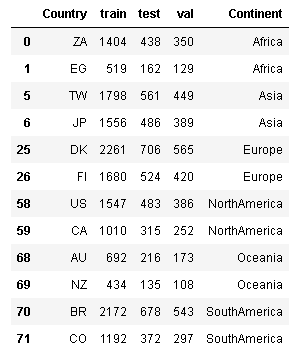
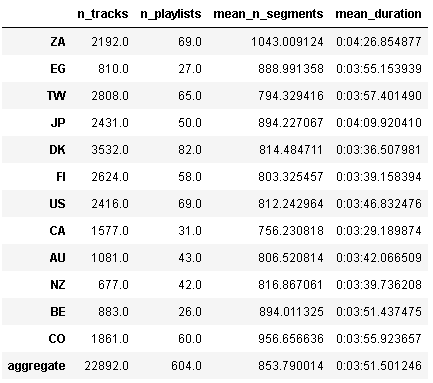
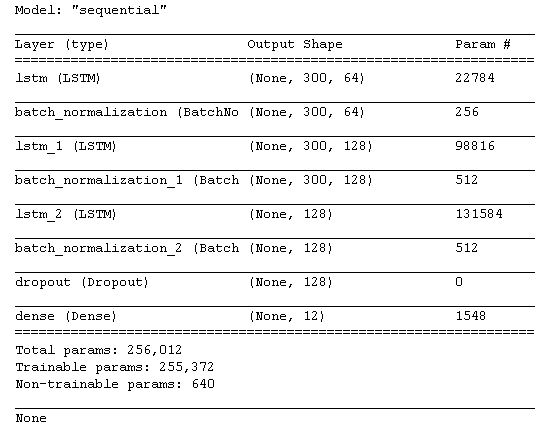
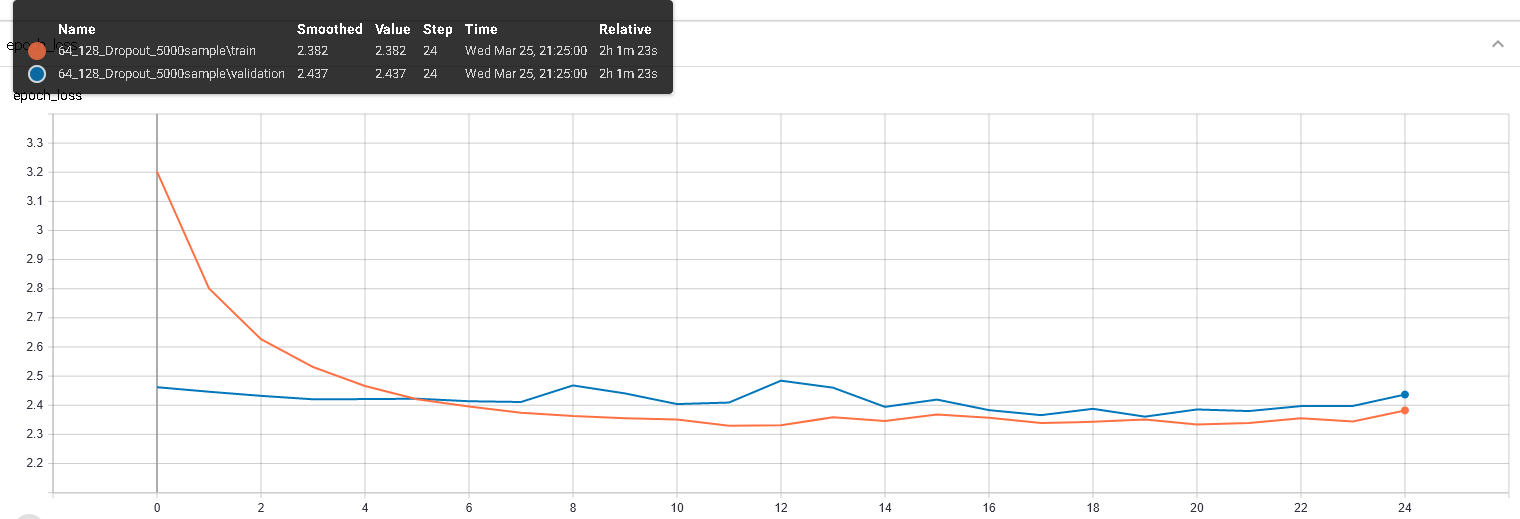
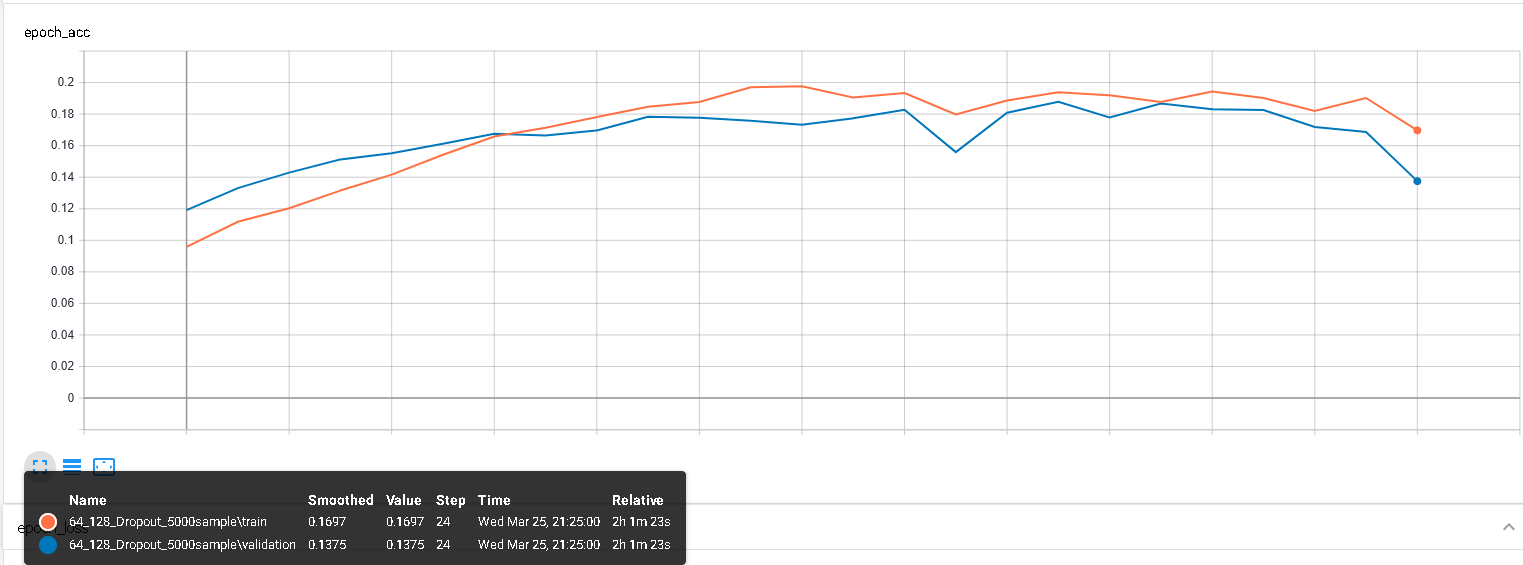
* Goal: Predicting which country a song is popular in using only the musical properties.
  + No contextual information such as artist, label, or year.
  + Using sequential musical relation between the segments of a song.
  + Can we differentiate the musical tastes of Countries?
* Dataset: Collected with Spotify API
  + Collected the most popular playlists in Spotify for 12 countries in a month in the last 19 years.
  + Songs appearing in playlists of multiple countries are discarded.
  + 
  + Songs are preprocessed by Spotify and divided into segments that are musically different than each other. Each segment is represented with two musical properties, pitch and timbre.
  + Timbre: Represented by a vector of 12. “Timbre is the quality of a musical note or sound that distinguishes different types of musical instruments, or voices. …The first dimension represents the average loudness of the segment; second emphasizes brightness; third is more closely correlated to the flatness of a sound; fourth to sounds with a stronger attack; etc.” <https://developer.spotify.com/documentation/web-api/reference/tracks/get-audio-analysis/>
  + Pitch: Represented by a vector of 12. It represents the dominance of 12 pitches in Chromatic Scale (<https://en.wikipedia.org/wiki/Chromatic_scale#Notes>) in the segment.
  + 
* Approach: Exploit the sequential structure of segments and use LSTM.
  + Architecture
    - Input:
      * 30 seconds, sampled 10 times per second, for a sequence of length 300
    - 
    - LSTM 1: Vanilla
    - LSTM 2:
      * Input Dropout: .5
      * Process sequence backwards
    - LSTM 3:
      * Input Dropout: .5
    - Dropout: Drop prob = .5
  + Sampling
    - Pick n = 5000 tracks per country with replacement
    - For each track
      * randomly select a starting position
      * construct a 30 second sequence from initial position
  + Training
    - Tf.keras
    - 8 cores clocked at 3.00Ghz
    - 32 GB RAM
    - 80% Training, 20% Testing, 20% Validation
    - Iterating over training attempting to get 20% accuracy across 12 categories on validation
    - Train on 5000 samples from each class for 25 epochs
    - Half learning rate
    - Train on 5000 samples from each class for 25 epochs
    - Half learning rate …
  + Evaluation
    - Validation accuracy across 12 categories
    - Pooled voting over tracks with final model
      * Subsample 30 second segments of test tracks and classify each.
      * Add softmax over all subsamples
      * Prediction = argmax over added softmax output
* Preliminary Results
  + Running
  + Latest results
    - 
    - 
* Limitations
  + Some playlists are generated by Spotify and it is likely that they use the same features to curate the lists.

**For our knowledge**

**Pipeline:** Collect data 🡪 Country Specific Pickle 🡪 Sample during training