

Volume III Project Proposal

1. Who will work on this project with you (remember groups must be at least 2 people and no more than four people)?
 - a. Clark Brown, Daniel Swingle, Sam Cochran
2. What the project will be?
 - a. A music classification model to classify audio files by genre
3. Questions you will try to answer:
 - a. What features of music make it a part of its genre?
4. Data sets you will use to try to answer the questions:
 - a. Free Music Archive (<https://github.com/mdeff/fma>)
 - i. We will use the audio files and genre tags, but build our own features (for example Spectral and Rhythm features from the audio)
 - ii. Use the *small* data set (8000 30-second songs, 8 GB)
 - iii. Preprocessing: converting each mp3 file to a wav file
5. Techniques you think you will use:
 - a. Feature extraction (Librosa Python library)
 - b. Principal Component Analysis and other dimension reduction methods
 - c. KNN Classifier--come up with some metric based on features we decide to use
 - d. Neural Network/MLP (maybe with lots of hidden nodes/layers)
 - e. Random Forest (classification model)
6. Metrics you expect to use to decide how good your answers are:
 - a. Classification accuracy or misclassification rate
 - b. Mean Average Precision (MAP)
7. How you will divide the work among the different team members:
 - a. Get data in a format that we can use (remove noise, etc.)
 - i. Parse track metadata files for genre and track ID (Daniel)
 - ii. Pair genre with mp3 file of each track (Clark)
 - iii. Use librosa to import mp3 files / convert to .wav (Sam)
 - b. Feature identification and extraction
 - i. Each team member will identify and extract at least one feature from the audio files and create a visualization of that feature in the data
 - ii. Identify Spectral Features using Librosa (Fourier Transform) (Daniel, Clark)
 - iii. Identify Rhythm Features using Librosa (tempogram) (Sam)
 - c. Analyze which features are most important (as group work) --PCA maybe
 - d. Create models/metrics
 - i. Experiment with various scikit-learn models
 1. Individually, each team member will test three models
 - e. Classify/test accuracy of classifier
 - i. Determine best model for audio classification by genre (as group meeting)
 - f. Split up various sections of writing among team members evenly and then review the other team members' work