

ECSE 484 - Assignment 10

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Have you ever listened to a song and wondered, what genre it is? Or have you ever thought what genre of songs do you like to listen? We are trying to create a neural network that would respond to both of those questions. We are gathering data from Spotify api about the song characteristics and then use that as training data to train a network to recognize the genre of songs that you like. The song features that we can gather from Spotify are: danceability, energy, key, loudness, mode, speechiness, acousticness, instrumentalness, liveness, valence, tempo. All of these values are floats and combined together are quite predictive of the song genre. We have already started designing a network that would be able to do the predictions for the genre.

Figure 1: Training set accuracy and loss

```
10/10 - 0s - loss: 0.0568 - accuracy: 0.9886 - 30ms/epoch - 3ms/step
Epoch 10/10
10/10 - 0s - loss: 0.0420 - accuracy: 0.9923 - 33ms/epoch - 3ms/step
16/16 [=====] - 0s 2ms/step - loss: 0.0343 - accuracy: 0.9918
```

Figure 2: Testing set accuracy and loss

```
Model performance on test set = [0.034327857196331024, 0.991752564907074]
```

Figure 3: The model that we used

```
model = tf.keras.models.Sequential([  
    tf.keras.layers.Dense(12, activation='relu'),  
    tf.keras.layers.Dense(20, activation='relu'),  
    tf.keras.layers.Dense(10, activation='relu'),  
    tf.keras.layers.Dense(5, activation='relu'),  
    tf.keras.layers.Dense(1, activation='linear')  
])
```

But we would not stop there. There are a couple of ideas we have in mind about how we can apply this data. For example we can get a sample of songs from your favorite artist and album and determine their genre and mood. We would also try to make the neural network that would train on the data of the songs you like and assigned score to train the network that would be able to rate the songs by how much you might like them and produce a ranking based on the predicted score for all of them.