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

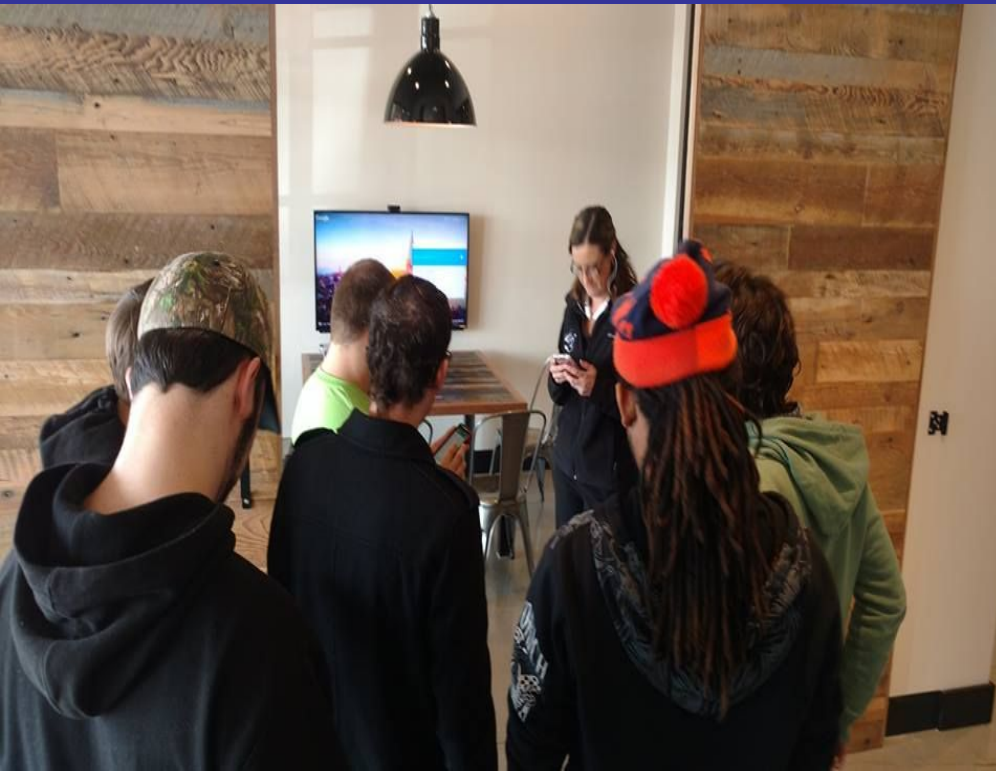FIZ   ACE

Process for Trials with ASR

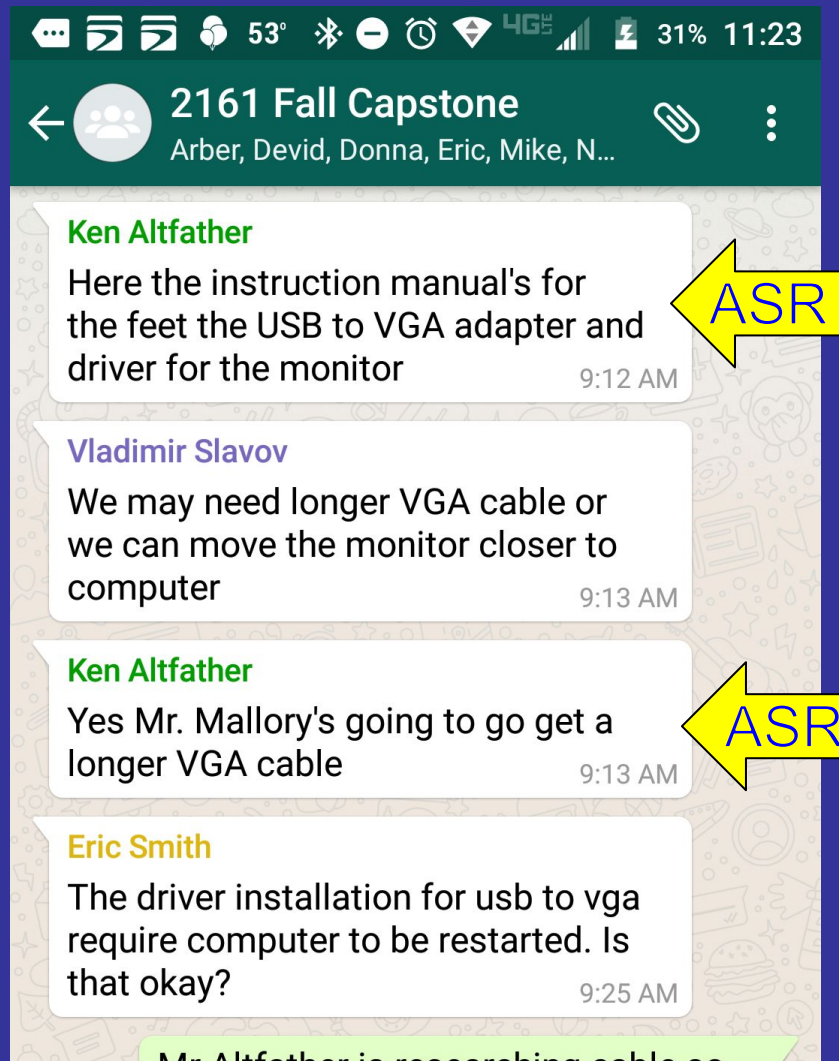Step 2: Customers and Students use ASR/WhatsApp for remaining interactions

FIZ

ACE

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

← ASR

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

← ASR

Eric Smith

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

2161 Fall Capstone
Arber, Devid, Donna, Eric, Mike, N...

Using ASR with Hearing Sr. Technician at F.I.Z.

Fixinazip
Arber, Devid, Donna, Eric, Mike, N...

Arber Deski

I have questions for you. You said that I have to remove battery before taking the screen out. How 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

ASR

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

ASR

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

ASR

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

ASR

Type a message

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
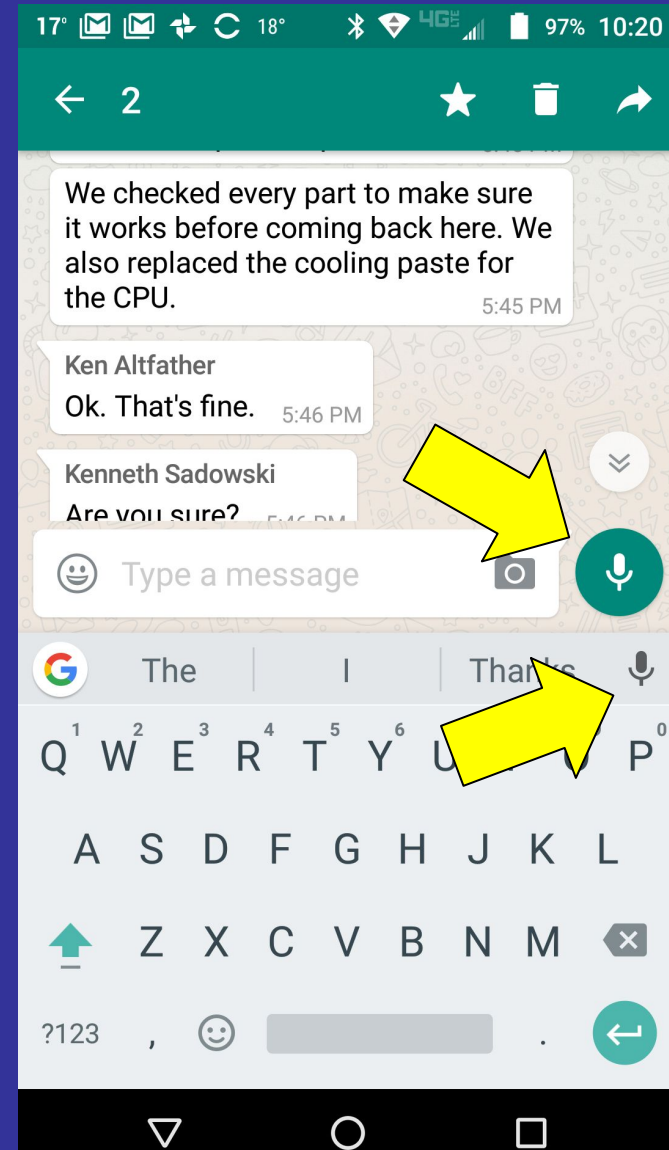 - Breakdown of Wifi or cell phone data connection

Positives - WhatsApp

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

Challenges - WhatsApp

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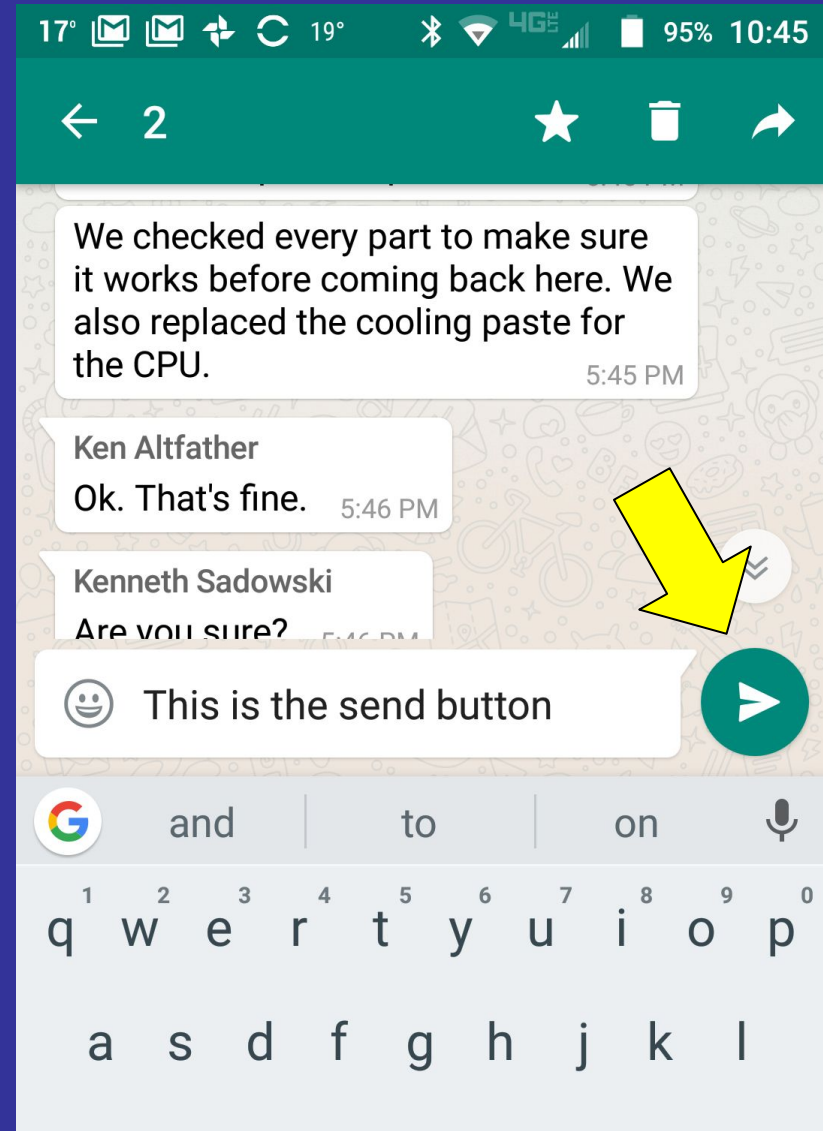 (ASR's fault, not app)

- Awkward adding users

Challenges - WhatsApp

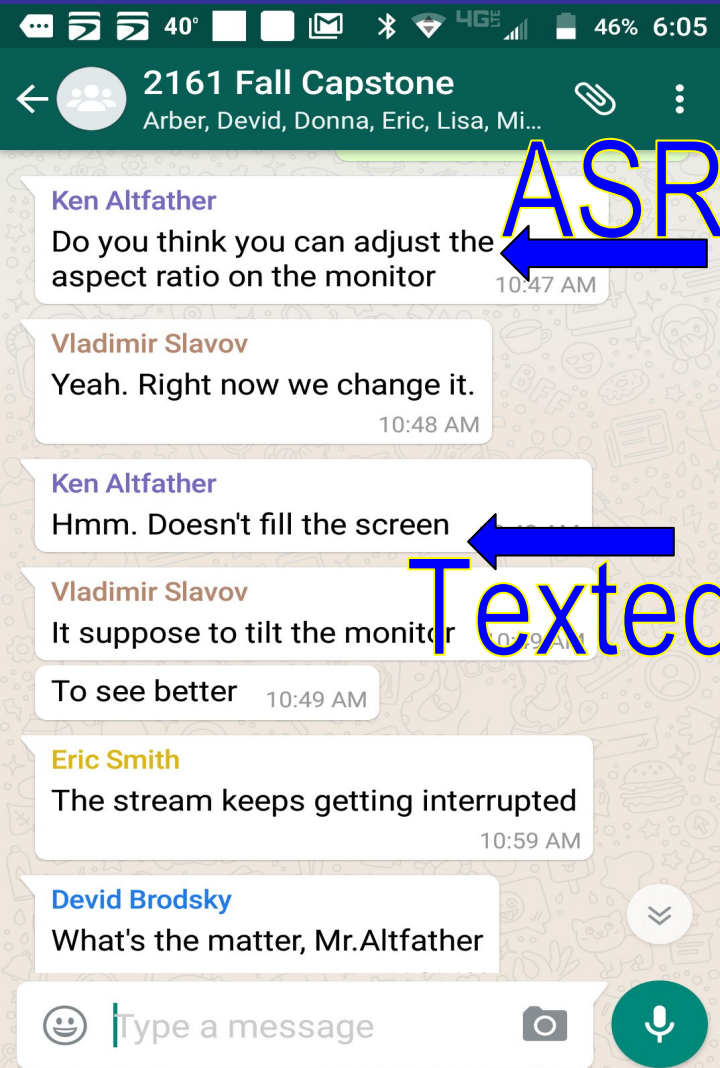- 2 Microphone Symbols

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
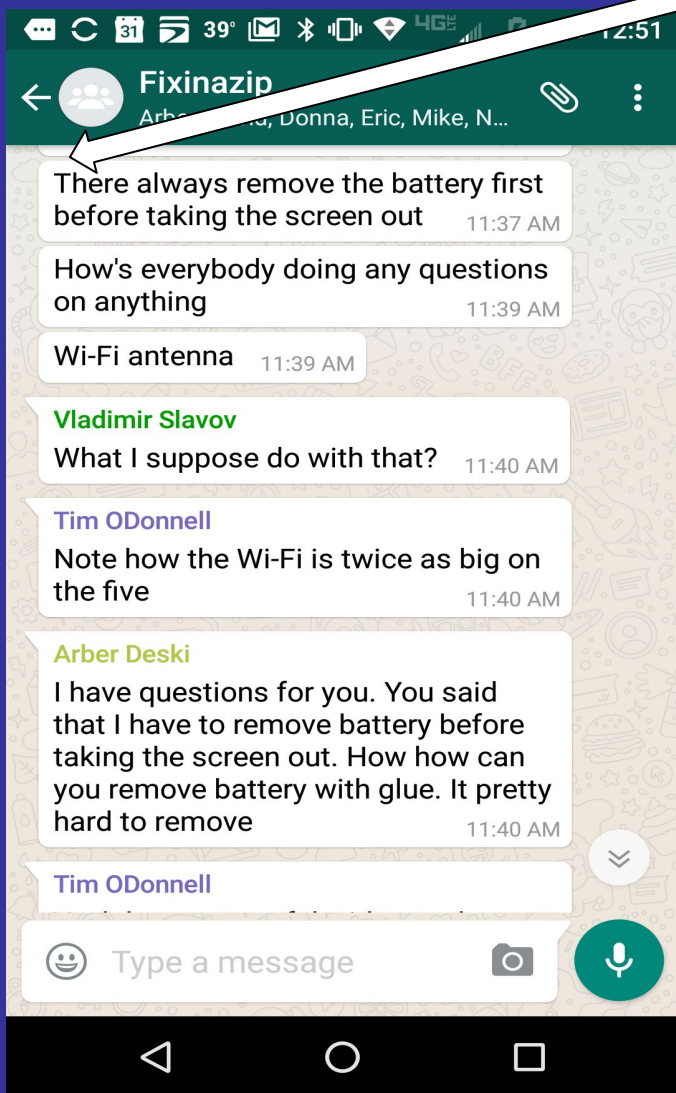
Challenges - General

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.

Fixinazip
Arber, ...d, Donna, Eric, Mike, N...

There always remove the battery first before taking the screen out   11:37 AM

How's everybody doing any questions on anything   11:39 AM

Wi-Fi antenna   11:39 AM

Vladimir Slavov
What I suppose do with that?   11:40 AM

Tim ODonnell
Note how the Wi-Fi is twice as big on the five   11:40 AM

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

Tim ODonnell

Type a message

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

24

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

Summary Continued

- 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?