Senior Design
ENG EC 463

Second Prototype Test Report

Speech Interactive Therapy App

Team 13
Speech Therapy

Team Members

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Equipment:

- Hardware:

    - An Android Phone (Testing touch features)
    - A Laptop with a Microphone (Used for console logs and main tests)
- Software:
    - Unity 3D Editor (on laptop)

Setup:

- Intended background noise is < 40db SPL (ideally 30db SPL) with minimal voice interference. The lab had a reading of 50 - 55 db SPL during class with significant background voices.

Measurements:

- Voice Algorithm
    - Vocalization and rewards response times met
        - Vocalization is captured 0.7 seconds after model word ends
        - Rewards trigger within 3 seconds of detection
    - Testing model words/sentences (correct is >30%, incorrect is < 15%)
        - “Land”
            - Correct vocalization - 33%
            - Incorrect vocalization - 16%
        - Note: All other words/sentences are tested outside class hours with intended noise levels (see Setup)
        - “Letter”
            - Correct vocalization - 29%
            - Incorrect vocalization - 15%
        - “Eleven”
            - Correct vocalization - 40%
            - Incorrect vocalization - 24%
        - “Describe yourself.”
            - Correct vocalization - 30%
            - Incorrect vocalization - 23%
        - “How was your day?”
            - Correct vocalization - 34%
            - Incorrect vocalization - 18%
        - “Uuuuuuuuuu”
            - Saying a constant vowel sound does not cause a false positive for all tests except for the case of “Eleven” where an input of “uuuuuuuu” scored > 30%. This is because the model word recording of “Eleven” has a fairly flat envelope. Any constant input can trigger a false positive. This issue should be resolved after adding more metrics such as change in pitch to the algorithm next sprint.
- Rewards Effects

- Loads scene “Almost There” for accuracy level < 15
- Loads scene “Great Job” for accuracy level > 15 and < 30
- Loads scene “Perfect Win” for accuracy level > 30
- Loads all the 2D effects with 2 seconds of voice recognition
- Loads the next video after 10 seconds of displaying the rewards effects
- The touch control triggers golden particles on touching anywhere in the screen making it interactive

Conclusion:

In conclusion, we believe that the core components of our app are working and communicating properly with each other. The video scene plays the correct video depending on the level selected by the user. These video clips are loaded when needed in order to minimize the amount of memory needed for the app. The voice algorithm is able to distinguish between correct and incorrect vocalizations, excluding some special cases. It did not perform well during class hours due to noise/voice interference, but this is not an issue. Our client expects children using the app to be in a quiet environment with minimal background voices. All the rewards scenes are triggered correctly based on the accuracy of the voice tracked. The different particle effects are synced to the right accuracy percentage and loaded within 10 seconds. The interactive UI of the rewards scenes worked fine on the Android phone during the testing and is compatible with any touch screen device. Additionally, the settings page (Parent’s Corner) is correctly keeping track of the user’s progress of the levels. Furthermore, everything we tested also worked on an Android phone.

Moving forward, our goals are:

1. Add a video recorder for custom parent/guardian model words
2. Optimize the sensitivity of the current voice algorithm and add more metrics based on transients and frequency domain information to resolve any ambiguities
3. Save more analytics for parents (level progress, accuracy scores, suggested levels, etc)
4. Sort the videos according to difficulty
5. Add more UI features (screen swipes, keypads, professional textures, etc)

Overall, we hope to build upon our progress and finish our app by increasing its responsiveness and stability.