Gamified Mobile Pronunciation Tutor for Language Learners Design Review

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

Mentor: Fabio Santos

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

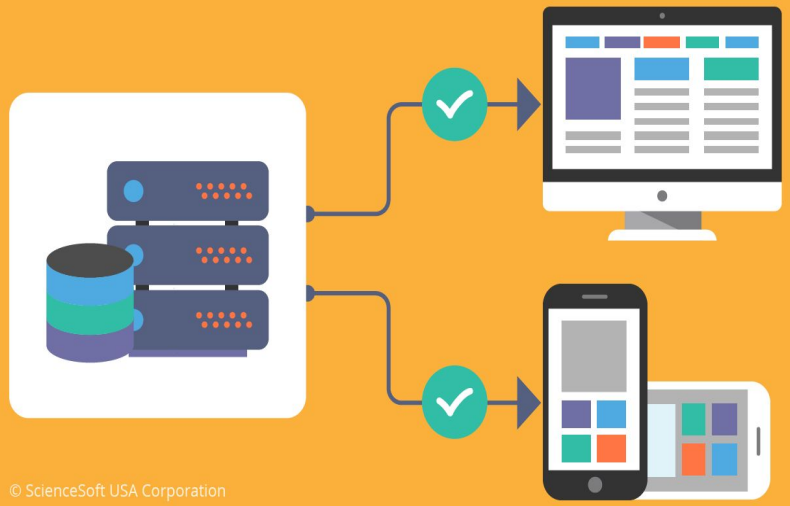
- Director of the Applied Linguistics Speech Lab, NAU
  - **Three members of her lab:** Kevin H., SungEun C., An Hoang N.
  - Research focuses on Computer-Assisted Pronunciation Training (CAPT)
- Main goal is to analyze the nature of accent speech of non-native speakers in English

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

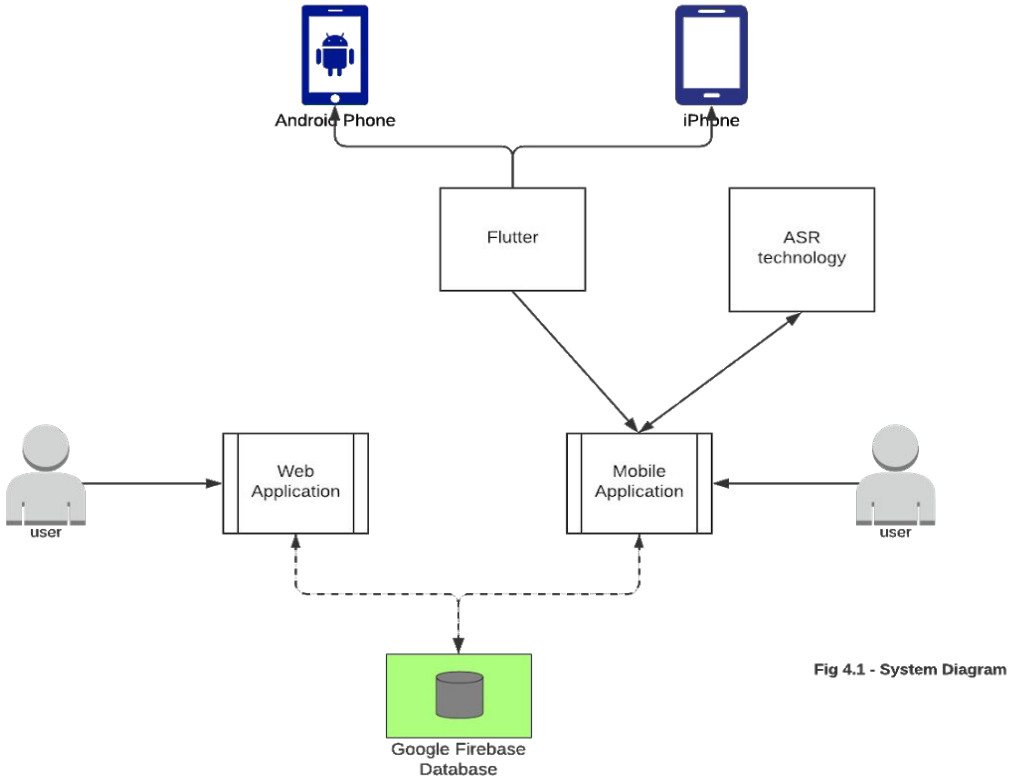


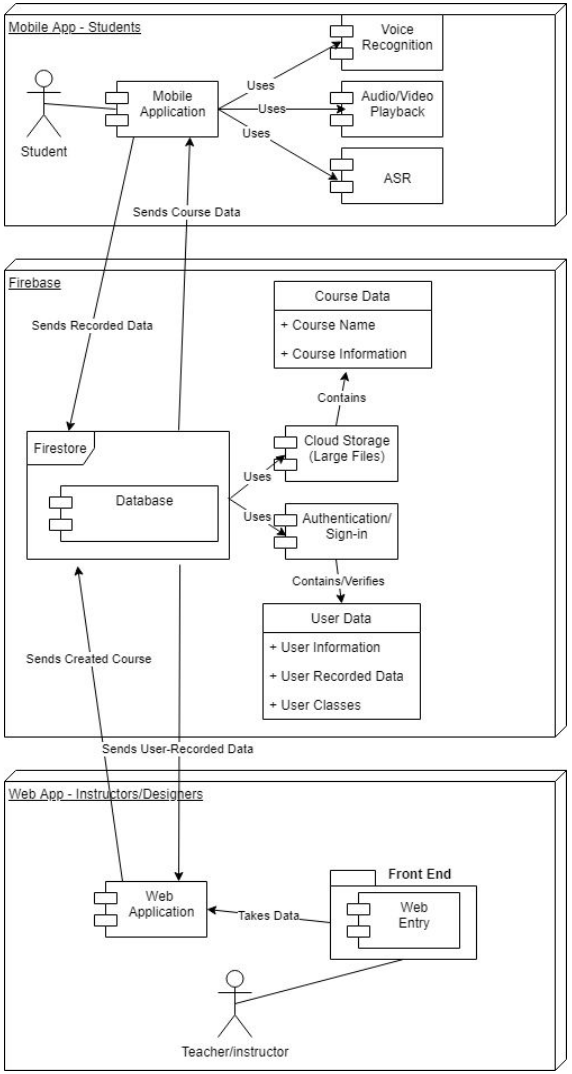
Fig 4.1 - System Diagram

Tech Integration of Proposed Solution

Architecture Overview

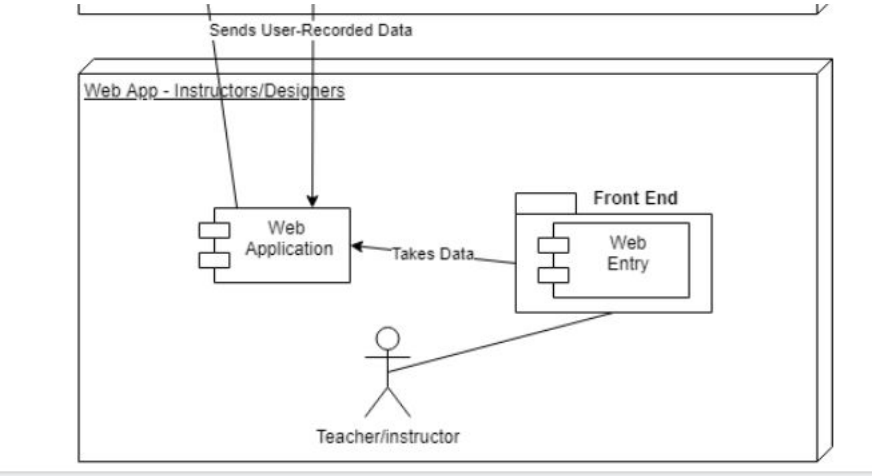
The Three Core Components

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



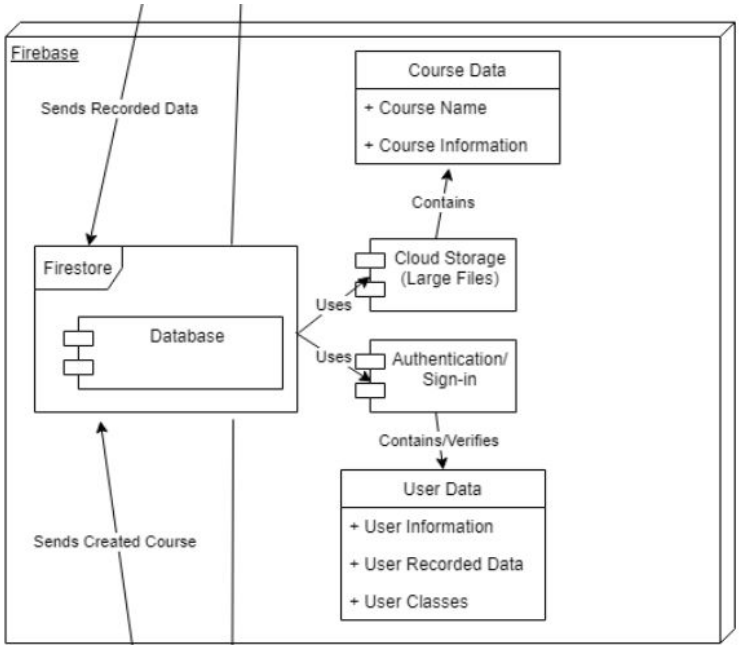
Website Dashboard for Course Designers

- Allows Designers to create Courses -> Modules -> Lessons -> Tasks
- Receives Learner Responses to created Tasks
  - Allows Designer to give Learner feedback
- Management of Learners within created Courses
  - Reassignment of Lessons
- Directly pushes and retrieves data to/from Google Firebase.

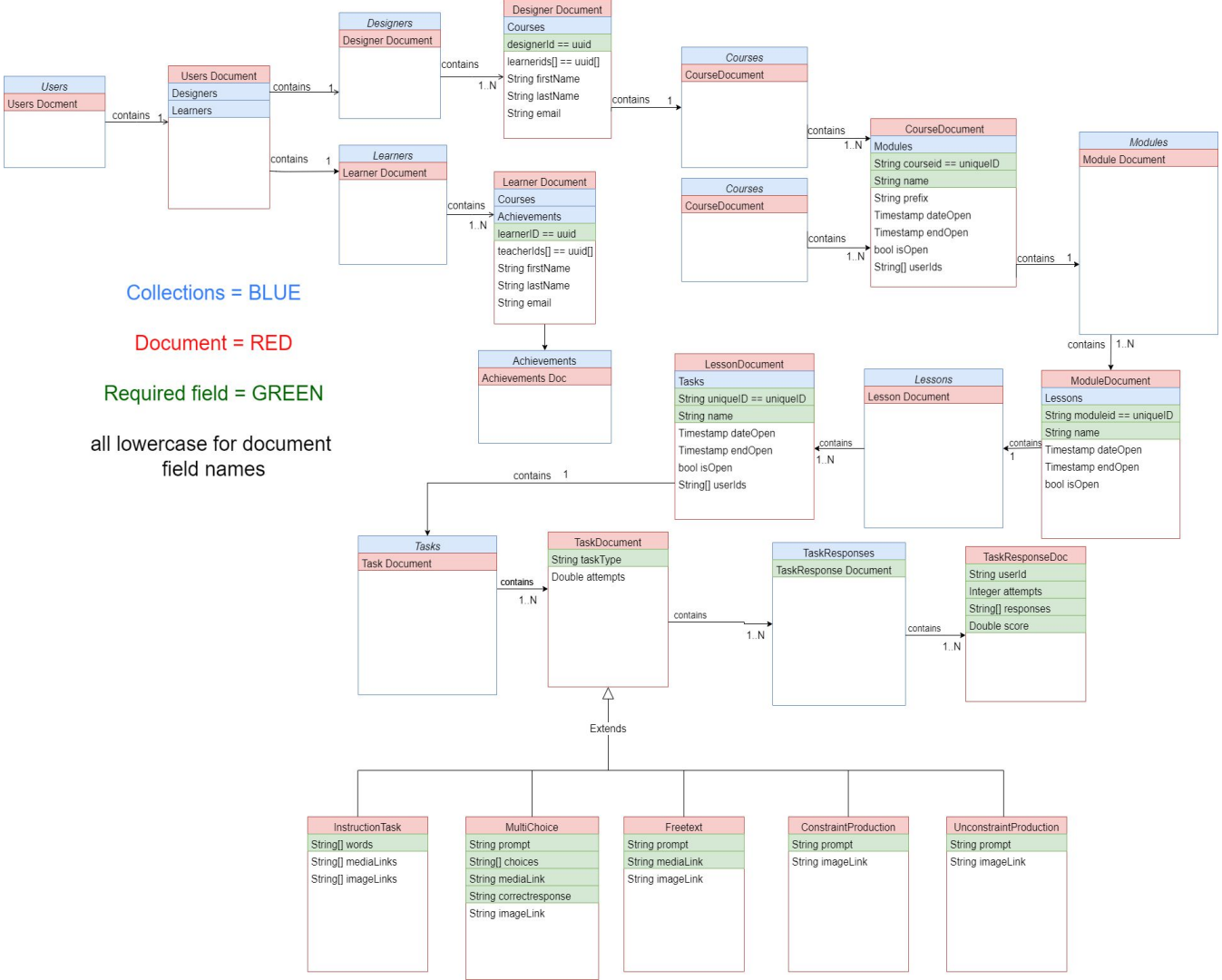


Google Firebase Suite

- Cloud Firestore
  - NoSQL Database
- Cloud Storage
  - Large files, such as audio, images, and video files.
- Authentication
  - Used to login and verify users
- Web Hosting

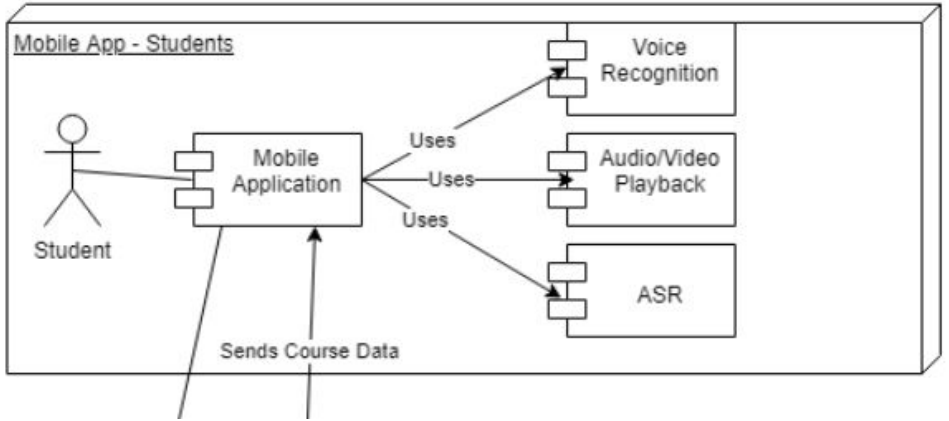


Firestore NOSQL Database



Mobile Application

- ASR Integration
- Course Data to/from Firebase
- Gamification
  - Badges and Achievements
- Recording and playing of audio/videos
  - Production
  - Perception



Challenges and Resolutions: Automatic Speech Recognition (ASR)

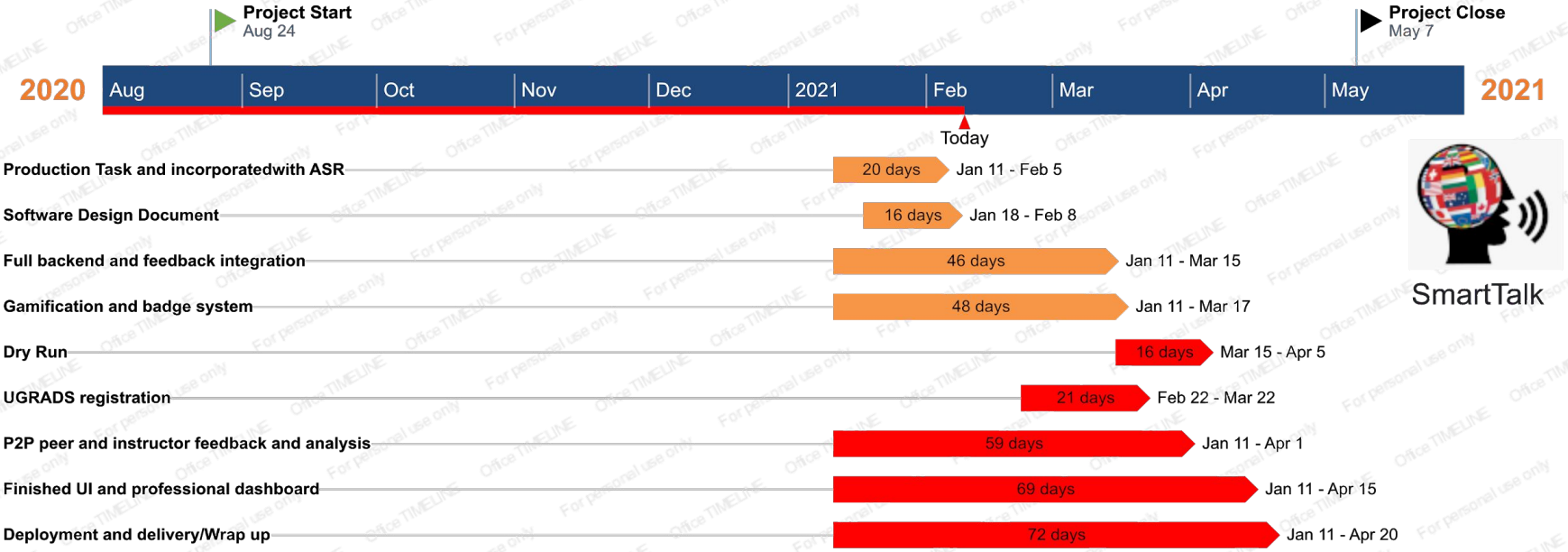
- ASR is difficult for a number of reasons, mainly stemming from a cross-platform viewpoint:
  - ASR Plugin packages developed for the platform utilize different technologies for IOS/Android
    - Requires a disclaimer when using our app for research
    - Very basic
  - Potential open-source ASR technologies 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



Conclusion

- Pronunciation is critical to learning a language
  - Simply learning WHAT words there are is not enough, must consider HOW to say them as well
- Dr. Kang's team desires a more integrated implementation
  - Previous technologies were difficult to work with/separated from other aspects
- Our Solution: create a system where the web and mobile applications work together
  - Database connection for transferring lesson courses and student responses
  - Gamification aspect
  - ASR integration
- We are confident that we will provide Dr. Kang a product she will be satisfied with!