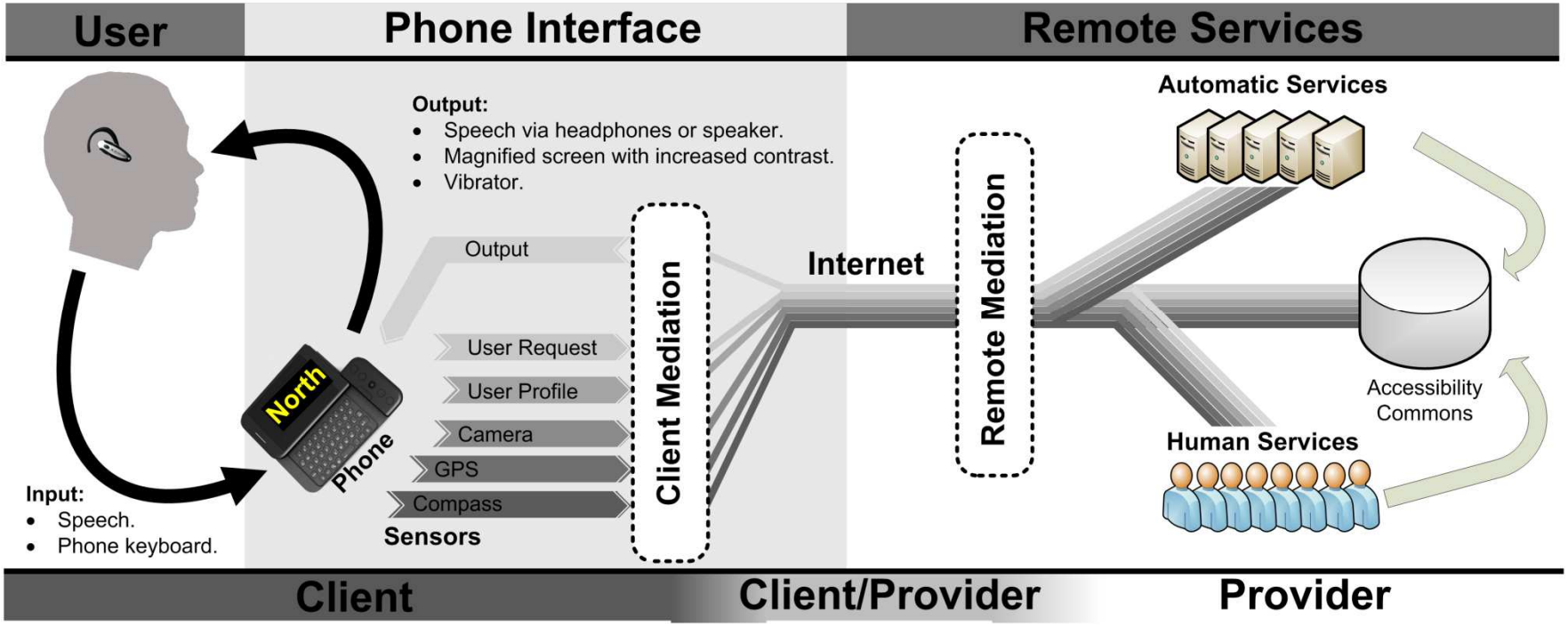
MobileAccessibility

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



http://mobileaccessibility.cs.washington.edu

Platform

- Sensors
  - Video camera
  - Microphone
  - GPS
  - Compass
  - Accelerometer
- Human input
  - Keyboard
  - Touch screen
  - Speech
- Output
  - Speech
  - Audio
  - Visual
  - Vibration

Alternative Platforms

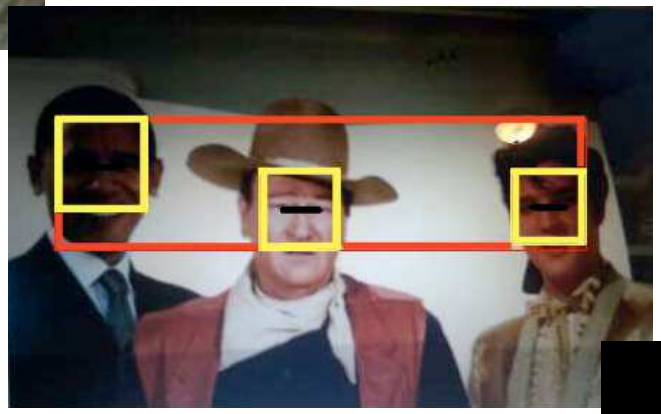
iPhone

Windows phone

Blind Portraits

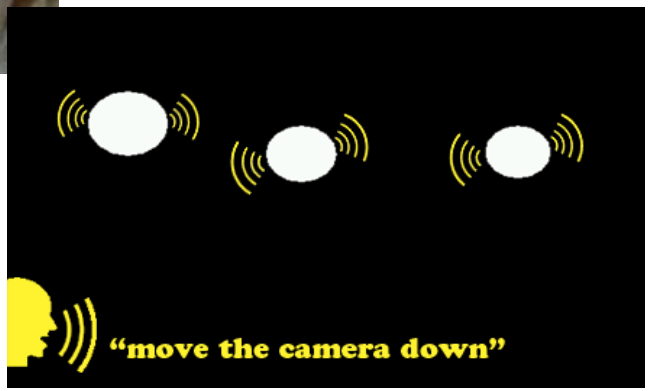
Chandrika Jayant

Portrait



Find Faces

Vibrate and Speak

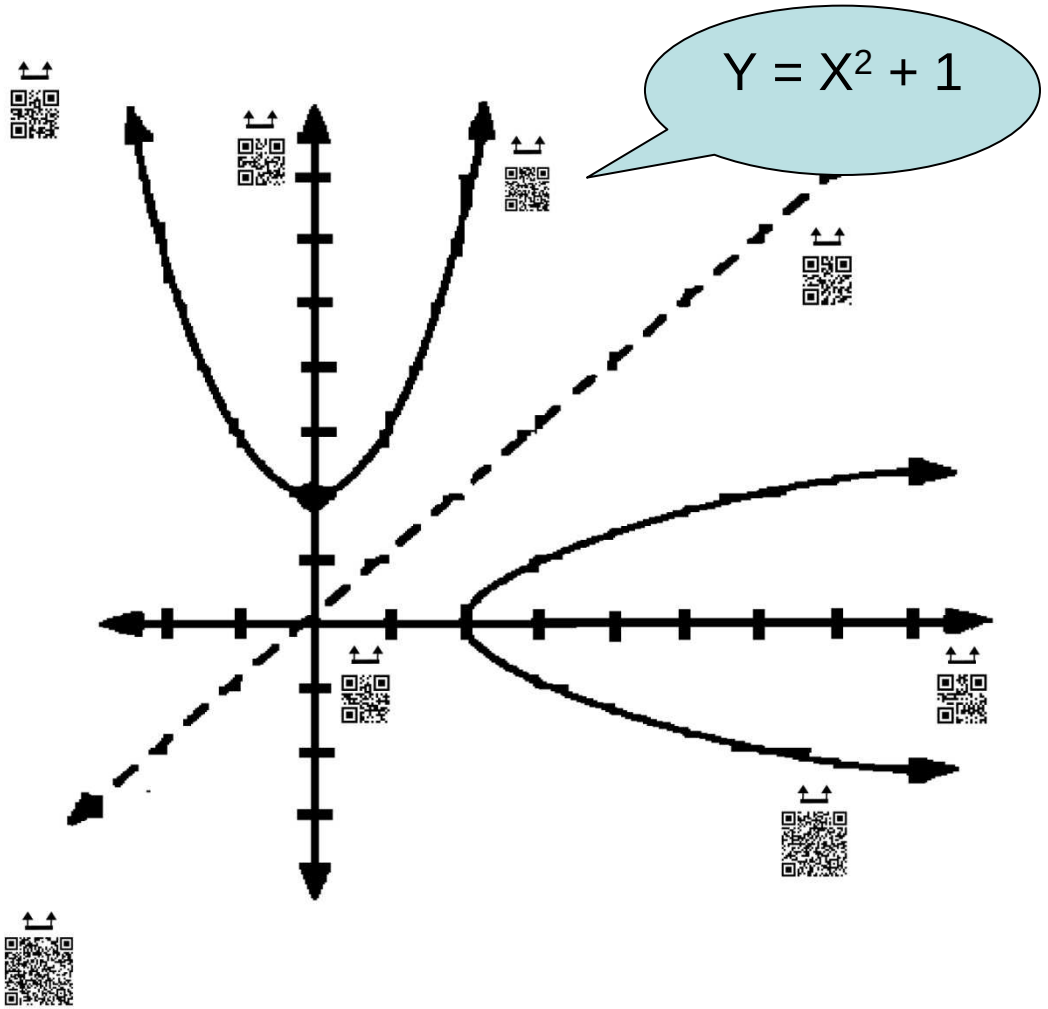


Talking Barcode Reader

Chandrika Jayant

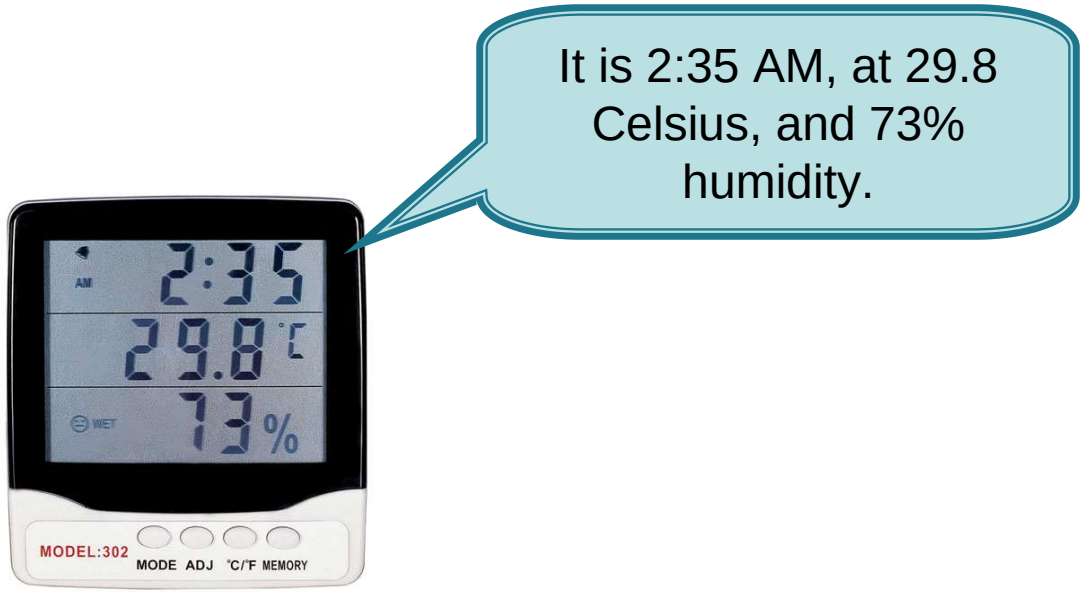
Tactile Graphics

Josh Scotland, Chandrika Jayant



Appliance Reader

Chandrika Jayant, Tom Guo



http:/www.mtixtl.com/productimages/oven/box-panel-300.jpg

GoBraille

Shiri Azenkot

Refreshable Braille Display, WiFi Enabled

Google Maps

OneBusAway

GoBraille Repository

Capstone Projects From 2010

http://www.komonews.com/news/local/87737592.html?tab=video

Capstone Projects From 2011

- The Phone Wand - Navigating routes using orientation and vibration feedback.
- Pic2Speech - Custom augmented speech.
- Street Sign Reader - Reading street signs so you don't have to.
- WhosHere - Finding out which friends are around you.
- SwipeSounds - The sound of gestures.
- Sound Detector - Detecting recognizable sound patterns to alert the user.

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Ideal Group

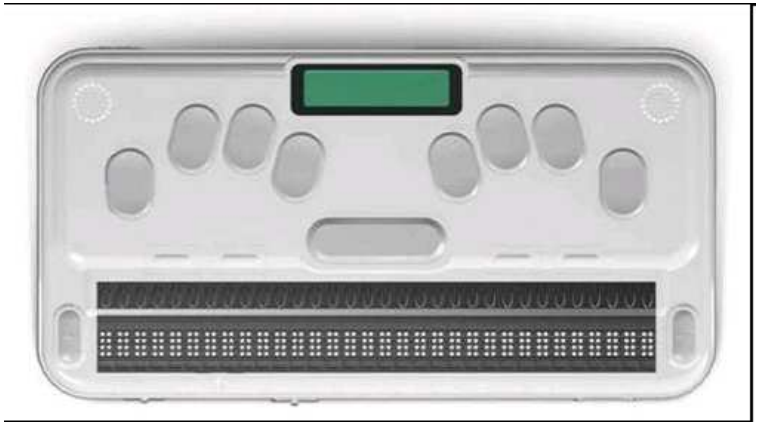
http://ideal-group.org/sj131264/

Project Possibility

http://projectpossibility.org/index.php

Braille Notetakers

BrailleNote



Braille Sense

Braillenote with GPS

DeafBlind Communicator

VizWiz

- Bigham, Jayant, … (UIST 2010)
  - Take a picture and send it to humans with a recorded question.

“What does this street sign say?”

MobileASL

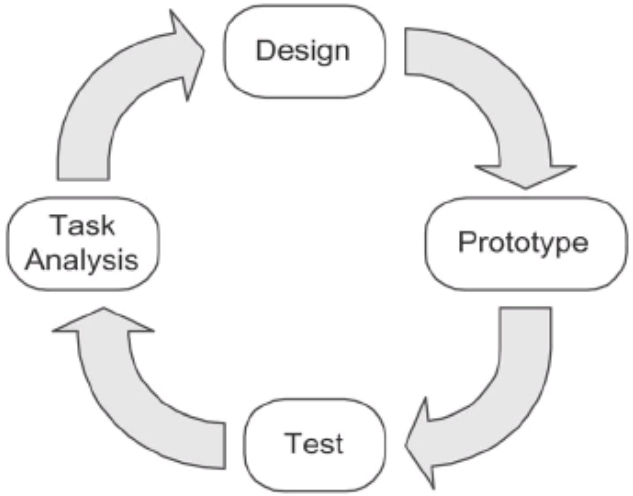
Eve Riskin, Jake Wobbrock, …

ASL communication using video cell phones over current U.S. cell phone data network

Challenges:

- Limited network bandwidth
- Limited processing power on cell phones
- Limited battery life

Video

Research

- User Centered Design
- Lab studies
  - Control as much as possible
- Field studies
  - Instrument to log data
  - Experience sampling
  - Diaries
  - Surveys