Do You See What I'm Saying? A Voice to Text Human-Machine Interface for the Hearing Impaired

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The purpose of this project was to create a feasible human-machine interface which could effectively transcribe speech onto a wrist-mounted display for those with hearing impairments. My hypothesis stated that if an affordable wearable attachment, designed to display the speech of others is created and tested for feasibility, then the device will be a feasible and effective option for the hearing impaired due to the efficiency of the open-source speech to text software, sustainable and adaptable battery life requirements, and compact design. I began with the setup of Silvius, a speech to text program, on a Raspberry Pi computer. Following the installation, a prototype wearable case was designed and 3D printed. After the prototype's creation, two sets of tests were run to determine its viability. Testing the program's accuracy found that Silvius had an average of about 84% words correct at one foot away, about 71% at two feet away, and about 63% at 3 feet away. These tests were run five times at each distance on five different sentences, each for a male and female computer-generated voice. This showed that Silvius was a viable candidate for the prototype device. The final tests used the device's amperage draw, and found an average of an 11,172 milliamp hour consumption, when running for fourteen hours. With current models, the total cost of the device would come in at about 146 USD, making it an affordable and effective option for enabling the hearing impaired to seamlessly converse with other people.