**Description of Reconnect:**

An interactive platform that assists individuals with impaired hearing to reconnect with communities and reintegrate into the society

**Inspiration**

As medical treatment for impaired hearing continues to improve, there is an increase in demand for speech therapy programs. As of now, there is an existing gap in the market for innovative platforms that facilitate self-initiated learning or relearning of communication skills. *Reconnect* assists individuals with speech issues with the recovery process through its progressive framework. Users would relearn simple sentences that include self-introduction and request for help before moving onto complex sentences that pertain to buying groceries, etc. The entire process will be supported by real-time feedback on their pronunciation, the relative speed of their vowel enunciation, and the duration of the breaks they have between clauses and sentences.

**What it does**

*Reconnect* first allows the user to listen to a sound file that contains a sentence which the user should learn as part of its progressive relearning process. The user would repeat after the sound file before *Reconnect* begins to evaluate the user’s speech.

*Reconnect* uses Microsoft Azure’s Speech-to-Text function to convert the user’s speech input into text. By comparing the text against the sentence provided to the user, *Reconnect* is able to determine if the user’s pronunciation is adequately correct. Following which, Azure’s Text-to-Speech function is used to generate a separate speech output from the same sentence. These two .wav files will then be processed by *Reconnect*.

*Reconnect* uses the SciPy library to convert the sound files into audio data chunks. By using our self-developed algorithms to process the audio data’s amplitude, frequency, and breaks, *Reconnect* is able to determine the relative speed of vowel enunciation, and the presence of unnaturally long or short breaks between words and sentences.

Finally, *Reconnect* will compile all of these feedback before presenting them to the user. The user will then be given the opportunity to try again. The user can also type a sentence which he or she hopes to practice, and *Reconnect* will generate a sound file to facilitate the same learning process as mentioned above.

**How we built it**

First, we imported Microsoft Azure’s Speech-to-Text API. Also, we worked on comparing the amplitude and speed of sound data which included breaks in between as well. The program was heavily based on packages such as Numpy and Scipy. Simultaneously, we also worked on developing a function that compared two texts and returned a dictionary of correct word and its incorrect pronunciation. The main objective of this function was to note the differences in pronunciation of the words and generate effective feedback to be delivered to the user.

For the front-end, we used Python, CSS and JavaScript to make an interactive platform where users could type a sentence, record the sound and get feedback.

**Challenges we ran into**

Since the team comprised of a sophomore and two freshman having less technical background, we ran into lot of difficulties. This was the first time we ever played with APIs and it was difficult to get things working together. In the beginning, we did not go think about the number of channels of the input. Also, for the text comparison, it was necessary to mind the length of the expected text and the received text. While the typed text had to be preprocessed so that it did not contain any characters, the expected text had to be preprocessed so that it omitted some unintended words like “oh”, “umm” etc. Since none of us had enough experience in web development, the significant challenge was getting the input from the user in form of audio.

**Accomplishments that we are proud of**

Despite all the challenges, we are proud that we successfully built an interactive platform *Reconnect* where people can practice speaking to reconnect to the world. Helping thousands of people worldwide in transitioning from impaired hearing to speaking effectively is indeed a great satisfaction to our team.

**What we learned**

Being new to hackathon, initially we were unsure if we should go forward with this idea due to technical complexities. However, we decided to take up the challenge and finally it worked. Therefore, in addition to learning more about programming, using APIs and developing web-site, we learnt to think big and apply the knowledge to have an impact on people’s life.

**What's next for Reconnect**

Turn it into a learning platform

Develop guided courses

Make it multilingual

Implement it for smartphones

Use it to learn foreign languages