



# Capstone Design

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

**Mentor:** Fabio Santos

**Sponsor:** Dr.Okim Kang

# Meet SmartTalk

Mentor Fabio Santos

Client Dr. Okim Kang



## Team Members:

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

# 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

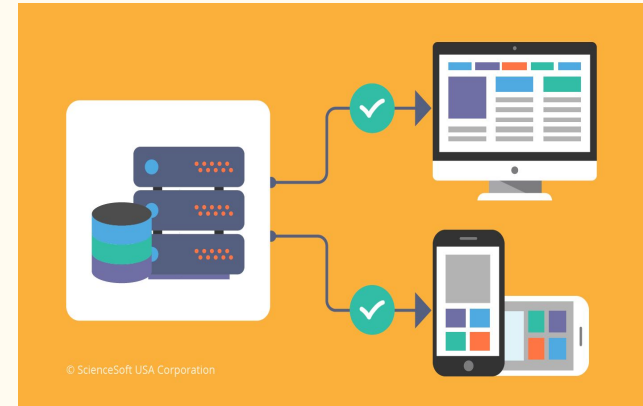
# Problem Statement

- ❖ Lack of mobile software for pronunciation training
- ❖ No gamification motivation
- ❖ **CAPT Software drawbacks:**
  - Problematic for both learners and researchers
  - Cannot create relevant learner tasks
  - No feedback on pronunciation
  - Modern ASR Technology is clunky



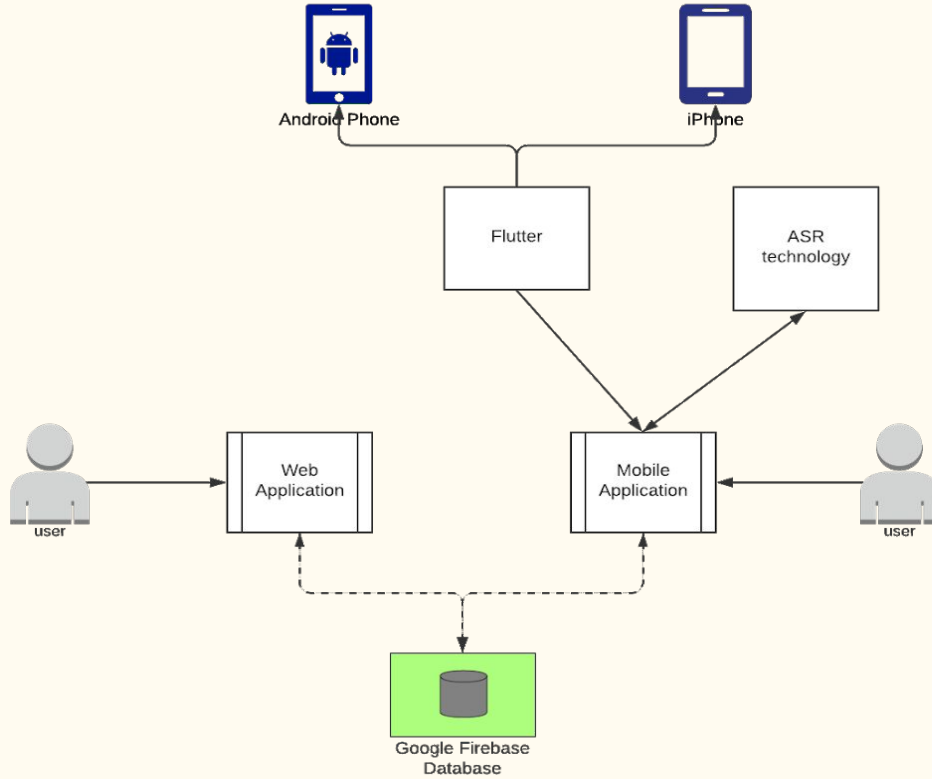
# Solution Overview

- ❖ Gamified mobile app with web integration designed to be fully customizable
- ❖ **Web Application**
  - Simple UI
  - Give designers lesson customizability
  - Feedback on learner responses
- ❖ **Gamified Mobile App**
  - Enjoyable & Engaging
  - Memorable and Educational
  - Keep track of User Badges and Achievements



# SmartTalk System Diagram

Malik Jones | October 4, 2020



## Tech Integration of Proposed Solution

# Requirements Review

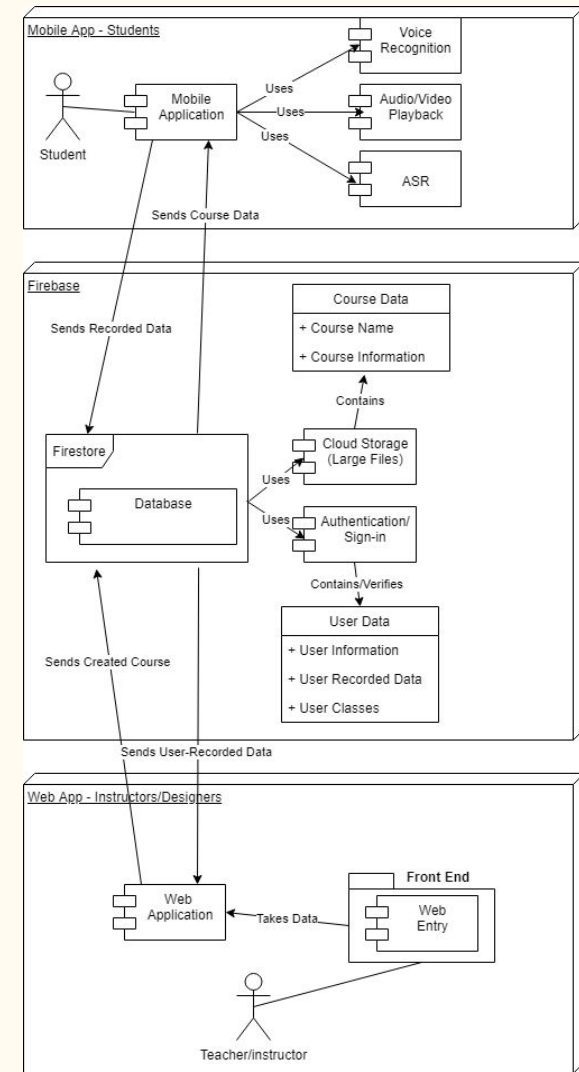
Requirements



- ❖ App should provide quick feedback on learner tasks.
- ❖ Gamification in the form of badges and achievements 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. -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/responses.





# 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)

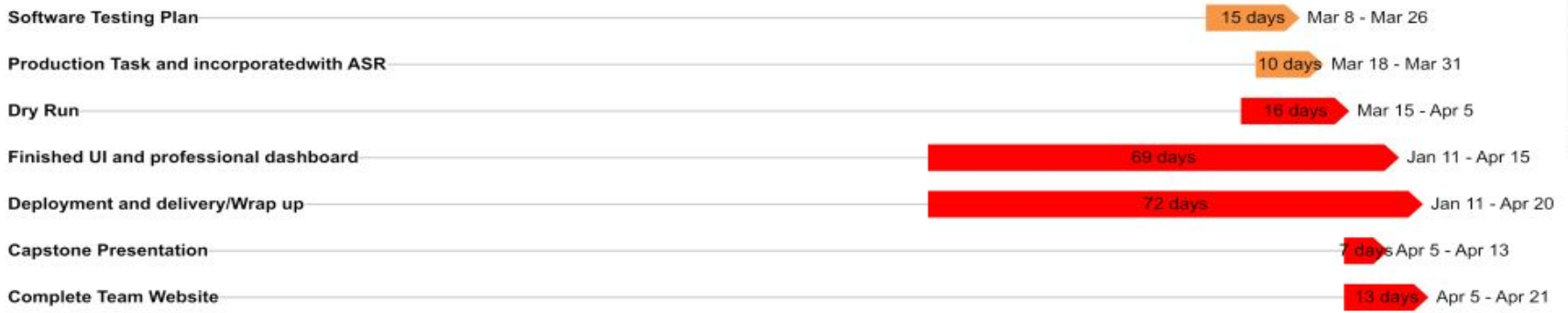
- ❖ ASR is difficult for a number of reasons, mainly stemming from a cross-platform viewpoint:
  - ASR Plugin packages use different technologies for IOS/Android
    - Requires disclaimers
  - ASR technologies have some drawbacks
    - Some technologies aren't completely developed
- ❖ Solution: Devote extra time to extend the functionality of a base plugin
  - Incorporate IOS through Flutter Native Platform Handling



# Smart Talk Schedule

Project Start  
Aug 24

Project Close  
May 7



SmartTalk

# Testing Plan

- ❖ Unit Testing
  - Mobile Application - 3 Main Units
    - Lesson Creation
    - ASR Download
    - Badge and Achievement Activation
  - Web Application - Course Creation/Modification
- ❖ Integration Testing
  - Website Dashboard & Database
  - Mobile Application & Database
  - Mobile Application & Vosk ASR library
- ❖ Usability Testing
  - List of User Benchmarks

# Future Work

- ❖ Phoneme Recognition
- ❖ Peer to Peer gaming
- ❖ Desktop Application
- ❖ Expanded statistical analysis
- ❖ Live lessons



# 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!