Music Genre Classification
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Introduction
Understanding the genre of music is the first step in music recommendation. The goal of this project is to explore music genre classification using various machine learning techniques.

K-Nearest-Neighbors
KNN algorithm fits this problem well because the music genres has no clear borders. Trained a KNN on full dataset with different feature sets. The accuracy is as follows:

- Full training examples, full features with PCA, 101 neighbors. Accuracy is 46.19%.
- Full training examples, chroma feature, 101 neighbors. Accuracy is 30.72%.
- Full training examples, chrom, mfcc, and tonnetz features. Accuracy is 32.06%.

Data Source
- 106,574 processed tracks from Free Music Archive (fma) [1].
- 100778 tracks are labeled to 16 top genres.

Neural Network
We experimented with various batch size, learning rate, hidden units architecture and regularization methods to train the full data set into 16 genres. But the best accuracy is only 27%. When we focus on train tracks in 5 genres, the accuracy increases to 35%. When we only train tracks in 2 genres, the accuracy increases to 68%.

Linear-regression
Trained a linear model as a baseline model to compare against Neural Network. The performance is in figure 1.

Conclusions and Future Work
- K-mean performs the best among three algorithms. The testing accuracy of neural network is better than the testing accuracy of the linear regression model. Also, the larger set of the target label is, the better NN outperforms than LR.
- When the target label set is 16, the accuracy of NN model is low (27%). This result might be caused by the fact that the data used are already compressed (statistic data instead of original music frequency). Needs more work to verify. Another guess is because the border of genres are fuzzy. If the overlap part of two genres are large, it is difficult to clarify them.

References