Northeastern University
Personal Health Informatics

Communigo: Personalized AAC system for individuals with severe speech impairment

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Intelligence Layer

Abstract

Individuals with severe speech impairments due to neuromotor disorders like Parkinson's disease, multiple sclerosis and stroke rely on Augmentative and Alternative Communication (AAC) devices to communicate. However, upper motor limb disorders associated with neuromotor disorders severely compromises communication speech and efficiency. Intelligent AAC systems that use multiple input modalities and context information may enhance ease and efficiency of communication.

Background

Individuals living with neuromotor disorders like Parkinson's disease, multiple sclerosis, and stroke may have associated speech impairments. The impaired speech hinders speech clarity and restricts interpersonal interactions[1]. For many individuals the inability to communicate is one of the most difficult aspects of their speech impairment[2]. Individuals whose speech is severely impaired need to use Augmentative and Alterative Communication systems to communicate[3]. 53% of individuals with cerebral palsy, and 75% of with amyotrophic lateral sclerosis (ALS) use AAC devices.

Challenges

- AAC users may have upper motor limb disorders making it challenging to use a touch screen.
- Using AAC devices is slow[4,5,6]. In comparison to normal speech (150 to 200 words per minute)[6] AAC communication is less than 20 words per minute[7]

Approach

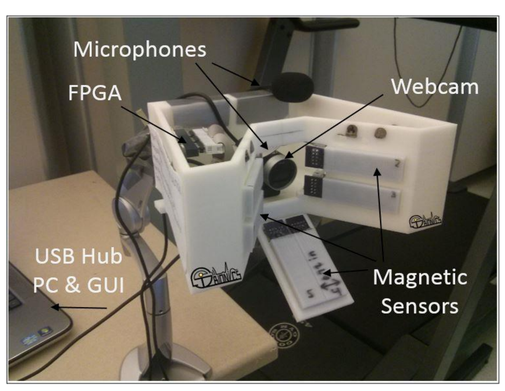
Develop intelligent interfaces predict user input by using:

- Multiple input modalities like impaired speech, tongue movement and lip movement
- Contextual information like time of day, location, and conversational partner,

Current Work

We developed a tongue drive system that tracks movement of tongue in the oral cavity and movement of lips. Currently we are running a study to collect data from individuals who are living with Multiple Sclerosis.

We are also developing an AAC interface that uses contextual information to predict user input



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