HAR$

21M.385 Final Project Proposal

# Team

Julia Guo

Annie Phan

Sara Stiklickas

# Project Goal

We would like to create an intuitive interface that teaches people vocal harmonic principles in a fun way, especially because currently it is difficult to learn without formal training. By using the interface to sing their favorite songs, users can enjoy the experience of learning to harmonize.

# Project Description

The interface will run on your computer. It can either use built-in microphone input or an external microphone.

Ideally, when the user opens up the program they will have the option between two modes: practice mode and song mode. The practice mode will train the user to recognize and practice intervals. The song mode will allow the user to practice harmonizing with actual songs, either in sections or running through the entire song.

In practice mode, the user will be able to pick a tonic and mode to practice harmonizing with. They would see a screen with horizontal lines indicating the notes and intervals relevant to the tonic, and as the user sings notes they would see an indicator on the screen of their current pitch.

In song mode, the user can pick a song they would like to harmonize with. The user will see notes scrolling horizontally across the screen from right to left, where the height is mapped to the pitch of the note. They can choose to either practice it or perform it. To practice, they will choose a section of the song, such as a verse or chorus. They will be guided through how to harmonize with that section by first playing the harmony line only. Once they can successfully sing with this line, they will be shown both the harmony and melody lines. Once they can sing the harmony with both lines playing, they can practice singing the harmony with only the melody line. Once they are finished practicing, they can perform the entire song with the same visual interface and the harmonic line playing very quietly and receive a score based on their performance. While performing, there will be a set of pitches and lines which will count as “correct” harmonies for each song.

In terms of musical reactivity, the user will always be able to see the current pitch they are singing. This indicator will be a particle system that changes colors depending on whether or not they are singing a “correct” pitch.

We will need to either find song files that are already split in to individual vocal and background parts, or make them. We will also need to analyze these files to determine the actual notes and rhythms of the melody, harmonies, and the intervals between them.

# Major Risks / Challenges

Pitch detection is necessary for project success, which we do not personally have experience implementing before. We will try to achieve accurate pitch detection within the interface, but until we have this working, then we can use keyboard input to simulate pitch input.

Another potential area of risk is finding songs that are appropriately separated into parts to use. If we cannot find anything legitimate then we can create our own short tracks to demonstrate how the system might be used.

# Division of Labor

* Pitch detection
* Song/interval analysis
* User interfaces
* Game logic

Above are the main sections of the project. We don’t need to have complete songs analyzed in order to work on other parts of the system, but we do need to agree on how this data will be structured and possibly have a sample melody and harmony to use for testing.

Since pitch detection is such an important component of our interface, we will work together to get it working. After that, we will start working on the game interfaces and the game logic in parallel. As we progress, we will divide tasks into smaller subtasks which people can claim.

# Timeline / Milestones

For Milestone 1, we would like to have working pitch detection, which can be made more accurate later. We would also like to have a working basic interface which shows you what pitch you’re singing.

For Milestone 2, we want to be able to tell the user whether or not they’re singing correct harmonies and to have actual songs within the interface instead of just a small sample song. We would like to have a rough version of song mode finished.

By the in-class presentation, we would ideally have everything finished. If there is not enough time, then we will leave out practice mode in favor of improving song mode.