

Technology for Deaf People

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Introduction to Deaf Studies
ASL 305
Spring, 2010

Outline

- Background and terminology
- Hearing technology
- Texting
- Video Phone
- Web
- Other Technology
- Research

Who Are Deaf People

- Born or became deaf before language development.
 - › 10% have deaf parents
 - › 90% have hearing parents
- Became deaf after language development.
- Became deaf in old age.

Models of Deafness

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

Deaf or deaf

- deaf with lower case “d”
 - › Severe hearing loss that may happen in aging
 - › No sign language
 - › Prefers to enhance hearing, if possible
- Deaf with upper case “D”
 - › Member of the Deaf Community
 - › Uses sign language socially and possibly at work
 - › May use hearing aids or other devices to enhance hearing
 - › Culturally Deaf

Technology

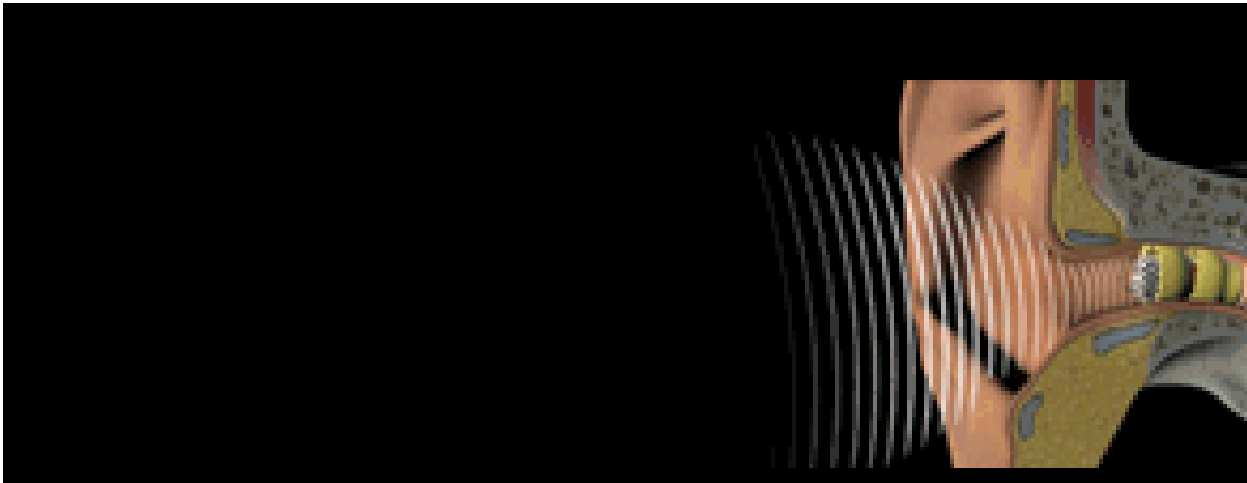
- **Prosthesis**
 - › Augmentation to restore lost function. Cure or partial cure. Examples: hearing aids, cochlear implants
- **Assistive technology**
 - › Popular in rehabilitation literature. Emphasis on the need for assistance.
- **Access technology**
 - › Allows an activity that would be difficult to impossible to achieve without it. Emphasis not on restoring function, but on achieving an end goal by whatever means possible.
 - › Examples: text messaging, video phones, captions

Hearing Technology

- Hearing Aids
- FM Systems
- Cochlear Implants

Latest Hearing Aid

- Lyric



FM Systems

- Personal
- Public (Opera House, ...)



Personal FM System

Cochlear Implant



“Normal” ear



Implanted ear

The Telephone

- The telephone was invented by A.G. Bell in his efforts to improve the lives of deaf people.

- His mother and wife were deaf.
- His father was a pioneer in speech training.



A.G. Bell
1880

Alexander Graham Bell

- Bell was very influential on public policy about deafness.
 - › He was a strong advocate of oralism.
 - › He advised the deaf not to marry each other and have children to help eliminate deafness.
 - › His telephone was not used by the deaf until the invention of the acoustic modem and TTY.

Texting

- TTY
- TTY Relay Service
- Captioned Telephone
- E-mail
- Instant Messaging
- Captions

TTY (Teletypewriter)



TTY circa 1970



Modern TTY with
built-in acoustic modem

TTY Relay Service



Captioned Telephone

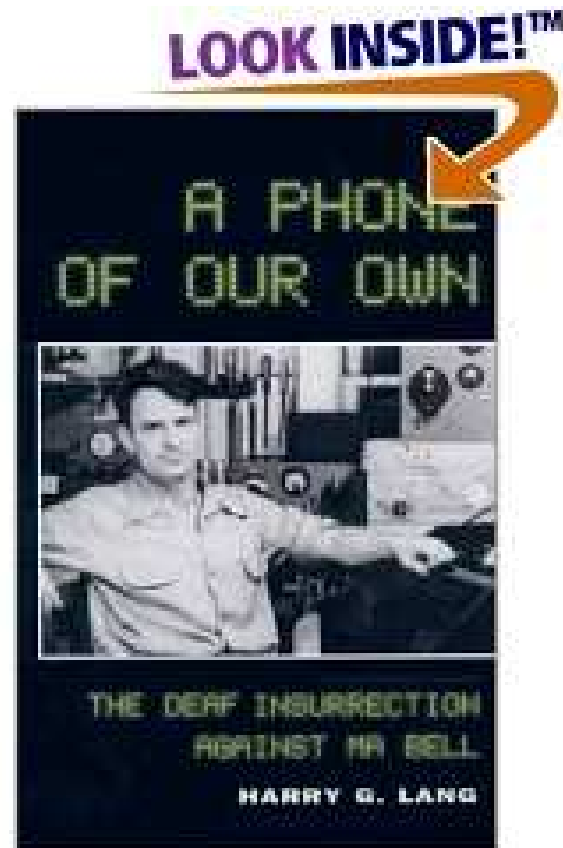


Deaf Technology

Robert H. Weitbrecht

- Deaf man who invented the acoustic modem in the 1960s so that he could use the telephone through a TTY.
- Over 20 years the idea caught on so that by 1980 the Deaf world was connected by TTYs.
- TTY relay services were created so that Deaf people could communicate with hearing.
- TTY laws in almost every state require the telephone company to provide a TTY to every deaf customer.

History of the TTY



Author: Harry Lang

E-Mail / Instant Messaging



Sidekick

Closed Captions



Closed vs. Open Captions

- Closed Captions
 - › Optional
- Open Captions
 - › Always on the screen
 - › Like subtitles for foreign language films
- Leader - WGBH Media Access Group

Closed Captioning

- Line 21 of the vertical blanking interval of a TV band was basically unused before 1970.
- The National Bureau of Standards was mandated to look for a way to provide closed captions using this band.
- In 1980 the first broadcasts of a regular series were captioned by ABC.
- Today all TVs must have a built-in caption decoder.
- Today real-time and off-line captioning of media is a large industry.
- Captioning of web video is a current problem.

YouTube Auto-Captioning

- Auto-captioning
 - › Speech → captions
- Auto-synchronization
 - › Speech + transcript → captions
 - › Much better
- <http://www.youtube.com/watch?v=kTvHIDKLFqc>

Captionfish

DeafCode LLC

Captionfish: A captioned movies search engine - Mozilla Firefox

File Edit View History Bookmarks Yahoo! Tools Help

http://www.captionfish.com/

Most Visited Latest Headlines Google Yahoo! MyUW Directory UW Library Content Tool Ladner Catalyst tcscomm oneBus SIGACT-EC

Online Applica... IT Connect UW Engineeri... CSE Colloquia... MSRRTC - ass... Julie Kientz - G... hearingimpair... The Collegiat... UW Events C...

See What I'm Saying continues its NYC run & starts playing at Marcus Theaters & Cinemark locations this Friday!

beta

CAPTIONFISH

Blog · About · FAQ · Contact · Advertise

Your Instant CC Film Finder™ Trailer Directory Theater Directory Upcoming Captioned Releases

Location: Seattle, WA Reset GO

Tip: Enter as much data as possible to get the best results: e.g. 1994 15th Ave E, Seattle, WA 98112

Captionfish found 30 movies showing at 15 theaters within 60 miles of the Seattle, WA area.

Filter your results: CC | RWC | Foreign/Subtitled | DVS | Show All

AMC Cinerama 1
2100 4th Ave., Seattle, WA 98121 0.60 miles

How to Train Your Dragon (PG)
TODAY: 2:00pm, 4:40pm, 7:15pm
TOMORROW: 2:00pm, 4:40pm

AMC Pacific Place 11
600 Pine Street, Seattle, WA 98101 0.99 miles

How to Train Your Dragon (PG)
TODAY: 10:35am, 12:55pm, 3:15pm, 5:40pm, 8:00pm, 10:20pm
TOMORROW: 12:55pm, 3:15pm, 5:40pm, 8:00pm, 10:20pm
Friday: 11:20am, 1:45pm, 4:20pm
Saturday: 11:20am, 1:45pm, 4:20pm
Sunday: 11:20am, 1:45pm, 4:20pm
Monday: 11:20am, 1:45pm, 4:20pm
Tuesday: 11:20am, 1:45pm, 4:20pm

Shutter Island (R)
Friday: 7:05pm, 10:05pm
Saturday: 7:05pm, 10:05pm
Sunday: 7:05pm, 10:05pm

See What I'm Saying
Get the latest schedule for "See What I'm Saying", the Deaf Entertainer's Documentary.

Get involved with Captionfish

RSS
Subscribe to have the latest movies and showtimes delivered to your favorite reader

Twitter
Follow Captionfish on Twitter to get the latest site updates

Facebook
Join the Captionfish fan group on Facebook

Captionfish Mobile
Get the same great results in a friendly format viewable on any mobile device

Share Captionfish With Others
Help us spread word about Captionfish!

Legend

RWC
Rear Window® Captioned
A transparent acrylic panel attached to your seat reflects the captions so that they appear superimposed on the movie screen.

Demo

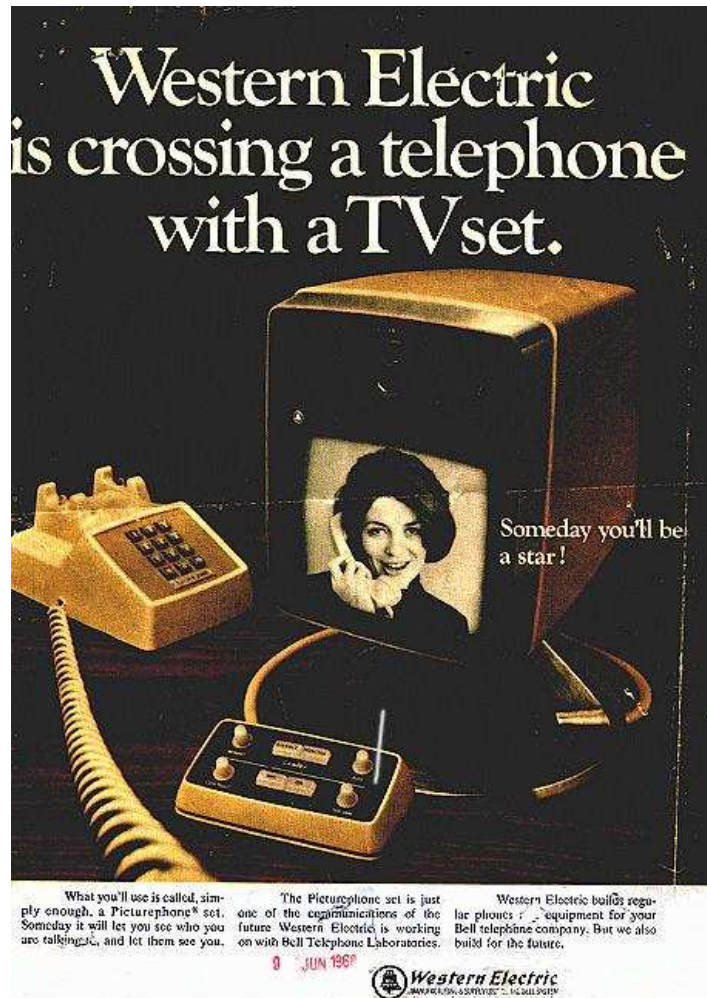
Deaf Technology

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Video

- Video Phone
- Video Relay Service (VRS)
- Video Remote Interpreting (VRI)
- MobileASL (UW Project)

Picturephone



“Picturephone” demonstrated by AT&T at the 1964 World’s Fair

- › Required too much bandwidth for phone system
- › Deaf world excited then disappointed

Video Phone



More Video Phones



Viable

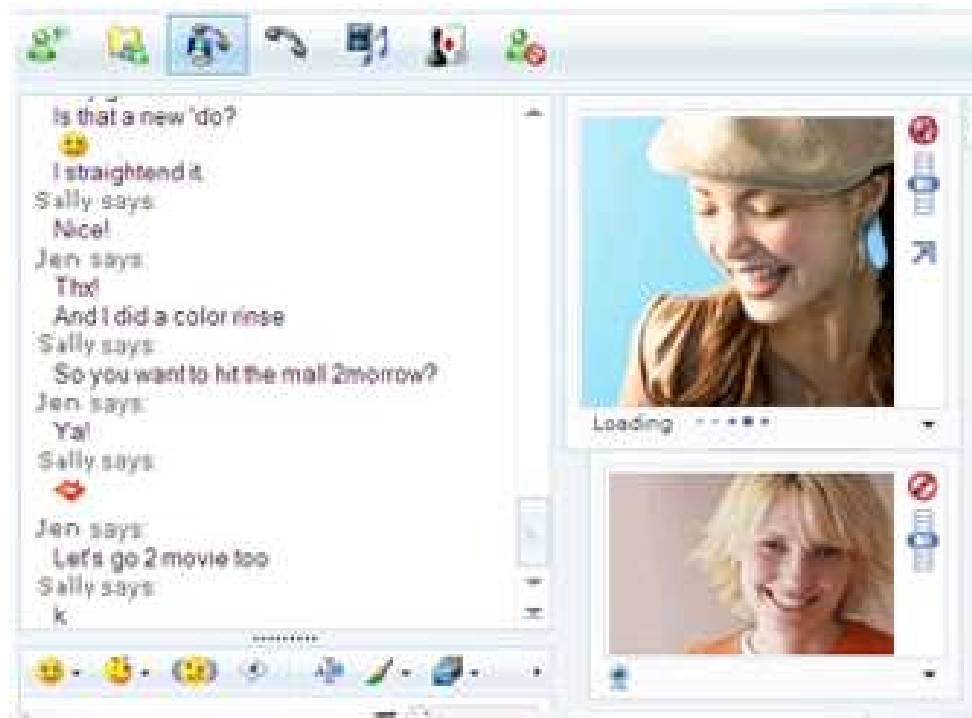


Purple

Ubiquitous Video Phones



Skype



Windows Live Instant Messenger

Video Relay Service (VRS)



© Sorenson

VRS

- VRS is a free service to deaf people in the US.
 - › Paid for by Universal Access Tax
- Major companies
 - › Sorenson
 - › Purple
 - › ZVRS
 - › Snap

Video Remote Interpreting (VRI)



MobileASL

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

Challenges:

- › Limited network bandwidth
- › Limited processing power on cell phones



MobileASL Platform

- HTC TyN II



Camera facing
in the right direction

Modern Video Phone

- Sorenson was the pioneer
- Many other companies in the field
- Relay service
- Point-to-point
- Computer based or TV with set top box
- Broadband required
- Free for broadband deaf users in most states.

The Web

- Vlogs (Video Web Logs)
- Social Networking
- ASL-STEM Forum (UW Project)

Vlogs



Deaf Technology

Social Networking

The screenshot shows the Camfrog website interface. At the top, there's a navigation bar with links like Home, Video Chat Rooms, User Directory, Buy, Download, Help, Contact, and Links. Below this, a section titled 'VIDEO CHAT ROOMS' states '3987 webcam chats available.' and includes a location dropdown set to 'North America and UK'. A search bar with 'powered by YAHOO! SEARCH' is also present. Below the search bar, there are four promotional boxes for various chat services. At the bottom, a table lists different chat rooms with columns for Name, Users, About, and Uptime. The 'Deaf' tab is highlighted with a red circle. Below the table, there's a red banner with the text 'Calculate the exact name of your perfect lover!' and a form to enter a name.

Name	Users	About	Uptime
Single (Join)	150	Info	6 days
Camfrog (Join)	56	Info	6 days
Italiano (Join)	53	Info	6 days
SignLanguage (Join)	47	Info	6 days
Deutsch (Join)	35	Info	6 days
SpeakEnglish (Join)	32	Info	6 days
Francophone (Join)	26	Info	6 days
HableEspanol (Join)	23	Info	6 days
NEDERLANDS (Join)	20	Info	6 days

Deaf Technology

facebook

Profile edit Friends Networks Inbox

home account privacy logout

ASL - American Sign Language

Global

Search

Applications

edit

- Photos
- Groups
- Events
- Marketplace

more

Information

Group Info

Name: ASL - American Sign Language
Type: Common Interest - Languages
Description: Facebook's group for ASL users...deaf, hard of hearing, or hearing.



Photos

Displaying 4 of 10 photos.

See All



View Discussion Board

Join this Group

Share +

Related Groups

American Sign Language and Deaf Culture Awareness
Common Interest - Politics

Join to support Breast Cancer Awareness Month.

Organizations - Non-Profit Organizations

D-PAN: Deaf Performing Artists Network

Entertainment & Arts - Performing Arts

If you remember this you grew up in the 90's

Just for Fun - Totally Random

Mosdeux : The Deaf Family

Entertainment & Arts - Movies

Group Type

This is an open group. Anyone can join and invite others to join.

Admins

- Lis de Saussure (Kent State) (creator)
- Steven J Sweeney (ASU)
- G. Lensbower (ASU)
- Christina Rogers (West Springfield High)

Videos

Displaying 2 of 12 videos.

See All



"Figure .09"
by Mike Mullen
3:12 Uploaded 5 hours ago
View Video



"Can't Get My Head (Around You)"
by Mike Mullen
2:07 Uploaded on Sunday
View Video

Posted Items

No one has posted any items.

Discussion Board

Displaying 3 of 70 discussion topics

See All



Find: bilingual Next Previous Highlight all Match case

Done

start



22

2

10

R..

2

g..

C..

Search Desktop

Search Desktop

Search Desktop

Search Desktop

Search Desktop

Search Desktop

Search Desktop

Search Desktop

Search Desktop

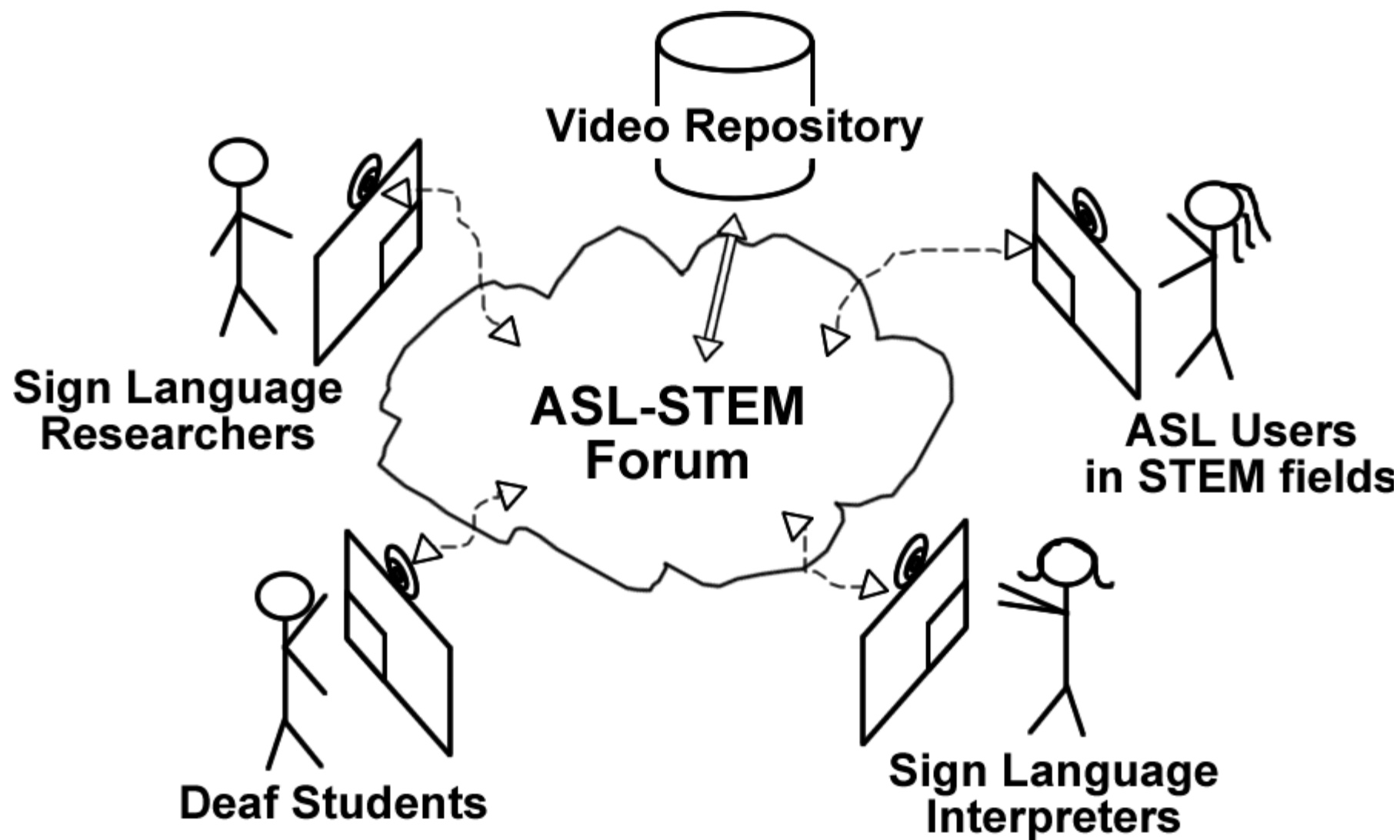
Search Desktop

5:48 PM


ASL–STEM Forum

Social Networking for a Purpose

- Enable ASL to grow into Science.
- Empower more deaf students to go into advanced science fields.
- Leverages the interest in the video enabled web.



Searchable
Index



ASL-STEM Forum

Enabling American Sign Language to grow in Science, Technology, Engineering, and Mathematics (STEM)

E-mail: Password:

[Forgot your password?](#) | [Register an account](#)

[Topics](#) | [Signs](#) | [About](#) | [Help](#) | Viewing topic: Algorithms

Navigate: [Index](#) | [Search](#)

[Theory](#)


- Algorithms
 - [Binary Search](#) new
 - [Hailstone sequences](#) new
 - [Merge sort](#) new
 - [Procedural Decomposition](#) new
 - [Selection Sort](#) new
 - [Sequential searching](#) new
 - [Sorting](#) new
 - [Complexity](#)

... >> [Computer Science](#) >> [Theory](#) >> Algorithms [sub-topics](#)


Algorithms

Definition: a step-by-step description of how to accomplish a task.
Source: Reges & Stepp, 2007


Example: Example sentence for context: "Knuth is an expert in algorithms, so he is naturally biased towards thinking of them as the center of computer science."



[Enlarge](#)




[Enlarge](#)



[Enlarge](#)


Highest Rated Sign



Video id: [#3 \(enlarge\)](#)

Post date: 2/27/2008

Posted by: [jndewitt](#)

Rating: 
1 rating
[See all signs \(4\)](#)

[Time \(reverse\)](#) | [Username](#) | Displaying 2 of 2

[« previous](#) | 1 | [next »](#)

perhaps the sign should show the "process" of something happening in the algorithmic process..

4:06pm 3/26/2008
User: jndewitt
Post count: 10

For video id#3, the sign was taken directly from the American Sign Language Computer Dictionary (publisher: Random House Webster's, edition 2001). In my opinion, I think it's too "English". The sign doesn't really clearly show the concept of the term, algorithm.

11:31am 2/27/2008
User: jndewitt
Post count: 10

Sign Video

Rating

Discussion

[Demo](#)

Deaf Technology

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Deaf-blind Technology



TeleBraille (1984)
TTY with Braille output



DeafBlind Communicator (2009)

- face-to-face
- TTY
- SMS

Other Technologies

- Doorbell light
- Phone ringer light
- Fire alarm light
- Baby monitor light or vibrator
- Alarm clock light or vibrator

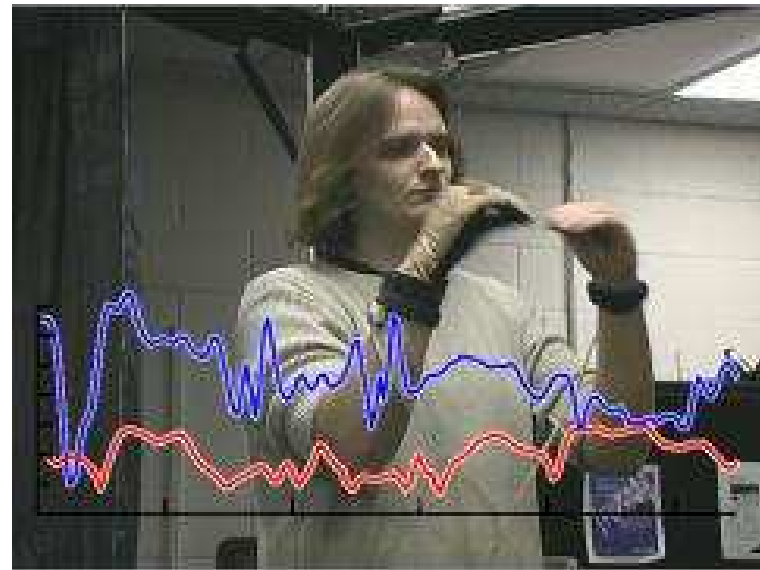
Research

- Sign Language Recognition
- Sign Language Activity Recognition
- Signing Avatars

Sign Language Recognition

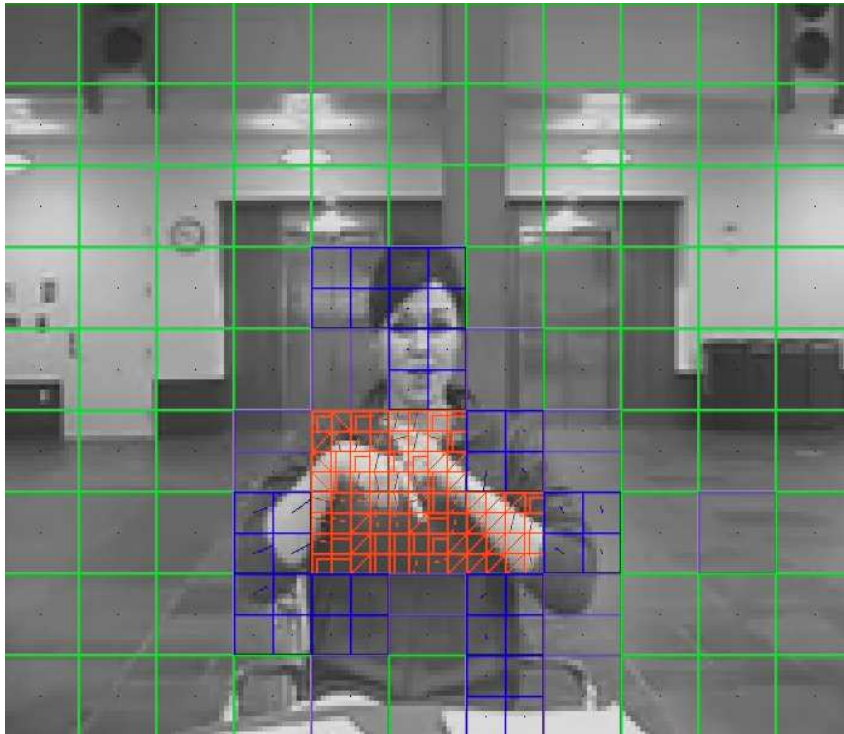


Thad Starner
Georgia Tech



Christian Vogler
Gallaudet

Compression Features for Activity Recognition



Type of macroblock



Motion vectors

Signing Avatars



[Vcom3D Demo](#)

Unsolved Research Problems

- Sign Language Recognition
 - › From video or even more sensors
- Sign Language Translation
 - › To or from sign language
- Useful Avatars
 - › Not natural enough
 - › Facial expressions poor
 - › Motion capture not perfect
- Speaker independent speech recognition for automatic captioning

Technology Classes

- Bottom-up technology - TTY, VRS
 - › Start from a small base and build
- Top-down technology - CC
 - › Government edict is necessary
- By-product technology - E-mail, SMS, IM
 - › Existing technologies, if useful, will be adopted

Discussion