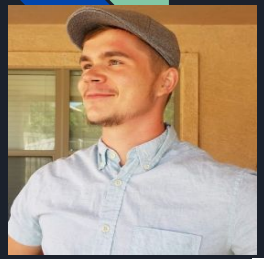
Gamified Mobile Pronunciation Tutor for Language Learners Design Review 3

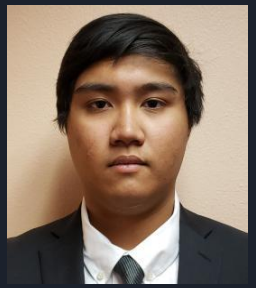
SmartTalk members: Joseph Vargovich, Andrew Munoz, Christian Bito-on, Kehan Cao and Malik Jones.

Mentor: Fabio Santos

Sponsor: Dr.Okim Kang

Meet SmartTalk





Team Members:

- Joseph Vargovich -> Leader
- Kehan Cao -> Release manager
- Andrew Munoz -> Customer Communication
- Christian Bito-on -> Architect
- Malik Jones -> Editor & Recorder

Team Mentor Fabio Santos

Client Dr. Okim Kang

Dr. Okim Kang

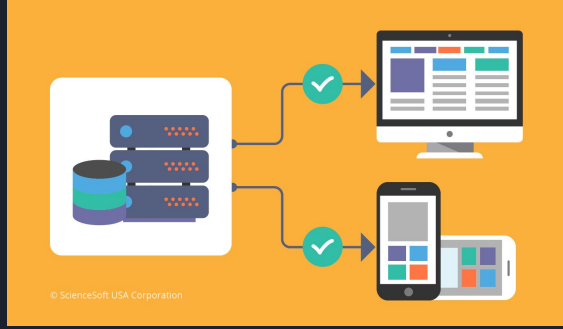
- Director of the Applied Linguistics Speech Lab, NAU
  - **Three members of her lab:** Kevin H., SungEun C., An Hoang N.
  - Research focuses on Computer-Assisted Pronunciation Training (CAPT)
- Main goal is to analyze the nature of accent speech of non-native speakers in English

Problem Statement

- Lack of mobile software for foreign language learners that both focuses on pronunciation and encourages learning through gamification.

- **CAPT Software drawbacks:**
  - Can be both costly to the learner and prohibitive for researchers.
  - Does not allow course designers to create relevant tasks for learners.
  - No relevant feedback on key features of pronunciation
  - Does not implement gamification to motivate the practice of pronunciation.
  - Most modern ASR technology is difficult for linguistics researchers to use

Solution Overview



- Gamified mobile app with web integration designed to be fully customizable
- **Web Application**
  - Simple UI
  - Giving designers the ability to customize their lesson plans
  - Provide feedback on users work
- **Gamified Mobile App**
  - Enjoyable & Engaging
  - Memorable and Educational
  - Users accounts to keep track of progress & Badges and Achievements.

SmartTalk System Diagram

Malik Jones | October 4, 2020

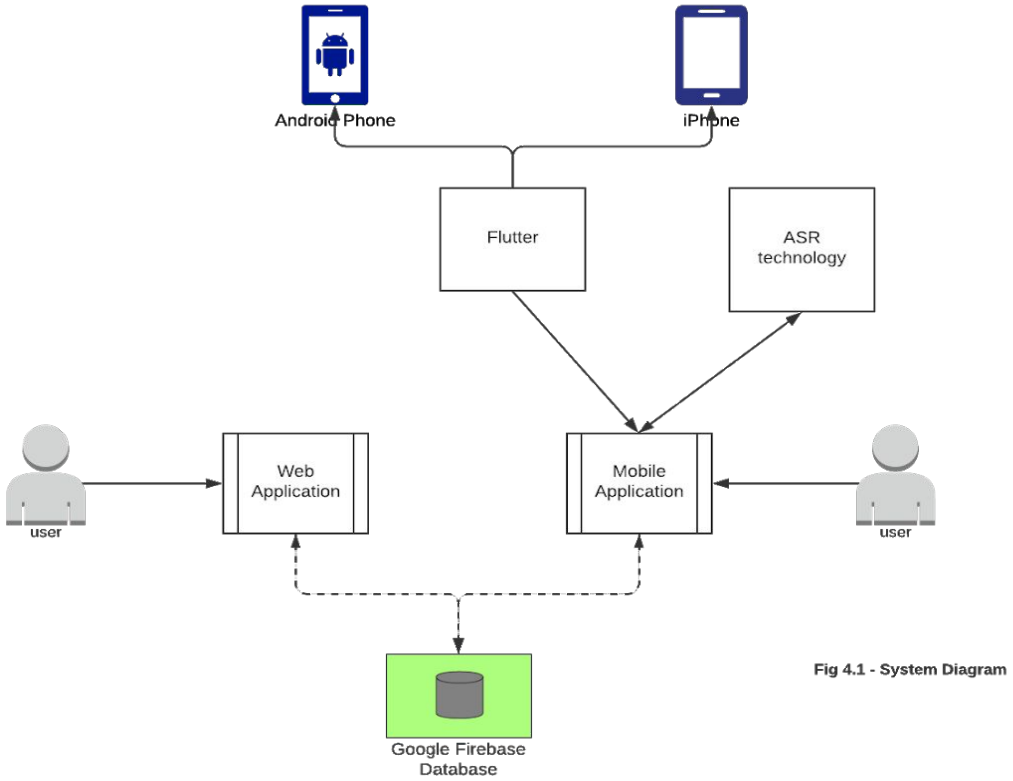
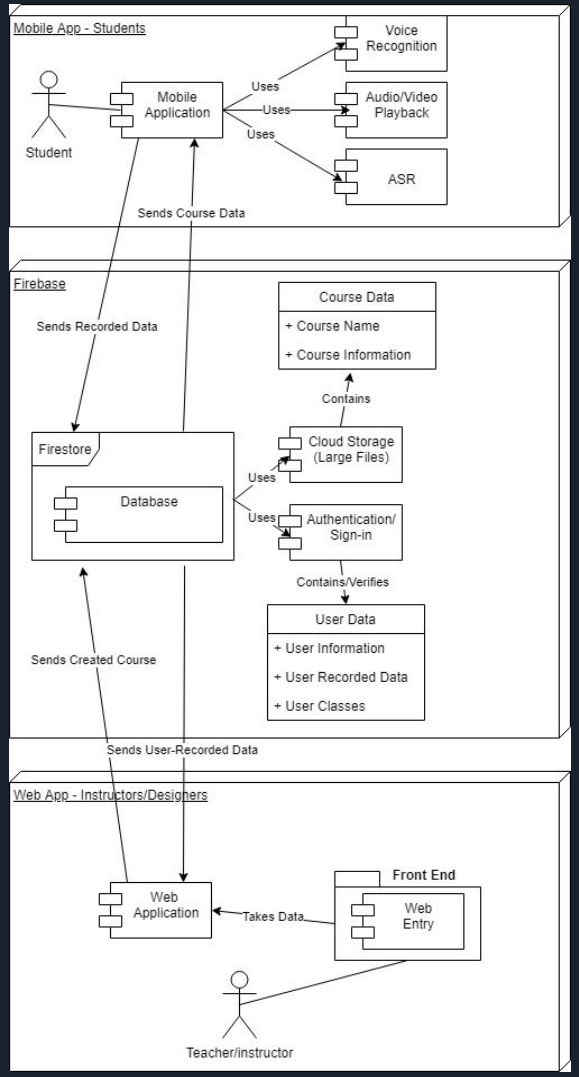


Fig 4.1 - System Diagram

Tech Integration of Proposed Solution

Requirements Review

- App should provide quick ASR feedback on production (speaking) tasks, and instant feedback on recognition tasks that do not require ASR
- Gamification in the form of badges and rewards for good progress.
- App should be useful to learners, helping them to track what they need to practice and what they are already good at.
- App should integrate well into a classroom setting as an easy-to-use application that allows for data analysis and feedback on students' work.



Architecture & Implementation Review

- Mobile Application for Learners to practice production and perception of English
- Backend database to glue the components together
- Web Application to build Courses and review learner data

Prototype Review

Demo 1: Showcasing a sample lesson on the mobile application.

Demo 2: Showing feedback sent to the website dashboard for review.

Challenges & Resolutions
Automatic Speech Recognition (ASR)

- ASR is difficult for a number of reasons, mainly stemming from a cross-platform viewpoint:
  - ASR Plugin packages developed for the platform utilize different technologies for IOS/Android
    - Requires a disclaimer when using our app for research
    - Very basic
  - Potential open-source ASR technologies have some drawbacks
    - Some only work on one platform
    - Some don't have documentation
    - Candidates that are developed for cross-platform are new/have not been further developed
- Solution: Devote extra time to develop a plugin of our own
  - Have a base
  - Implement further functions

Challenges and Resolutions: IOS

- IOS Audio Plugin
  - Plugin work in Android can’t work in IOS
  - The way build IOS app is different from Android

- Resolution
  - Recode app plugin part of IOS with a new plugin
  - Use different plugin in different platform

Smart Talk Schedule

Testing Plan

- **Unit Testing**
  - ***Mobile Application***
    - Lesson Setup
    - ASR Download
    - Achievement Reception
  - ***Web Application***
    - Course Creation/Modification
- **Integration Testing**
  - ***Website Dashboard & Database***
  - ***Mobile Application & Database***
  - ***Mobile Application & Vosk ASR library***
- **Usability Testing**

Conclusion

- Pronunciation is critical to learning a language
- Dr. Kang's team desires a more integrated implementation
- Our Solution: create a system where the web and mobile applications work together
  - Database connection
  - Gamification aspect
  - ASR integration
- We are confident that we will provide Dr. Kang a product she will be satisfied with!