**RAD Engineering Notebook**

**10/07/20**

1. Planned Milestone 1 presentation
2. Completed team agreement

**10/08/20 - 10/09/20**1. Refreshed Fourier Transform  
2. Read about Time-Frequency Spectrum Analysis

3. Reading about YIN Pitch Detection this  
 1. Based of a modified autocorrelation function  
 1. Refresh Autocorrelation Function (based off of time series data)  
 2. Compare current phase with previous phase (lag) to find differences and "correlate"

3. This helps create periodicity - patterns in the time series data

2. Uses Difference Function to make data uniform  
 3. Cumulative Mean Normalized Difference Function - more normalization  
 4. Absolute Threshold  
 5. Parabolic Interpolation - make sure that the period is a multiple the sampling period (want to make sure that it fits nicely)  
4. Read about pyin  
 1. Yin calculates pitch on a frame by frame basis 1. There are no smoothing measures  
 2. Instead modify yin to produce multiple pitch candidates  
 1. Use probabilities in a viterbi decoded hidden markov chain to find pitch  
 1. This means that it find the most probably path through the time series

data - dizzy then cold then fever

3. Also has some human voice detection stuff

**10/9/20**

1. Team zoom meeting with Professor DuBois
   1. There are many resources at NYU for sound and pitch recognition
   2. Simplify sound recognition
   3. Focus on visuals rather that a complex technical side
   4. Introduction to possible softwares we can use

**10/11/20**

1. Create beat recognition
2. Create chromagraph recognition
3. Combine chronograph and beat recognition
4. Data with Matplot-lib

**10/14/2020**

1. Submitted Benchmark A
   1. Have a good understanding of the tools that Librosa provides and be able to explain to the TA how they plan to use it
   2. Have a flowchart for the process that the product uses
   3. Have an algorithm to synthesize the data into a form Librosa can work with
   4. Have an algorithm to import the million song dataset from Google Cloud into Librosa
   5. Have the PDI report for the project
   6. Show the engineering notebook with notes

**10/19/2020**

1. Worked on Milestone 2 presentation

**10/20/20-10/25/20**

1. Create Server Infrastructure
2. Develop all server infrastructure, from lambda functions, ecs, ecr, autoscaling, launch templates
3. Completed Milestone 2 presentation

**10/25/20-10/28/20**

1. Create docker image with flask
2. Developed docker image including port mapping and flask integration

**10/29/20-11/03/20**

1. Create Javascript to transfer audio
2. This means encoding the audio, asking for permissions, and making things work.

**10/29/2020**

1. Design Logo
2. Download SolidWorks and AutoCAD
3. Research and learn how to use each software

**11/01/2020**

1. Tech difficulties with SolidWorks
2. Decided to use AutoCAD to 3D design the logo and print the headset
3. Add logo to the Virtual Reality Headset

**11/04/20**

1. Create the base sphere for the visual asset and present it to a TA.
2. Have a submission for 3D printing(or have a file for laser cutting) for the hardware component of the VR headset.
   1. Had to convert the file to .stl in order to submit
3. Demonstrate a sample of output based on input to a microphone. (Does not have to be on the visual asset (sphere).

**11/09/2020**

1. Learn about Dreamweaver
2. Create an outline for the landing Page
3. Begin writing sections for the landing page and distribute sections
4. Update: not doing early submission

**11/11/2020**

1. Completed Milestone 3 presentation

**11/13/2020**

1. Decided to download Raspberry Pi Desktop instead of buying the Raspberry Pi
2. Searched for websites and videos to help download Raspberry Pi Desktop

**11/16/2020**

1. Found the website to help download Raspberry Pi Desktop
2. Learned how to setup and use VirtualBox through videos

**11/20/2020**

1. Used a flash drive to contain the ISO file
2. Raspberry Pi Desktop Setup with VirtualBox

**11/24/2020**

1. Finalize Website and share with all members to edit
2. Insert link to the visualizer on landing page

**11/27/2020**

1. Created a layout for the presentation
2. Assigned parts to each of the group members

**11/30/2020**

1. 3D printed headset
2. Create visuals for presentation

**12/01/2020**

1. Gather all files and upload them to github
2. Finalize Presentation and distribute speaking roles
3. Finalize Final Design Report
4. Set up Link for the class to access the visualizer

**12/02/2020**

1. Submit Commissioning Form
   1. Be able to get a visual output using the spherical tool created based on an input from a microphone.
   2. Extra credit: Setup a Raspberry Pi and display to show the visual output based on microphone input.
   3. Extra credit: Create a website landing page for the app!