

# CSCI379 - Final Project Proposal

Team Name: Wang

Group Members: Warren Wang

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Title: User Authentication via Hybrid Face and Speaker Recognition

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## Background and Motivation

The team has decided to try to create an authentication system that uses a combination of face recognition in addition to voice recognition. We will use the facial recognition system that we started in homework 2, the attendance system, and modify it to integrate a voice component as an additional biometric input required to authenticate the user. If time permits, we will also see if we can do identification of the user given their face and voice captured at test-time.

The motivation for this project comes from wanting to build off of an existing codebase created from this course and integrate a new biometric source that we have not covered in the course, but already has literature, code, and production systems out in the wild that have demonstrated their usefulness.

## Methods and Tools

The student will make use of all the common tools used by modern software developers, including but not limited to Google, ChatGPT, research articles, kaggle datasets, medium articles, etc. to learn about what methods can be used to approach this. There are two main problems that need to be addressed, given that this is building off of a previous project:

1. Speaker Recognition – This could be a project in of itself, but the team is interested in diving into other biometric sources for extracting entropy out of to use a comparator.
2. Integration into Existing System - We will need to consider how we will make the hybrid part of the authentication system come together. That is, how do we combine the results of face recognition with speaker recognition? Ideally, since we have two sources of information about the current user, we should expect a higher recognition accuracy, that is, a higher True Acceptance Rate (TAR). However, we can also entertain the argument that we could see the inverse occur in which TAR decreases and FAR and FRR increase because we have now made it harder to get to the “perfect match” to properly authenticate a particular person by complicating the pipeline.

Therefore, for the final project, we will focus on two main objectives as the deliverables to be made in that order. We need to first successfully create the speaker recognition system independent of the facial recognition system. If we are able to attain success in this objective and if time permits, we will attempt to deliver the integration of both biometric systems into a single hybrid one.

## Progress Tracking

The team will track progress via git commit history frequency. We will ensure that the developer consistently delivers new updates to the code in a continuous timely manner. This way, we will avoid procrastination and having to cram all of the work needed until the final last moments. The team will maintain a todo list and try to divide work into two week sprints, following an Agile software development process. Weekly progress reports will be logged.

## Timeline and Division of Labor

Considering that the team consists of a single person, the single student will be responsible for designing the objectives and deadlines across the remaining timespan of the semester. They will break down each milestone into subgoals and tackle each one incrementally. Each accomplishment will build on top of the previous, until the whole project becomes a single working system that is greater than the sum of the parts. When project problems or hurdles arise, as they always do in projects, since the team consists of a single developer, the solo developer will not hesitate to reach out to the professor for some guidance and assistance in thinking out how to break down and solve the current stumbling block.

## Proposed Schedule

Task	Deadline
Proposal Submission	11/08/2023
Design	11/15/2023
Present working Demo	11/27/2023
Finish Coding & Debugging	11/29/2023
Final Testing & Reiterations	12/02/2023
Generate Evaluation metrics	12/03/2023
Report and code submission	12/05/2023

## Presentation Slides

 CSCI379 Final Project - Proposal Presentation