Music Genre Classification

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1 Motivation

1.1 Introduction

Music classification is an interesting problem with many applications, from Drinkify (a program that generates cocktails to match the music) to Pandora to dynamically generating images that complement the music. However, music genre classification has been a challenging task in the field of music information retrieval (MIR). Music genres are hard to systematically and consistently describe due to their inherent subjective nature.

In this paper, we investigate various machine learning algorithms, including k-nearest neighbor (k-NN), k-means, multi-class SVM, and neural networks to classify the following four genres: classical, jazz, metal, and pop. We relied purely on Mel Frequency Cepstral Coefficients (MFCC) to characterize our data as recommended by previous work in this field [**?**, **?**]. We then applied the machine learning algorithms using the MFCCs as our features.

1.2 Problem Statement

2 Our Approach

2.1 Data Retrieval

2.2 Data Process Overview

2.3 Mel Frequency Cepstral Coefficients (MFCC)

3 Techniques

3.1 Kullback-Lieber (KL) Divergence

3.2 k-Nearest Neighbors (k-NN)

3.3 k-Means

3.4 Multi-Class Support Vector Machine (DAG SVM)

3.5 Neural Networks

4 Results

5 Conclusion

5.1 Discussion

5.2 Future Work

TODO alphabetically rearrange sources, and actually add all of them.

Table 1: DAG SVM Results

		Actual			
		Classical	Jazz	Metal	Pop
Predicted	Classical	29	4	1	1
	Jazz	1	20	1	0
	Metal	0	4	26	0
	Pop	0	2	2	29
Accuracy		97%	67%	87%	97%

Table 2: Neural Network Results

		Actual			
		Classical	Jazz	Metal	Pop
Predicted	Classical	14	0	0	0
	Jazz	1	12	4	0
	Metal	0	0	13	0
	Pop	1	0	0	19
Accuracy		88%	100%	76%	100%

Table 3: k-Means Results

		Actual			
		Classical	Jazz	Metal	Pop
Predicted	Classical	14	16	0	0
	Jazz	2	27	1	0
	Metal	0	0	27	3
	Pop	0	1	1	28
Accuracy		88%	61%	93%	90%

Table 4: k-NN Results

		Actual			
		Classical	Jazz	Metal	Pop
Predicted	Classical	26	9	0	2
	Jazz	4	20	4	1
	Metal	0	1	24	0
	Pop	0	0	2	27
Accuracy		87%	67%	80%	90%

References

[1] *Chen, P., Liu, S.*. "An Improved DAG-SVM for Multi-class Classification" `http://ieeexplore.ieee.org/stamp/stamp.jsp?arnumber=0566976`.

[2] *Marsyas*. "Data Sets" `http://marsysas.info/download/data\_sets`.