

The Music Assistant

Milestone 2 • October 28, 2019

Overview

- JavaScript pitch detection library research
 - Integration of ML5
- Connect and integrate AlphaTab, ML5, and P5
- Create sheet music using AlphaTex
- UI design
 - Home page, practice selection page, and practice page
- Aubio research
 - Beats, tempo, and notes

A nighttime photograph of a university building, likely Florida Tech, illuminated with vibrant blue and red lights. The building's facade features large windows and classical architectural elements. In the foreground, a fountain is lit with blue light, and its water is visible. The sky is dark, filled with a large, brilliant display of fireworks in shades of orange, yellow, and white. A sign in the lower-left corner identifies the building as the F.W. Olin Physical Sciences Center. The Florida Tech logo is in the bottom right corner.

Milestone 2 Tasks

ML5 Pitch Detection

- Tensorflow ML model
- Built in JavaScript (Tensorflow.js)
- Runs client-side

Connect and integrate AlphaTab, ML5, and P5

- Provisions
 - AlphaTab: sheet music rendering
 - ML5: machine learning model for mic input stream to frequency
 - P5: drawing library and connection to microphone
- Combined logic for drawing note developed for Aubio into webpage directly
- Includes: small sampling and display for silence

Create sheet music in AlphaTex

```
\title "Down by the Riverside"
```

```
\subtitle "Arranged by: Brant Adams. B.M.I."
```

```
\tempo 84
```

```
.  
\track "Soprano" \staff {score} \tuning piano \instrument  
acousticgrandpiano \ks G  
r.1 | r.2 :4 d3 e3 | g3{d}.2 :8 g3{-} a3 | b3{d}.2 :8 b3{-} r |
```

```
\track "Alto" \staff {score} \tuning piano \instrument  
acousticgrandpiano \ks G  
r.1 | r.2 :4 d4 e4 | g4.1 | g4{- d}.2 :8 g4{-} r |
```

```
\track "Piano Upper" \staff {score} \tuning piano \instrument  
acousticgrandpiano \ks G  
r.8 d6{d}.4 d6{-}.2 | r.8 d6{d}.4 d6{-}.2 |  
r.8 d6{d}.4 d6{-}.2 | r.8 :4 d6{d} d6{-} :4 (e6 b6)
```

```
\staff {score} \tuning piano \instrument acousticgrandpiano  
\ks G  
:1 (d4 g4) | :1 (d4 g4) | :1 (d4 g4) | :1 (d4 g4) |
```

SBMP 232

Down by the Riverside

arranged by Brant Adams,
B.M.I. (b. 1955)

The image shows a musical score for 'Down by the Riverside'. It includes a Soprano Alto part and a Piano part. The tempo is marked 'Calmly, quietly' with a metronome marking of ♩=84-88. The piano part is marked 'p'. The score is in 4/4 time and G major. The Soprano Alto part starts with a whole note G4, followed by a half note A4, and then a quarter note B4. The Piano part starts with a quarter note G4, followed by a quarter note A4, and then a quarter note B4. The score is arranged by Brant Adams, B.M.I. (b. 1955).

```
\staff {score} \tuning piano \instrument acousticgrandpiano  
\ks G  
r.8 :16 g5 a5 :8 f#5 d5 d5{-}.2 | r.8 :16 g5 a5 :8 f#5 d5 d5{-}.2 |  
r.8 :16 g5 a5 :8 f#5 d5 d5{-}.2 | r.8 :16 g5 a5 :8 f#5 d5 d5{-}.2 |
```

A nighttime photograph of a university building, likely Florida Tech, illuminated with vibrant blue and red lights. The building features large windows and a prominent entrance. In the foreground, there are palm trees and other foliage, also lit up. The sky is dark, and a large, bright firework display is visible on the right side of the image. The overall scene is festive and celebratory.

UI Design

Home Page, Practice Selection Page, and Practice Page



Home



Practice



Progress



Choir



Messages

Good Afternoon, Cayla

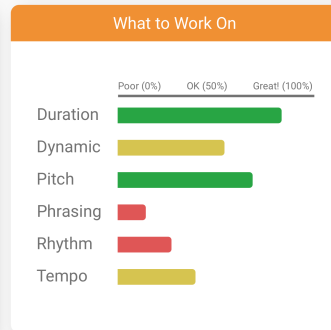
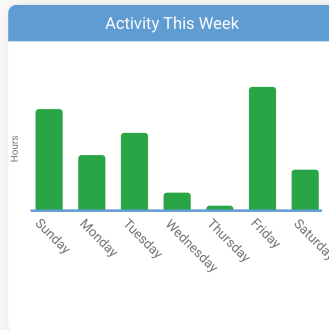
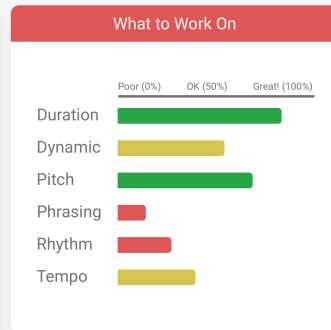
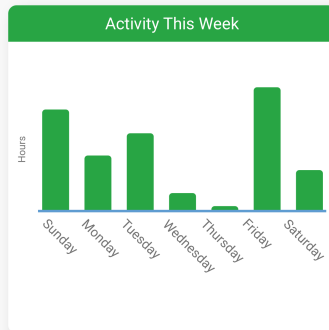
The Last Piece of Music You Practiced

Canon Rock
JerryC

Guitar Standard Tuning

rendered by alphaTab (https://alphatab.net)

Your Performance Updates





Your Latest Pieces

Canon Rock Yesterday
JerryC

Play button

Canon Rock Yesterday
JerryC

Play button

Canon Rock Yesterday
JerryC

Play button

Canon Rock Yesterday
JerryC

Play button

Canon Rock Yesterday
JerryC

Play button

Canon Rock Yesterday
JerryC

Play button

[View All Pieces](#)



< Latest Pieces



Home



Practice



Progress



Choir



Messages

Canon Rock
JerryC

4 m 32 s



View Progress



Canon Rock
JerryC

Guitar Standard Tuning

Piano $\text{♩} = 90$

The musical score is written in 4/4 time with a tempo of 90 BPM. It begins with a treble clef and a key signature of one sharp (F#). The first measure is highlighted in yellow and contains a whole note chord of F#2. The score includes various rhythmic patterns, including eighth notes, quarter notes, and triplets. A dynamic marking of *f* (forte) is present. The score concludes with a double bar line.

rendered by alphaTab (<https://alphaTab.net>)

Aubio Post Analysis

- Aubio provides various analysis tools
- We plan to use it server-side for analyzing recordings
- It has the ability to provide
 - MIDI-like notes
 - Timestamps of beats
 - Pitch
 - Tempo
- We can pass it the file and produce text files with the output

Client-Server Communication

- Eventually we plan to have a database server to store data
- Currently, we email recordings as .wav to fitmusicproject@gmail.com
- A script will download the .wav and reply to emails with the output
- We are working on making this output more understandable and tweaking it's numbers.
 - Currently somehow reading pitches above 1000 Hz

Demos

F.W. OLIW
PHYSICAL
SCIENCES CENTER

 FLORIDA
TECH

Main Website Demo

- React (UI library)
- SCSS (CSS preprocessor)
- Webpack (JavaScript module bundler)

Test Website Demo

- AlphaTab, ML5, and P5 integration
- Includes AlphaTab features and is able to listen and draw pitch on first Track

Goals (Milestone 3)

- Main website
 - Finish integration of AlphaTab and ML5
 - Code home page
 - Code practice selection page
- Design real-time feedback UI
- Improvements
 - P5 note drawing
 - AlphaTab rendering (also add options)
- Exercise generation
- Post analysis program

Questions?

The Music Assistant • Milestone 2