Comparing Speech Recognition With Remote Microphone Technology Using KEMAR and Voice-to-Text Testing
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INTRODUCTION
- During the COVID-19 pandemic, traditional experimental data collection methods with human subjects were interrupted.
- An alternative method using voice-to-text, KEMAR, and remote microphone technology was developed in place of a human response. The transcription application “Otter” was used due to its accuracy to provide responses.
- Previous research has shown a significant improvement when using a remote microphone in noisy environments.
- To test the accuracy of the setup, an experiment was conducted examining the accuracy of Otter program to transcribe speech-in-noise when using remote microphone/hearing aid arrangement on KEMAR.

PURPOSE
The purpose of this investigation was to:
1. Develop an alternative setup to testing technology in various controlled conditions without involving human subjects.
2. Compare the scores obtained via the transcription application Otter in five signal-to-noise ratio (SNR) conditions and four remote microphone arrangements.

EQUIPMENT
Figure 1 shows the equipment used for the RMT microphone arrangement. RMT was connected to a Phonak Marvel M90 RT hearing aid (HA) programmed for a flat 60 dB HL loss. The smartphone app SHARP 2+ was developed in collaboration with UTD Engineering Department and connected to an iPhone 11.

METHODS
PROCEDURE:
The signal pathway is shown by the dotted line in Figure 2. KEMAR wore circumaural headphones over KEMAR, and remote microphone technology in various controlled conditions.

STIMULI:
Sentences – One list of ten HINT sentences (list #4) presented at 65 dB SPL three times for each test condition (0° azimuth) ex. “The clown has a funny face.”
Noise – Continuous speech-shaped noise presented from GSI-61 audiometer (180° azimuth)
SNR conditions: Quiet, +10, +5, 0, -5 dB
TRANSCRIPTION:
Otter: Version 2.3.116 ran on Dell laptop provided transcription for each list presented.

RESULTS
Figure 3. Speech Recognition with Remote Microphone Technology Using KEMAR and Voice-to-Text Testing

CONCLUSIONS
- Figure 3 shows as SNR decreased, performance declined similarly across the four microphones types.
- In quiet, all microphones yielded similar performance to the HA alone ranging from 96.9 to 100%.
- Higher percent correct scores were seen in all SNR conditions compared to HA alone.
- At the most difficult SNR (-5 dB), Roger Select microphone yielded the highest performance with 78.4% accuracy.

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REFERENCES

ACCESS TO SUPPORTIVE WORK
UTD’s Hearing Health Lab (HHL) Website: www.utdallas.edu/hhlab