CULTURALLY INCLUSIVE EDUCATION FOR THE **SPEECH SCIENCES**

SPEECH & TECHNOLOGY LAB

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OBJECTIVES

Students will…

- Provide examples of speech technology used in everyday life
- Describe the equipment and processing needed for automatic speech recognition
- Discuss biases present in automatic speech recognition's artificial intelligence algorithms
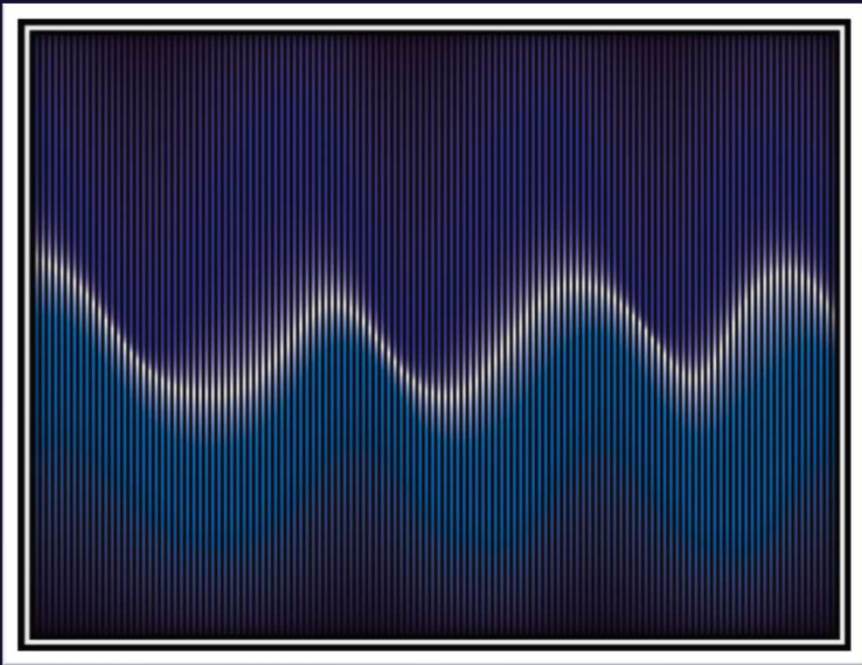
SPEECH TECHNOLOGY

- What are ways that we speech and technology interface?

- What tools do you use everyday?

- Why do you use these tools?

How do we get a good speech signal?

Sampling Rates

- High quality recordings are sampled at 44,100 Hz
- What are the pros/cons of high sampling rates?
- How low of a sampling rate can we go and still have intelligible speech?

What do you hear?

4000 Hz   8000 Hz   12,000 Hz   16,000 Hz   44,100 Hz

## Activity: Looking at Phoneme Frequency Ranges

- Download the samples provided to you
- Take a look at each frequency range using Praat
- Answer questions on your worksheet

SPEECH-RELATED TECHNOLOGY
has become a part of
everyday life for many

Speech Recognition

- The accuracy of automatic speech recognition(ASR) software depends on AI algorithms
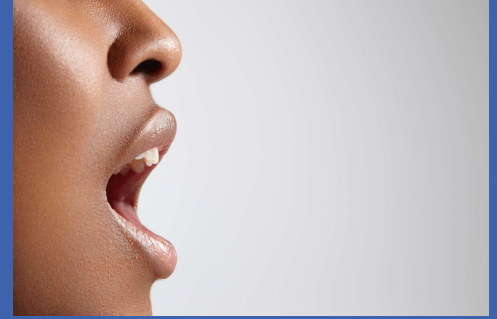
- Who might have difficulty using ASR?

- https://www.youtube.com/watch?v=e2R0NSKtVA0
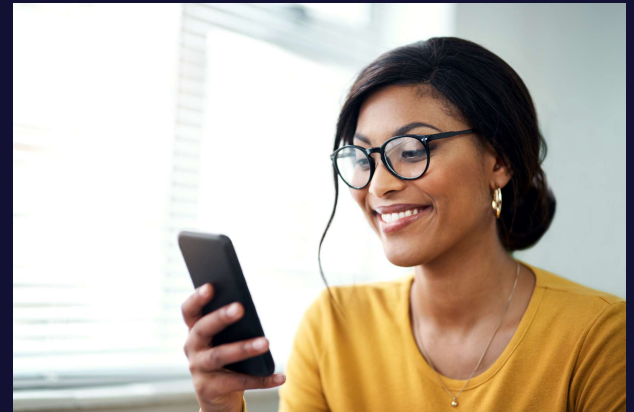
- Why do biases exist in ASR and AI?

- What is our responsibility as a consumer, professional, and an advocate for others?

Biases in ASR

Trying out speech recognition

- Choose and app and try out different dialects

- How accurate was the speech recognition?

- What did you learn?

References & Resources

- Behrman, A. (2018). Speech and Voice Science. 3rd edition. Plural Publishing, San Diego, CA.

- Defined.AI. (2021). "Building inclusive speech technology with diverse data." Blog post. Received October 31, 2022. https://www.defined.ai/blog/building-inclusive-speech-technology-with-diverse-data/

- Mengesha, Z., Heldreth, C., Lahav, M., Sublewski, J., & Tuennerman, E. (2021). "I don't think these devices are very culturally sensitive."—impact of automated speech recognition errors on African Americans. *Frontiers in Artificial Intelligence, 4*. https://doi.org/10.3389/frai.2021.725911

Voice & Swallow Mechanics Lab