Ryan Bentz

Ram Bhattarai

ECE 558

Final Project Proposal

Project Description

You have an app that you can say a word into the microphone and it will use the Google Speech Recognition API to get a string of the word. The word is added to Firebase and kept there with a dictionary of all the words the app knows. The app displays the dictionary using fragments and the user can scroll through and select a word. When the user selects a word, they can press a button and that will send a command to a raspberry pi. The app running on the raspberry pi will use the Text-To-Speech API to convert the word back to audio and output the speech out the stereo jack. Each word also has its own "lightshow". The raspberry pi controls a bunch of LEDs and on the app, the user has options to change the colors and light sequence for each word.

App
1. Use phone microphone to get audio
2. Process audio to get text of word
3. Upload word to dictionary in firebase
4. Display dictionary of known words using fragments and lists
5. User selects a word and go to "light show" activity/fragment where they can customize the colors and the light sequence
   a. Able to choose 5 colors using slider bars
   b. Choose light sequences: blend, flashing, random, rotating
   c. Choose speed
6. Button to tell raspberry pi to play audio/do light show

Raspberry Pi
1. Get word and lightshow information from Firebase
2. Use text-to-speech to play word out stereo jack
3. Use GPIO pins to do light sequence

Design Approach

1. Identify design features for HW and SW apps
2. Design rough draft of LED schematic
3. Determine shared data for database and how apps interact with the data
4. Sketch architecture and create draft algorithm for HW and SW apps
5. Build draft of apps and independently verify basic functionality
6. Increase complexity of apps and verify functionality of speech/text API's
7. Interconnect apps and verify inter-communication through database
8. Build and verify LED schematic

If we run out of time the project can be scaled down. Depending on how things go, either the text-to-speech or speech-to-text could be abandoned. Preferably, the LED lightshow could be scaled down first, from a fancy RGB LED show to something more basic.

Milestones

Tentative Schedule:

1. **Verify text-to-speech and speech-to-text work (Nov 12- Nov 18)**
2. **Verify database interactivity works(Nov 12 - Nov 18)**
3. **Verify HW app is functional and controls LED's properly(Nov 18 - Nov 31)**