

Speech of Light

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Project Description and Features

Speech of Light is a mobile application that's designed as a tool to help in speech therapy. Our app uses Android's speech recognizer and a Raspberry Pi web service to light up a string of LED lights in accordance with the pronunciation correctness of a word or phrase. Users can simply enter the IP address of a Raspberry Pi and the word or phrase of interest, then press the microphone button to speak into the device's microphone. The device will automatically detect speech, and the LED lights of the Raspberry Pi will light up with different colors depending on the correctness of the user's pronunciation. The use of the lights is especially child-friendly, as they provide good visual feedback for correctness and help to capture the interests of children who might find it fun to try and turn the lights different colors.

Users can navigate the application using the menu, which contains a description of the application as well as an instruction screen. There is also a "settings" screen, whereby the user can set the sensitivity of speech detection (higher sensitivity means a more accurate pronunciation is required). On the main screen, Speech of Light uses a third-party web service from Wordnik in order to access a dictionary database. The "random word" button consumes the services of Wordnik by returning a random word from their database, and the "word of the day" button uses Wordnik by returning the web service's word of the day. These features can help users to learn how to pronounce new words.

Lessons Learned

Through this project, our team has learned a lot about how all the different components of an Android application work together to create a fully functional app. We had a lot of trouble in the initial stages of the project to set up the Raspberry Pi web service. We also ran into some problems working with JSON objects to send information to the Raspberry Pi. However, though we spent countless hours trying to figure out why our code wasn't working, we ended up learning a lot about how information is passed between applications and web services.

In terms of the application itself, we got to learn more about how information is transferred between activities as well as how different components of the app are able to communicate with each other. Since we've all had some experience working with android applications from CS2110, we didn't encounter many problems working with the basic android components such as the buttons and text fields. It did, however, take a while to incorporate the Android speech recognizer into our application and getting the proper permissions in the Android manifest to use our device's microphone. But, it was really interesting to see more of how speech detection works with Android and how it's able to determine what the user is saying. In fact, we were able to use what we learned about speech recognition to implement the "pronunciation correctness" part of our application.

At a higher level, we also learned a lot about application design and HCI. As we discussed during the class lectures, the process of designing the mobile application was very different from the process of designing our websites for the web development project. Instead of just assuring functionality of the application, we also had to consider the overall design. Since we had the Samsung Galaxy Tablet, there was a lot of real estate to work with--however, we realized that we didn't necessarily need all of the space and had to come up with ways to get rid of the dead space within our application. Being able to discuss our wireframes with other groups

really helped us see what problems we had with our designs and gave us ideas on how to improve them.

Overall, we've developed a deeper understanding of the overall flow of information from the user to the application, and how the app is able to communicate with other web services to provide functionality. We really enjoyed working with the Raspberry Pi (lighting up the LEDs with Christmas colors helped to pass the long hours we spent trying to debug our code) and ended up learning a lot about mobile development.

APK Link

http://plato.cs.virginia.edu/~hl3wb/signed_apk/app-release.apk