Present Better: Final Report

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ECE 1778: Creative Applications for Mobile Devices
April 21, 2021
Word Count: 2,443 words

Introduction

Present Better teaches you to present virtually by measuring your nonverbal and verbal communication and provides feedback in four areas: Facial Expressions, Gestures, Eye Contact and Pace of Speech.

Presentation skills are an essential competency for students and professionals alike. However, fear of public speaking is greater than fear of death for many people (Burgess, 2013) and virtual presentations can further exasperate this issue. According to Van Ginkel et al. in their meta-analysis that reviews 52 studies from the last 20 years on presentations in the post-secondary classroom, practice and feedback are fundamental for the development and acquisition of public speaking skills (2015). A computer application is an ideal method to facilitate this practice. Other presentation training applications exist but their focus is predominantly on verbal communication which is only one aspect of presenting. Nonverbal communication (facial expressions, gesture, eye contact and space) is just as important and it is often overlooked.

Our application offers the opportunity to practice and receive feedback in the following four areas:

Facial Expressions

The first component of effective presentation skills is displaying appropriate facial expressions during your presentation. But what is considered appropriate? In a 2017 article evaluating non-verbal communication skills and the quality of presentations, authors Schneider et al. interviewed several experts in public speaking for their opinions. Their advice when considering facial expressions was for all presenters to avoid a blank face by smiling from time to time to show the presenter is human. However, they also caution that the facial expression should be "congruent with the content. As one of the experts said: 'You won't smile if you are talking about how the people in South Africa could not get their medicines'." (Schneider et al., 168).

Since context of the smile is beyond the scope of this project, we will concentrate on three areas of facial expression to provide actionable feedback to the user:

- Blank/neutral face (ineffective)
- Smiling too much (ineffective)
- Smiling "from time to time" (effective)

Gestures

"Show what you are saying, move your hands. Audiences listen with their ears and their eyes" (Neff, 2020). The second component of effective nonverbal communication is

appropriate gesturing during a virtual presentation. Gesturing helps to hold the attention of the audience while also helping the speakers voice to sound more dynamic, adding greater interest.

We will concentrate on three types of gestures to provide actionable feedback to the user:

- Not moving your hands (ineffective)
- Moving your hands too much (ineffective)
- Moving your hands from "time to time" for emphasis/interest (effective)

Eye Contact

The third component that our app analyzes is eye contact. Eye contact invites your audience into your presentation. However, eye contact can be tricky in a virtual presentation because you are not actually looking at another person "in the eye." You are actually trying to maintain the illusion of eye contact. To do this, the user needs to look into the camera from time to time, likely about 50-75% of the presentation.

We will concentrate on three levels of eye contact to provide actionable feedback to the user:

- No eye contact/looking into the camera (ineffective)
- Too much eye contact/looking into the camera (ineffective)
- Appropriate amount of eye contact/looking into the camera (effective)

Pace of Speech

The fourth and final component that our app analyzes is pace of speech. Pace of speech is one of the most important aspects of verbal communication. It is also one of the easiest to correct. Speak too slowly and your audience will lose interest. Speak too quickly and your audience may not understand you. Normal speech is between 140-170 words per minute (wpm).

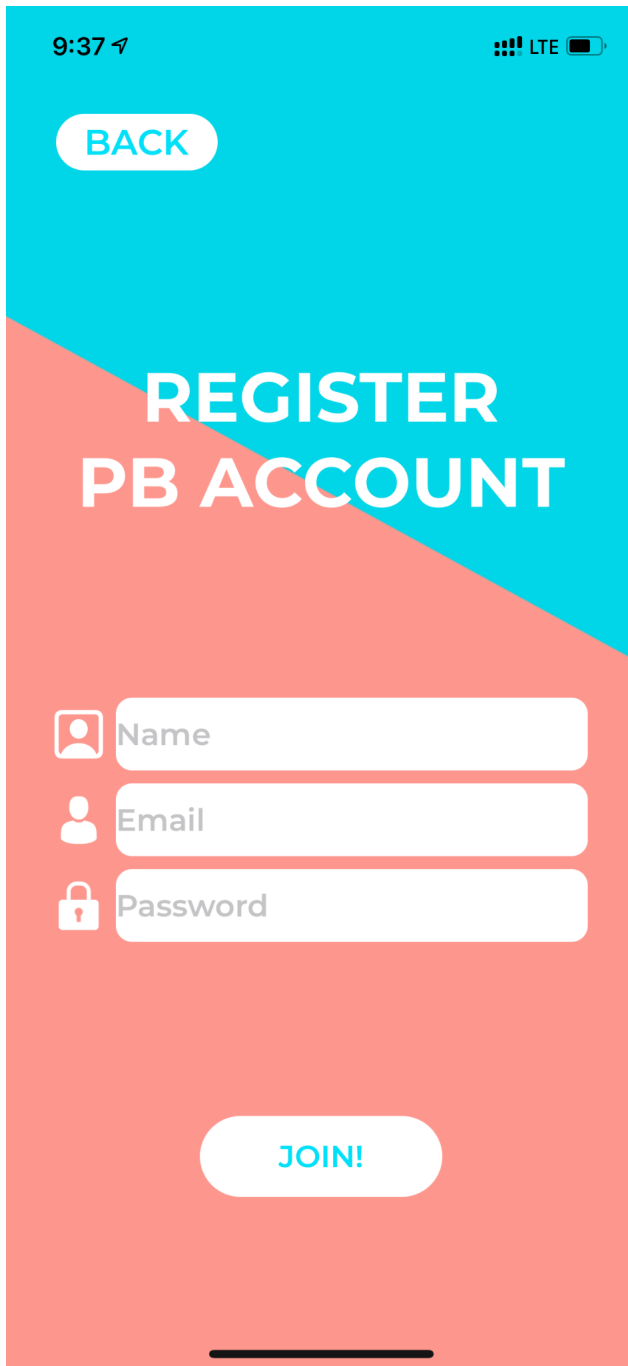We will concentrate on three speeds of speech to provide actionable feedback to the user:

- Appropriate speech pace (140-170 wpm)
- Too fast (greater than 170 wpm)
- Too slow (less than 140 wpm)

Statement of Functionality

1. Sign-in Page: You will need a Present Better account to use this app. Enter your account information and tap SIGN IN. If you don't have an account, tap SIGN UP to create one.

Sign-Up Page: You need your first name and email address to create an account.

2. Home Page: This page is the you will land on after you sign in. On this page you can:

- View your last score and high score;
- Sign out by tapping the arrow to the right of the welcome message;
- Set a practice alarm (described in Section 3) by tapping the alarm icon;
- View your historical scores (described in Section 4) by tapping either high score or last score;
- Start the PRACTICE mode (described in Section 5) by tapping PRACTICE;
- Start the PRESENT mode (described in Section 6) by tapping PRESENT.
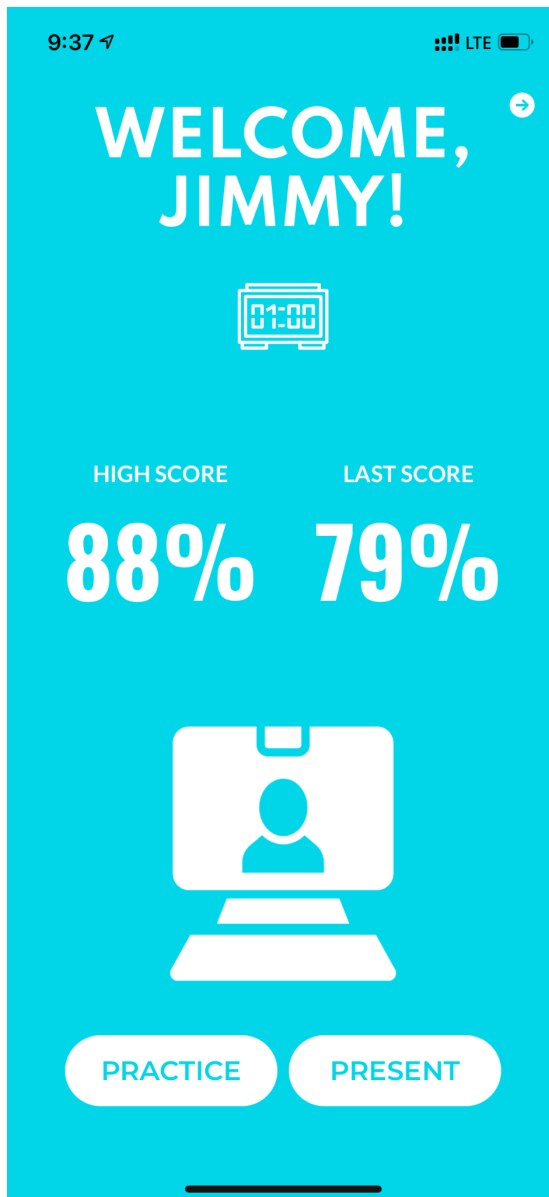
3. Practice Alarm Settings Page: On this page you determine when you would like to receive your daily notifications that will remind you to practice in the app. These reminders will pop up as iOS system notifications.

9:37 ⌕   ⌗ LTE ▮
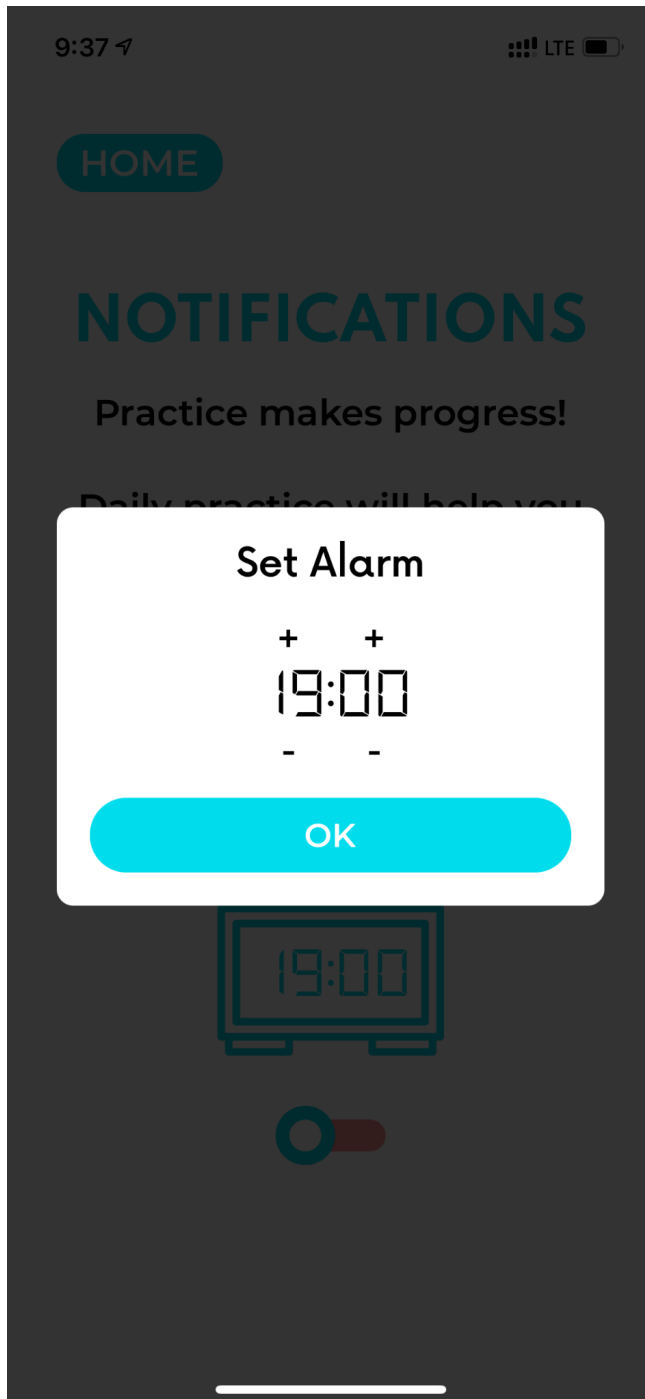
HOME

NOTIFICATIONS

Practice makes progress!

Daily practice will help you improve more quickly - especially if you practice at time you are actually presenting.

Set a daily alarm here.

19:00

Slide the switch to the right to enable the alarm. Then, tap the alarm icon to set the alarm. You may tap and hold + or - to rapidly increase or decrease the time.

4. Historical Scores Page: This page lists your previous attempts in using the PRESENT mode of the app. You may tap one entry to view the Presentation Report for this attempt (described in Section 6).

9:37 ⌁   ⦙⦙!! LTE 🔋

BACK

SCORES

Apr 14, 10:36 AM	79%
Apr 14, 9:54 AM	68%
Apr 14, 9:46 AM	78%
Apr 14, 9:37 AM	74%
Apr 13, 10:08 PM	59%
Apr 13, 9:41 PM	53%
Apr 13, 9:12 PM	75%

HIGH SCORE   LAST SCORE

88% 79%
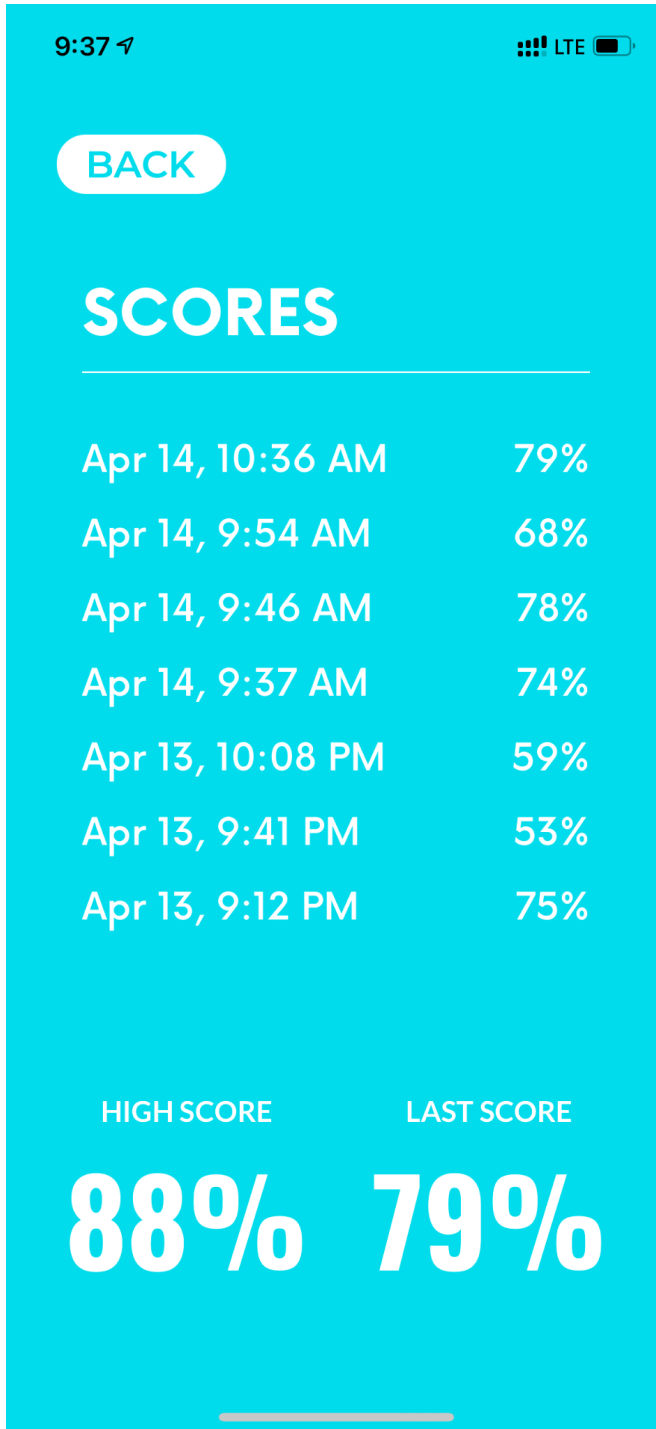
5. Practice Mode: This mode of the app is to train your presentation skills. You have the option to select an individual area to train in. This mode will provide real-time feedback as you present in your chosen area. Fully train yourself before proceeding to PRESENT mode!

   Upon entering this mode, you are prompted to select an area you would like to practice on.

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HOME

TRAINING AREA?

FACIAL EXPRESSIONS

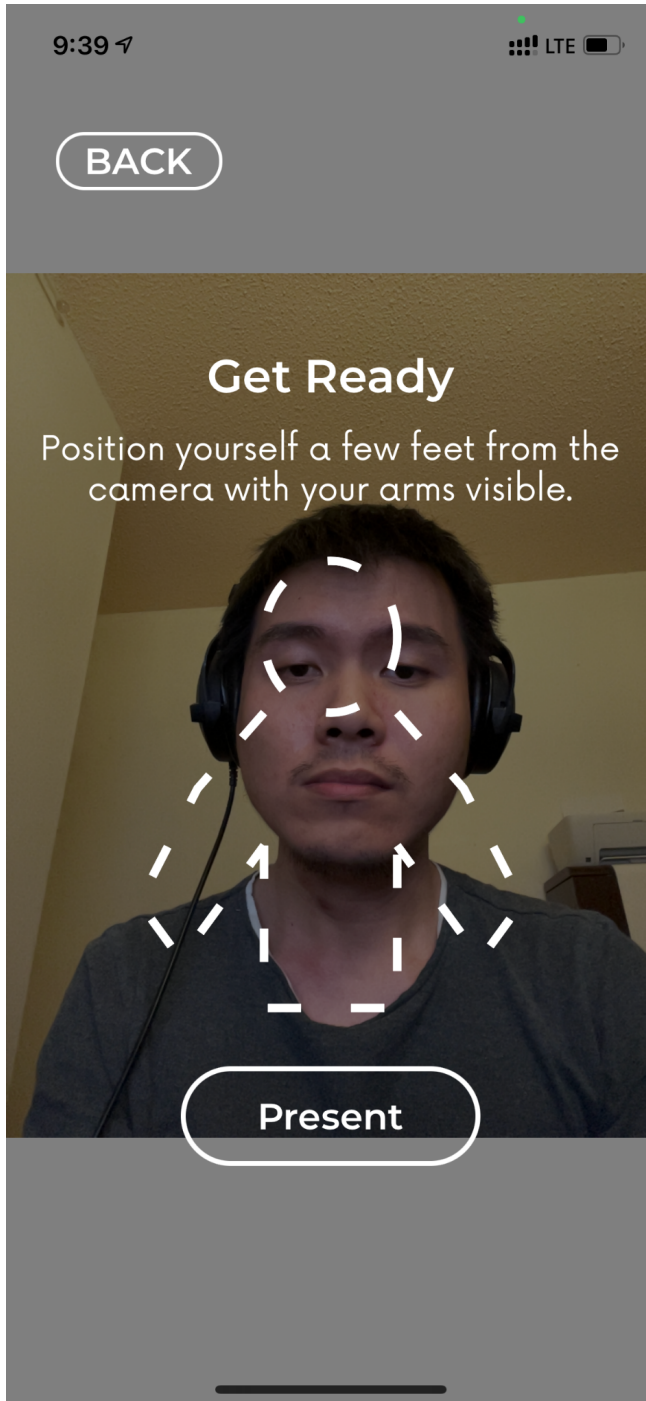**EYE CONTACT**

GESTURES

SPEECH

Once you have chosen an area of focus, you will be directed to the Prepare page, where you will be asked to position yourself behind the body outline and place your face in the circle.

Once you are ready, tap Present. Prepare yourself during the 5-second countdown. You will then start presenting for 20 seconds and a timer will show up on the top.

As you present, a tip will show up at the bottom of the page indicating how you need to improve in this area (typically in these three types: more, keep going or less). Follow the instructions and you will gradually make progress!

A brief evaluation of your overall performance will show up after the 20-second window. Tap LEARN MORE to learn the best practices for this area of presenting.

6. Present Mode: This mode quantifies the quality of your presentation by giving a score on each nonverbal area (Facial Expression, Gestures and Eye Contact) and word per minute (wpm) data on the verbal area (Pace of Speech).

    Steps to use this mode are roughly the same as the PRACTICE mode, except that your presentation will be recorded for future review, and there will not be tips while you present.

    After finishing your 15-second presentation, you will get a Presentation Report:

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BACK

PRESENTATION REPORT

✋ Nonverbal
79/100   ›

👄 Speech Pace
Fast (162 wpm)   ›

▶ **View Recording**

You may tap your nonverbal score to view a full breakdown of your score. You may further tap any area to learn the best practices of that area.

9:38   LTE

BACK

Best Practices

"Show what you are saying, move your hands. Audiences listen with their ears and their eyes" (Neff, 2020).

Moving your hands during a virtual presentation will also make your more dynamic and your presentation less boring.

However, do not move your hands too much. This could distract your audience from the focus of your presentation.

Close
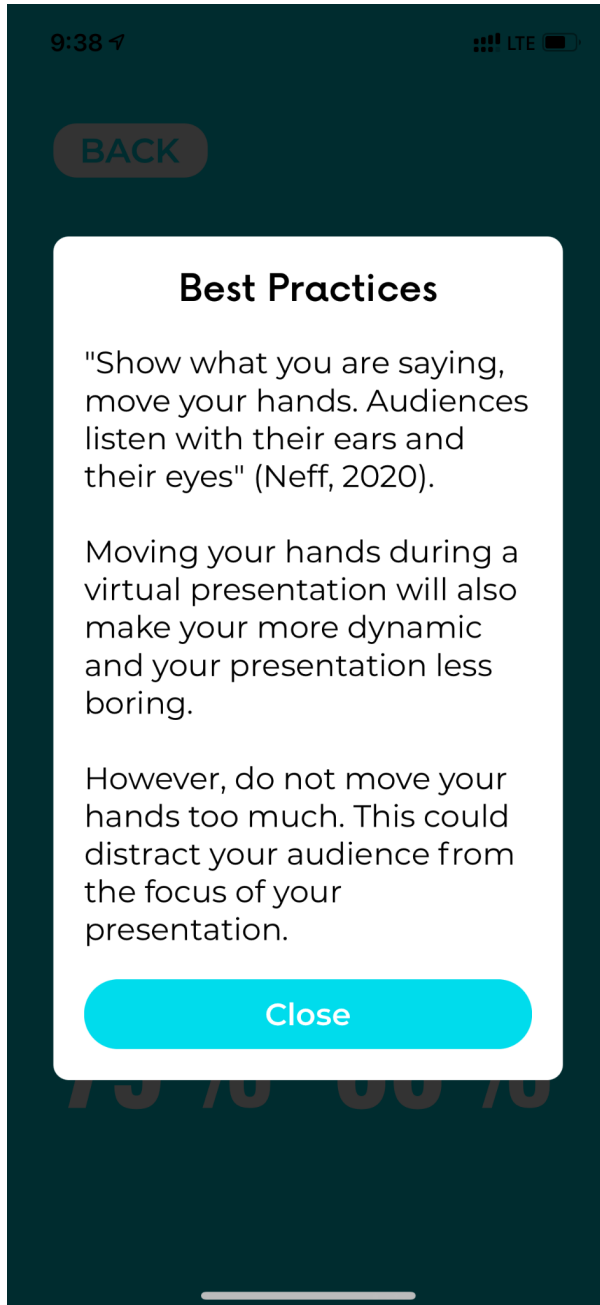
You may also tap VIEW RECORDING to review your presentation recording, share it with your friends, or delete it to save space on your phone storage.
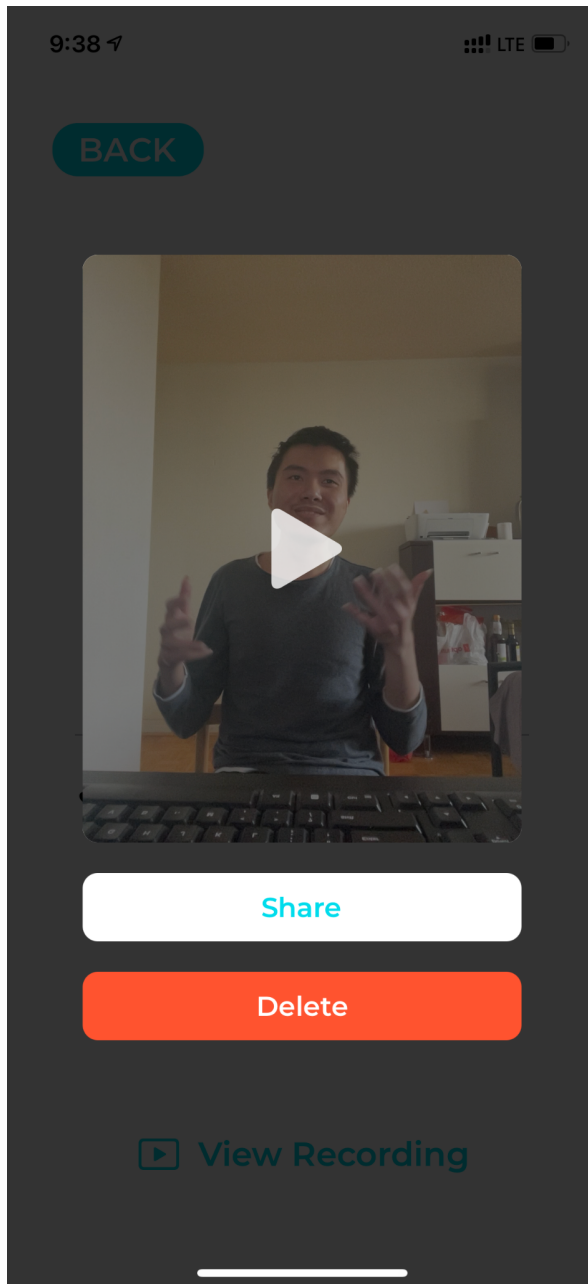
Overall Design

Software Structure

1. **User Interface**: These classes are basic views with Login page, Home view, etc. In the home view, it displays the username, last score and high score which read from the firebase. The last score and high score are buttons linking to the history page.
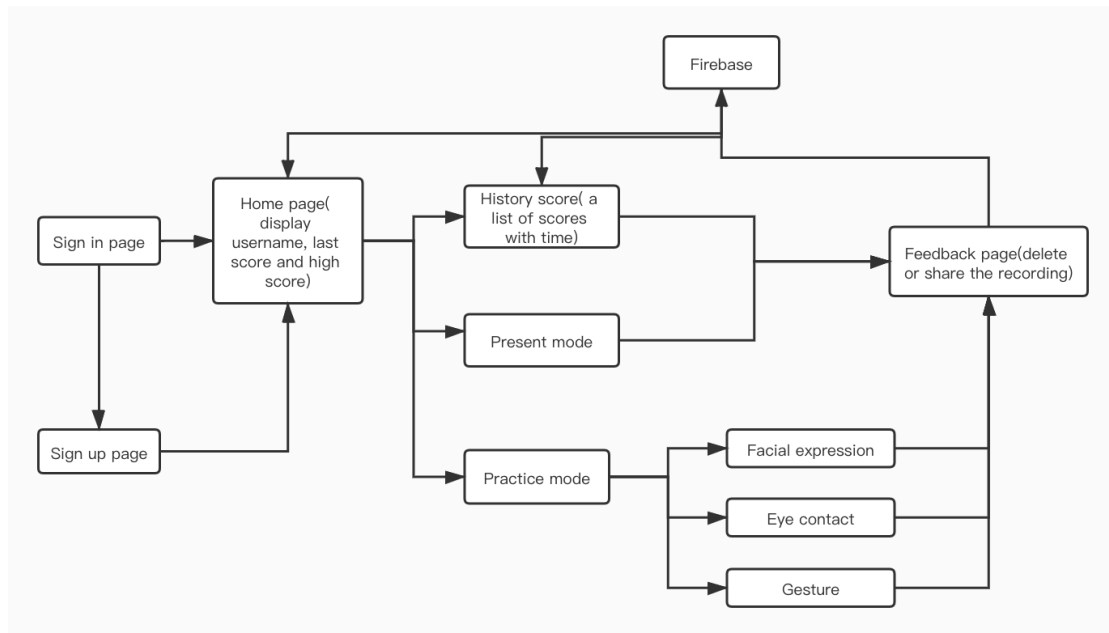2. **Storage**: Firebase is used to store all history scores for all users containing scores of each presentation, presentation time and feedback.
3. **Algorithms**: We use different algorithms for each area we evaluate.
    a. Face Expression Recognition: We train a custom neural network that classifies facial expressions, and use CoreML to make it work on the device.
    b. Gestures: We use Vision to get metadata of body movements, and apply trigonometrics to detect motion.
    c. Eye Contact: We use ARKit and the phone's front dot projector to estimate eye concentration.
    d. Pace of Speech: We use the Speech framework to recognize user speech and apply an averaging algorithm to get the words per minute data.
4. **Scoring System**: Based on the output of our algorithms, a score will be calculated for each area. For example, smiling from time to time will give a score of 100, and smiling the whole time will give a score of 60. An average of scores from all areas will be calculated as the final score.

5. **Feedback System:** Besides the scores, our app provides real-time feedback, such as "smile more," when users practice and present. After a user finishes practicing and presenting, it gives a specific result about all areas to report to users on their performance.

Reflection: What did you learn? What would you do differently?

Machine Learning is Complex: We would have chosen not to dive directly or too deeply into machine learning - which we haven't been thoughtful about its complexity in both data collection and model optimization. We tried to adapt to this, however, apparently without success because we were able to only collect data with very limited diversity during the pandemic. If we were to start again, we would listen to what Dr. Rose advised us and focus more on what our app can achieve rather than technical details. We may have saved more time allowing us to complete more of our "Future Work" goals.

Code Quality is Important: Having clean code that follows the industry standard for maintenance allowed us to easily add new functionality when needed.

Plan Together Early: Planning development features and splitting the work before the spirals made it easy and straightforward to work individually and as a team.

Teamwork: Working together across different time zones and different professional backgrounds was both challenging and rewarding. We learned about different areas of expertise.

Class Structure: It was excellent to experience a class structured rigidly in terms of deliverables but with the openness to allow for a rich diversity of class projects.

Contribution by Each Group Member

Jimmy: ML model training, algorithm design and interface design.

Yufei: User data storage design, historical scores storage design, Firebase buildup and interface design.

Casey: Research, planning and guidance, interface design, testing, report and presentation preparation.

Specialist Context

For the past 15 years, I have worked in corporate and capital market communications. In 2015, I was excited to also begin teaching in the Department of English and Communications at George Brown College. However, as I began my work in higher education, I was shocked to see how little emphasis was placed on presentation design and delivery skills for students and faculty despite the value of these skills both academically and professionally. This issue, my communication background and my work at George Brown has led me to pursue my doctorate at the Ontario Institute for Studies in Education (OISE) with a focus on higher education and presentation skills and software.

Presentation skills should be a core competency for all post-secondary students. In my Professional Communications classroom, a large part of the term is devoted to presentation design and delivery. Despite this emphasis in class, learning to present effectively takes practice outside of class. This is where students struggle the most. They present to their family and friends, they make videos of themselves presenting, but they still aren't sure how to improve. This is where our application can be most helpful. By receiving feedback on their nonverbal and verbal communication during a presentation, they can work to improve these areas each time they practice presenting. As previously mentioned in our introduction, practice and feedback are fundamental for the development and acquisition of public speaking skills (Van Ginkel et al., 2015).

Present Better is convenient, research-based tool to facilitate presentation practice. The application allows user to train in the "Practice" mode in four areas (Facial Expressions, Gestures, Eye Contact and Pace of Speech) and receive real-time feedback and learn about best practices. In the "Present" mode, the user can test their abilities and compare and share their past presentation attempts.

This application could greatly support my field of research. There is currently a gap in the literature in the area of online student presentations. Using Present Better in classroom setting would allow students to practice presenting more efficiently and effectively. Practice using the application has the potential to lead to greater student confidence and ultimately, better student presentation outcomes. A pilot study in a college communications classroom using Present Better would endeavour to answer the following research questions: Does using Present Better result in greater student confidence when presenting online? Is there a corelation between the amount a student uses Present Better and their confidence presenting? Is there a corelation between the amount a student uses Present Better and the outcome of their presentation assignments and the course?

Future Work

1. More precise scoring mechanism: We plan to implement detection of specific gestures during presentation, like whether people are crossing their arms or touching their faces.
2. Customized evaluation that adapts to specific context: We plan to enable people to choose their context before presentation, like whether they are attending a funeral or a ceremony, which changes what the calculations of scores are based on.
3. Practice alarm with incentives: We plan to embed a notification mechanism that reminds people to practice by either push notification, E-mail or text, and set incentive goals like "streaks".
4. Including "space/position" as additional nonverbal area: Best practice for virtual presenting is to do so with your arms visible, from the waist up. We have a body outline to guide users but keeping your body in this outline could also be another important aspect of nonverbal communication to include.

Permission for Posting

	Video of final presentation	Report	Source code
Jimmy	Yes	Yes	Yes
Yufei	Yes	Yes	Yes
Casey	Yes	Yes	Yes

References

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Schneider, J., Börner D., van Rosmalen P., & Specht M. (April 2017). *Presentation Trainer: what experts and computers can tell about your nonverbal communication.* 33(Issue 2) Pages 164-177. Journal of Computer Assisted Learning.

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