APPLICATIONS OF ASR FOR PEOPLE WITH HEARING LOSS

Harry Levitt

The City University of New York

And

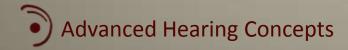**Advanced Hearing Concepts**

Advanced Hearing Concepts

DIFFERENT NEEDS FOR DIFFERENT GROUPS

- **Hard of Hearing: Improved Hearing Aids**

- **Profoundly Deaf: Speech Transcription**

    Sign Language

- **Deaf- Blind: Tactual Aids**

Advanced Hearing Concepts

RESEARCH PHILOSOPHY

- **Explore capabilities of emerging technologies for people with hearing loss**

  Initially without regard to practical constraints

- **Once an idealized technique has been evaluated with positive results, find a practical approximation to the ideal**

Advanced Hearing Concepts

COMPUTER ASSISTED REMOTE TRANSCRIPTION (CART)
AS A RESEARCH TOOL

Explore potential applications
of ASR using CART

If positive results obtained, develop
practical version using ASR

Advanced Hearing Concepts

CART IN THE CLASSROOM

- **Used at NTID, Gallaudet University**
- **Evaluations are positive, but cost is high**
- **ASR would be cost effective**

- **Error rate is a problem and varies with the complexity of the transcription**

Advanced Hearing Concepts

MOBILE PHONES + CART IN THE WORKPLACE

- **Very useful for instructing deaf employees**

- **Invaluable at group meetings, conferences**

- **Hotel experiment showed greater efficiency and increased earnings for deaf workers**

- **CART not cost-effective in this application**

- **Great potential for mobile phones + ASR**

- **Background noise & drop-outs a problem**

Advanced Hearing Concepts

MOBILE PHONES + CART IN EVERYDAY LIFE

- **Shopping**

- **Getting directions**

- **Using public transit**

- **Emergency services**

- **Problems:**

  Time consuming explanations often needed

  Background noise, drop-outs

  Difficulty with public address systems

Advanced Hearing Concepts

FROM CART TO ASR

Prediction is very difficult

especially when it involves the future

(Chinese proverb)

Advanced Hearing Concepts

UNEXPECTED PROBLEMS WITH DEAF STUDENTS

- **Students skipped classes**

  Borrowed transcribed lectures from friends

- **Faculty not happy with unedited lecture notes being circulated**

- **Simplifying transcribed text controversial**

Advanced Hearing Concepts

UNEXPECTED PROBLEMS WITH HARD-OF-HEARING

- **Digital wireless devices (DWD) generate interference in hearing aids**

- **Pressure from FCC resulted in development of ANSI standard setting limits on interference generated by DWDs**

- **Hard-of-hearing more sensitive to distortions in wireless transmissions**

Advanced Hearing Concepts

INNOVATIVE APPLICATIONS OF ASR

TEACHING SPEECH TO DEAF CHILDREN

AND ESL STUDENTS

- **ASR can identify nature of speech problem**
- **Recognize errors in speech production**
- **Synthesize corrected speech**
- **ASR errors can reinforce poor speech**
- **Recognition and synthesis of deaf speech a powerful research tool**

Advanced Hearing Concepts

SUMMARY

Experiments with CART have identified several very useful applications of ASR. These include:

- **Classroom applications**

- **Speech training**

- **Improved speech understanding in noise**

Advanced Hearing Concepts

SUMMARY (continued)

- **Mobile phones + ASR for deaf workers enable greater efficiency and increased earnings**

- **Mobile phones with ASR for shopping and social interactions improves quality of life**

- **Mobile phones with ASR in emergency situations can be extremely valuable**

Advanced Hearing Concepts

THANKS FOR LISTENING

YOU CAN WAKE UP NOW

Advanced Hearing Concepts