Field Study Using Automatic Speech Recognition to Facilitate Communication between Deaf Students and Hearing Customers

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Agenda

• Apps Used in the field
• Companies
• Research methods
• Experiences - Positive
• Experiences - Challenges
• Summary of Findings
• Q & A
Challenges

• Automatic speech recognition is imperfect
• Designed for dictation
• Not designed for conversation
Apps Used in ASR Research

Customer and Capstone Classes experiences with two ASR apps:

• Ava
  – Was too complicated and time consuming

• WhatsApp
  – Easy to install
  – Many useful features
Partners in ASR Research

Capstone Classes worked on projects in:

- Fix-in-A-Zip (FIZ) Rochester
- Baycreek Paddle Center
- ACE Swim & Leisure
- Rochester Recreation Club for the Deaf *

*Used WhatsApp but not ASR; no data collection
Field Trials
Fall Semesters: 2151, 2161
Spring Semester: 2155

• Trials observed
  – 5 without ASR
  – 5 with ASR

• Participants
  – 21 deaf/hard of hearing students
  – 6 hearing owners/managers who did not know sign language
Types of Data Collected

1. Observational checklist
2. Field notes
3. Participant ratings and open-ended comments on survey
4. Examined transcripts of ASR from WhatsApp
Without ASR/WhatsApp Use

Deaf/HH Students

- Depend on others to interpret or use pencil/paper to communicate
- Interact with each other using SL - do not document or inform customer of progress
- Interrupt customer more frequently
Without ASR/WhatsApp Use cont…

Hearing Customers (Business Owners/Managers)

- More time involvement to communicate
- Can’t monitor students progress
- No record of interaction or recommendations
- Handwritten notes are slow
Process for Trials with ASR

Step 1: Interpreter or Instructor Interprets first Interaction

FIZ

ACE
Process for Trials with ASR

Step 2: Customers and Students use ASR/WhatsApp for remaining interactions
Using ASR with Hearing
Business Owner at Baycreek

Ken Altfather
Here the instruction manual’s for
the feet the USB to VGA adapter and
driver for the monitor
9:12 AM

Vladimir Slavov
We may need longer VGA cable or
we can move the monitor closer to
computer
9:13 AM

Ken Altfather
Yes Mr. Mallory's going to go get a
longer VGA cable
9:13 AM

Eric Smith
The driver installation for usb to vga
require computer to be restarted. Is
that okay?
9:25 AM

Mr. Altfather is research cable so
Using ASR with Hearing Sr. Technician at F.I.Z.

Arber Deski
I have questions for you. You said that I have to remove battery before taking the screen out. How can you remove battery with glue. It pretty hard to remove
11:40 AM

Tim ODonnell
Yeah be very careful with metal around the batteries we have blown up a couple
11:41 AM

To get back to the Wi-Fi the Wi-Fi of the six is even bigger I need to see the progression
11:41 AM

Once you remove the motherboards let me take a look
11:42 AM

With the for the screen does a pop straight up you have to remove 10 screws to get the screen out
11:42 AM

Remove the motherboard first
2155 Semester Survey with Capstone Students (N = 12)

• Communication with hearing customer:
  – 12 reported WhatsApp as somewhat/very helpful

• Communication with other members of team
  – 12 reported WhatsApp somewhat/very helpful

• Information from hearing customer compared to without WhatsApp
  – 6 reported receiving more information
  – 4 reported receiving same amount of information
  – 2 reported receiving less information
Students’ Open-ended Comments

- How WhatsApp helped with Capstone
  - Keep track of project progress
  - Know what is happening in other areas of project worksite
  - Communicate easily with hearing customers
  - App easy to use
  - Faster to type than to write
  - May be useful in business
Comments Continued

• Limitations
  – Hard to look at screen instead of having eye contact
  – Breakdown of Wifi or cell phone data connection
Positives - WhatsApp

- ASR Accuracy reasonable
- No Cost
- Easy to Load
- Easy to Use
- Can get transcripts from Web
Challenges - WhatsApp

- Some Accuracy Errors
  (ASR’s fault, not app)

- Awkward adding users
Challenges - WhatsApp

- 2 Microphone Symbols
Challenges - WhatsApp

- Extra Step - Hitting “Send”
Challenges - General

- BayCreek, had to remind:
  - Owner to use ASR, prefers texting
  - Students to use WhatsApp instead of signing with each other
Challenges - General

Ken Altfather
Do you think you can adjust the aspect ratio on the monitor
10:47 AM

Vladimir Slavov
Yeah. Right now we change it.
10:48 AM

Ken Altfather
Hmm. Doesn't fill the screen
10:48 AM

Vladimir Slavov
It suppose to tilt the monitor
To see better
10:49 AM

Eric Smith
The stream keeps getting interrupted
10:50 AM

Devid Brodsky
What's the matter, Mr. Altfather
10:59 AM
Challenges - General

Fix-In-A-Zip

○ Needed to use hands, awkward holding phone

○ Selecting proper microphone icon
Challenges - General

Customer pressed wrong microphone the first time.

Customer has to keep picking up and putting down phone to communicate.
Summary

- ASR can be effective for deaf/HH students in the hearing workplace
- Whatsapp is reasonable for this implementation
- Phone needs to be attached to Technician in some situations.
- Hearing users need to be trained
- Better Apps need to be developed
• One issue in a better app is for participants to correct ASR errors
  – Next presentation focuses on identifying ways to mark or “flag” ASR errors
Questions?