The Team

Daniel Griessler
Team Lead, Music Expert, & Developer

Dan Levy
Designer & Web/Mobile Developer

Javier Muñoz
Machine Learning Engineer

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Associate Professor, Florida Institute of Technology

Professor Elizabeth Dopira
Director of Choral and String Studies

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Goal

- The goal is to help students learn sheet music and improve their singing ability

- Design an application that
  - Analyzes pitch, duration, dynamic, tempo, rhythm, and phrasing
  - Provides dynamic exercises
  - Includes a communication tool

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Motivation

- Focus on Choir members
  - Don't practice
  - Don't know how to practice
  - Don't practice correctly
  - → Time is wasted

- Current applications exist
  - Rely on a set series of exercises
  - Abstract away the actual sheet music and multi-part harmony
  - Do not provide interactive guidance to students who are struggling.

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Approach

Features for Singers and Teachers

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Core Features for Students

1. A web and mobile application which provides playback features and a method to record the student's performance to provide real-time, dynamic feedback (novel feedback).

2. Statistical analysis

3. Exercises

4. An integrated communication tool (novel) will allow students to query their peers and teacher about their current progress, to get suggestions for help, and to provide peer support to fellow students.

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Core Features for Teachers

1. Statistics about individual student performance
2. General statistics about the choir as a whole
3. The integrated communication tool will provide a connection to remote or struggling students. Through this connection, teachers can provide guidance, reminders, and additional feedback.

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Additional Features for Singers

1. Sheet music image parser
2. Teacher-curated exercises
3. Support other instruments as input

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Additional Features for Teachers

1. The teacher will be able to upload their own copies of their sheet music per copyright laws into the app which can then be used for rehearsal.

2. Digital sheet music editing

3. Integration with other sheet music databases while adhering to copyright laws.

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Technical Challenges and Milestones

Technical Challenges

- We plan to use JavaScript to represent sheet music and playback, but we don't know much about JavaScript

- We plan to develop a mobile app for this project, but we don't currently have much experience in mobile app development

- We plan to provide real-time, interactive feedback which requires machine learning, but we need to learn more about machine learning and real-time feedback

Milestone 1

September 30

- Compare technical tools for vocal input, digital sheet music representation, and playback of digital sheet music.

- Provide small ("hello world") demo(s) to evaluate the tools for vocal input, digital sheet music representation, playback of digital sheet music.

- Resolve Technical challenges in learning JavaScript, getting experience with mobile app development, and gaining understanding and experience with machine learning.

- Compare and select collaboration tools for software development, documents/presentations, communication, and task calendar.

- Create Requirement Document

- Create Design Document

- Create Test Plan

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Milestone 2

October 28th

- Implement, test, and demo sheet music importation, digital representation, and playback.
- Implement, test, and demo vocal recording, digital representation, and integration with music playback.

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Milestone 3

November 25th

- Implement, test, and demo basic statistic gathering in areas of pitch and duration.
- Implement, test, and demo development of interactive exercises based on statistics gathered concerning pitch and duration.
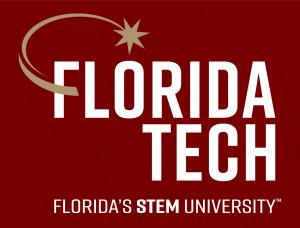
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Task Matrix for Milestone 1

Task Matrix

Task	Daniel Griessler	Dan Levy	Javier Muñoz
Compare and select Technical Tools	Sheet music representation and playback	Web integration of sheet music representation and playback and singing recognition	Singing recognition and analysis
"hello world" demos	Sheet music representation and playback demo	Web integration between sheet music representation/playback demo and the singing recognition demo	Singing recognition demo
Resolve Technical Challenges	Learn basics of JavaScript	Learn basics of android development and machine learning	Learn basics of machine learning
Compare and select Collaboration Tools	Documents and Presentation	Communication and task calendar	Programs

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Task Matrix (Cont.)

Task	Daniel Griessler	Dan Levy	Javier Muñoz
Requirement Document	write 50%	write 25%	write 25%
Design Document	write 25%	write 50%	write 25%
Test Plan	write 25%	write 25%	write 50%

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