

# A Better Society Through Computers

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*With Special Thanks to Prof. Richard Ladner*

# “Computers” + “Social”

- When we think of computers and society at the same time, we usually think of social media – FB, Twitter, Tumblr, Pinterest

# “Computers” + “Social”

- ~~When we think of computers and society at the same time, we usually think of social media – FB, Twitter, Tumblr, Pinterest~~
- Instead, think of ways computers make the society better
- Today:
  - Assistive Technologies help people with disabilities
  - Crowd Sourcing harnesses the power of the people

# Who's Considered Disabled?

- 650 million people worldwide
  - Sight: blind, low vision, color blind
  - Hearing: deaf, hard of hearing
  - Speech: limited ability to speak, stuttering
  - Mobility: limited ability to walk, use hands, arms
  - Cognition: dyslexia, short-term memory loss, dementia
  - Multiple: deaf-blindness

# Assisting The Blind

Ray Kurzweil built first text-to-speech machine

- Think of the problems
    - High resolution scanning of documents
    - Character recognition from bits (OCR)
    - Word identification
    - Speech Synthesis
- + a zillion tough tech problems in between

**AMAZING!**



# Kurzweil Reading Machine

Stevie Wonder said: "The Kurzweil Reading Machine was a breakthrough that changed my life. With the Kurzweil Reading Machine, I could read anything I wanted with complete privacy: music lyrics, letters from my children, the latest best sellers and magazines, memos from my business associates. **It gave blind people the one thing that everyone treasures, which is independence.**"



# Expanding Technologies

<https://www.youtube.com/watch?v=TOwDzDnd9NY>



FROM: KURZWEILTECH.COM

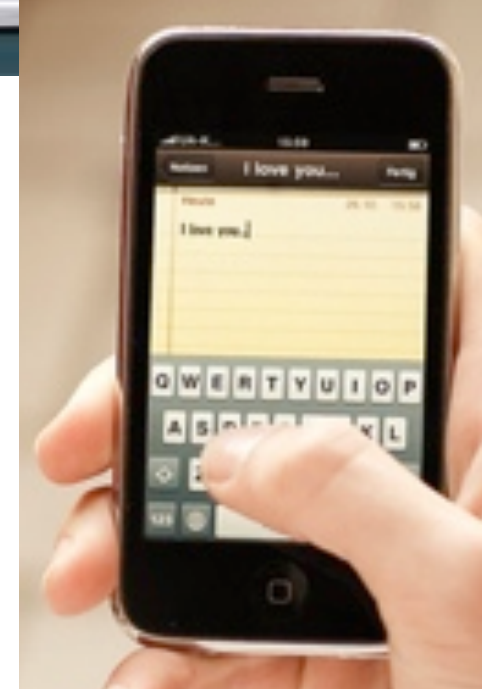
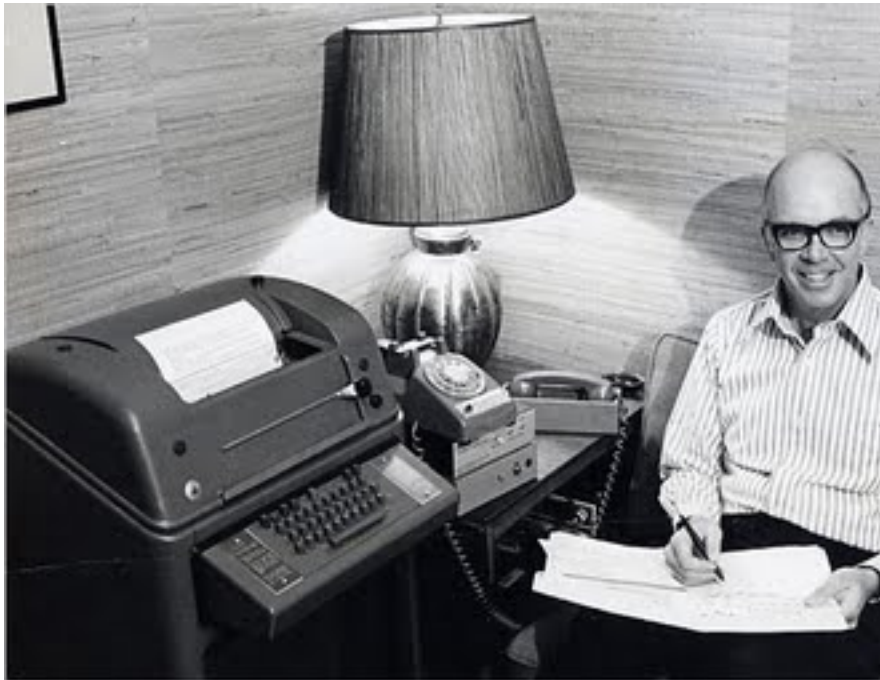
KNFB Reader



Prismo for iPhone



# Texting: TTY to SMS



Deaf people need to type/read text when communicating over a distance ... since the invention of the acoustic modem in the '70s this has been possible, but only now is **mobile**



# From The Examples ...

- Technologies designed to assist the disabled to function in society usually turn out to be extremely useful to everyone!
  - Telephone
  - Texting
  - OCR
  - Speech recognition
  - Speech synthesis
  - Electric toothbrush
  - Sidewalk curb ramps and on and on and on ...

Helping Disabled is Right!  
First: Their Lives Are Better  
Next: Everyone's Life Is

# What Else Can Be Done – Lots!

- How about ASL over a smart phone?



Tough problems: Bandwidth,  
Computer Speed, Battery Life



# Take Home Message

- Don't think of disabled people as a medical, educational or social "problem" ... think how tech can let them live WELL with a disability

Assisting The Disabled Is Right!  
First: Their Lives Are Better  
Next: Everyone's Life Is Better

# Crowd Sourcing

- Crowd sourcing is a distributed problem-solving and production technique
  - Problems are broadcast to an unknown group of 'solvers'
  - 'Solvers' – the crowd – submit solutions that become the property of the broadcaster
  - They are compensated in some form -- money, prizes, community accolades, intellectual satisfaction and/or skill development
- Computers are the perfect 'agent' for this!

# Before There Were Computers ...

- Crowd sourcing doesn't need computers ...
- The Oxford English Dictionary (OED), started in 1857, is an example. (It has EVERY English word in it; it's so huge a person would need 120 years to type it in!)
- OED gave a general call for people to find the earliest use of each word ... so, for example, *byte* was first used in 1964
- 1,000s and 1,000s of people have helped out, and continue to

# More Familiarly ...

- [setiathome.berkeley.edu/](http://setiathome.berkeley.edu/)



## What is SETI@home?

SETI@home is a scientific experiment that uses Internet-connected computers in the Search for Extraterrestrial Intelligence (SETI). You can participate by running a free program that downloads and analyzes radio telescope data.

The screenshot shows the SETI@HOME website interface. At the top left is a satellite dish icon. The main navigation area is divided into several columns: PARTICIPATE (Download, Get help, Tell a friend, Donate, Porting & optimization, ... more), ABOUT (About SETI@home, About Astropulse, Science newsletters, Technical news, Server status, Science status, Sponsors, ... more), COMMUNITY (Message boards, Questions & answers, Profiles, User search, Teams, Web sites & IRC, Pictures & music), YOUR ACCOUNT (Your account, Preferences, Certificate), and STATISTICS (Top participants, Top computers, Top teams, Top GPU models). Below the navigation is a search bar with 'GoodSearch powered by YAHOO! SEARCH' and a 'Languages' link. The main content area is split into two sections: 'Get started' and 'News'. The 'Get started' section contains two numbered steps: 1. Read our rules and policies; 2. Download, install and run the BOINC software used by SETI@home. The 'News' section contains two news items: 'We are recovering from a database crash' and 'SETI@home annual fund raising campaign has started'.

- Search for intelligence goes on; user computers keep busy

# More Familiarly ...

- [www.freerice.com](http://www.freerice.com)

The screenshot displays the Freerice website interface. At the top, a navigation bar includes links for HOME, SUBJECTS, GROUPS, RICE!, SIGN UP, LOGIN, ABOUT, SPREAD THE WORD, and ENGLISH. The main header features the Freerice logo and a mission statement: "For each answer you get right, we donate 10 grains of rice through the World Food Programme to help end hunger". Below the header, there are options to login or sign up. The central content area is titled "English Vocabulary" and shows a question: "fluid means:". The possible answers are puppy, duty, stamps, and liquid. To the left of the question, there are three icons representing different levels of rice donation: 1 right = 10 grains, 5 right = 50 grains, and a pile of rice with the text "Play and feed hungry people". To the right of the question, there is a "How to Play" section with three bullet points explaining the game mechanics and a warning that the game may improve users' skills. At the bottom of the page, a statistics bar shows "10745800 grains of rice donated yesterday" and "Over 97 billion grains donated to date (see totals)".

- UN Food Program gets rice; Users learn vocab

# More Familiarly ...

- [www.kickstarter.com](http://www.kickstarter.com)

The screenshot shows the Kickstarter project page for 'Iva Jean: Bike Fashion for Women, Spring 2013' by Ann DeOtte. The page features a navigation bar with the Kickstarter logo, links for 'What is Kickstarter?', 'Discover great projects', 'Start your project', a search bar, and links for 'Help', 'Sign up', and 'Log in'. The project title is prominently displayed, followed by the creator's name. Below the title, there are navigation tabs for 'Home', 'Updates 0', 'Backers 86', and 'Comments 1'. The main content area includes a video player with a 'PLAY' button, showing three women modeling different styles of clothing. To the right of the video, a summary box displays '86 backers', '\$7,585 pledged of \$15,000 goal', and '22 days to go'. A green 'Back This Project' button with '\$1 minimum pledge' is visible. Below the video, there are social media sharing options (Like, Tweet, Embed) and a link to the project page. At the bottom right, there is a section for the project creator, Ann DeOtte, with a small profile picture and contact information.

- Entrepreneur gets presales; users get discounts



# More Familiarly ...

- [beamartian.jpl.nasa.gov](http://beamartian.jpl.nasa.gov)



- NASA processes data; user gets prizes, status

# More Familiarly ...

- [fold.it](http://fold.it) [<http://vimeo.com/focusforwardfilms/semifinalists/51888393>]

fold.it BETA  
Solve Puzzles for Science

20:09:04 GMT

PUZZLES BLOG CATEGORIES FEEDBACK GROUPS FORUM PLAYERS WIKI FAQ RECIPES ABOUT CONTESTS CREDITS

GET STARTED: DOWNLOAD

Win Beta Mac Beta Linux Beta

Windows (XP/Vista/7) OSX (Intel 10.4 or later) Linux (64-bit)

Click to learn how you contribute to science by playing Foldit.

What's New

**Vote for a short documentary on Foldit!**

A short documentary on Foldit is a semi-finalist for the FOCUS FORWARD Filmmaker Competition! You can help it win the Audience Favorite award by voting for it online. The video is here, and the "VOTE" button is in the top-right of the video.

<http://vimeo.com/focusforwardfilms/semifinalists/51888393>

(Thu, 11/15/2012 - 16:24 | 0 comments)

SEARCH

RECOMMEND FOLD

USER LOGIN

SOLOISTS EVOLVERS GROUPS TOPICS

PLAYER	PUZZLE	SCORE
meatexplosion	55 10 652: 40 Residue...try	11,312
karstenw	22 21 653: CASP ROLL ...025	10,969
doug.ehlert	28 3 651: Electron D...d 2	3,169
smilingone	6 6 Beginner Puzzle...lin	9,726
retiredmichael	140 4524 Beginner Puzzle...lin	9,573
Ribo-soma	40 510 Beginner Puzzle...lin	9,633

TOP NEW USERS

- kathinka1984
- Brodosh
- lostwarp
- parsnip
- mirp

- AIDS research furthered; users get status!!!

# Types of Crowd Sourcing

- What other crowd sourcing activities are you familiar with?

# Types of Crowd Sourcing

- What other crowd sourcing activities are you familiar with?
- What types of crowd sourcing do the examples illustrate?

# Why Does Crowd Sourcing Work?

- People bring a variety of skills to the problem –
  - Gamers may be better at 3D visualization than people selected for medical research knowledge
  - Motivation – Learning vocabulary and giving rice to UNWFP is better than learning vocabulary alone
  - Large supply of workers with nothing else to do –
    - Mechanical Turk exploits programming skills
    - Being a Martian is a “better” time waster than SuDoKu
  - Collective intelligence trumps a few smart people
- Participating in something new is FUN!

# Take Home Message

- Computers and the Internet made crowd sourcing a powerful, easy-to-apply idea that makes the world better
- We may all be able (and eager to) contribute
- If “two heads are better than one” than a million heads are at least better than 500,000