Robots for Disability Project

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Introduction

Altered Auditory Feedback (AAF) device
  • Delayed Auditory Feedback (DAF) + Frequency Altered feedback (FAF)

• Potential relief for stuttering speech
Hardware

First Attempt

- Adafruit Esp32
  - Bluetooth + WiFi
- SPH0645 I2S Microphone
- Bone Conduction Transducer
- PAM8302A amplifier

- Library for the I2S not compatible with ESP32
Hardware

- Switched to Arduino and Electret microphone
  - Very low quality audio
  - Arduino unable to process speech in real-time at a high sample rate
Hardware

- Ended up using Android mobile phone
- Bone conduction transducer
- Adafruit 3.7V/4.2V LiIon charger
- Li-ion 3.7V 7.4Wh battery

- Delay from 50ms – 500ms
- Pitch from 100% - 200%
Effects

• Confusion on first time use

• Slows down speech

• Stuttering reduces up to an extent
  • Might get better results over prolonged usage

• Can be improved by adding background noise cancellation and dedicated microphone
Conclusion

• The system provides decent AAF but there is an inherent delay

• Added circuitry of Microcontrollers and mobile phones adds to the audio delay

• A dedicated hardware circuit should be used to eliminate as much delay as possible
Thank You