Music Genre Classification Using Multiple Classifiers

Machine Learning Project

Lisa Korntheuer, Jan Birkert, Adrian Desiderato, Jan Wangerin, Spyridon Spyropoulos

Technische Hochschule Ulm

January 13, 2025

Table of Contents

Introduction

- This is an awesome slide with very important information.

Table of Contents

Data Understanding

- This is an awesome slide with very important information.

Table of Contents

Data Preparation

- This is an awesome slide with very important information.

Table of Contents

Modeling — Random Forest

- Two experimenting approaches using GridSearchCV:
  - Soft hyperparameter tuning:
    - Number of trees (default = 100)
    - Splitting criterion (default = Gini)
  - Heavy hyperparameter tuning:
    - Number of trees (default = 100)
    - Splitting criterion (default = Gini)
    - Maximum depth (default = None)
    - Minimum samples per leaf (default = 1)
    - Minimum samples per split (default = 2)
    - Maximum features (default = sqrt)

Modeling — Random Forest: Results

- Soft hyperparameter tuning:
  - Training time: 20s
  - Accuracy: 0.760
  - Parameters: Number of trees = 1000, Splitting criterion = Gini
- Heavy hyperparameter tuning:
  - Training time: 18min
  - Accuracy: 0.760
  - Parameters: Exactly the same forest as in the soft hyperparameter tuning

Modeling — Decision Trees

- This is an awesome slide with very important information.

Modeling — K-Nearest-Neighbors

- This is an awesome slide with very important information.

Modeling — Artificial Neural Network

- This is an awesome slide with very important information.

Table of Contents

Comparison — Results

Model	Accuracy	F1 Score	ROC AUC
MLP	0.770	0.772	0.956
Random Forest	0.760	0.761	0.958
KNN	0.740	0.743	0.913
Decision Tree	0.530	0.532	0.759

Table: Model performance comparison.

Comparison — ROC Curves

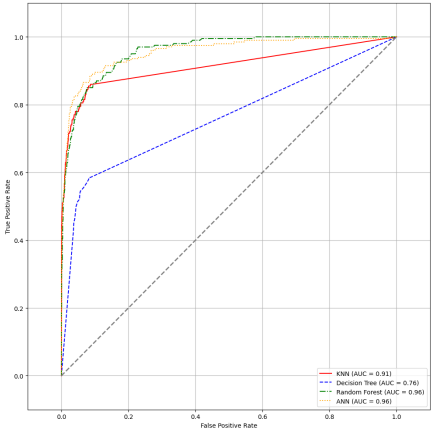

Figure: ROC Curves of the different classifiers

Lisa Korntheuer, Jan Birkert, Adrian Desiderato, Jan Wangerin, Spyridon Spyropoulos

Experimentation — 13 Datapoints

Datapoint	True Label	Random Forest Prediction	KNN Prediction	Decision Tree Prediction	ANN Prediction
0	pop	hiphop	hiphop	hiphop	blues
1	pop	hiphop	hiphop	disco	hiphop
2	pop	hiphop	hiphop	hiphop	hiphop
3	metal	hiphop	hiphop	hiphop	blues
4	metal	hiphop	blues	hiphop	hiphop
5	blues	blues	blues	disco	blues
6	blues	blues	blues	country	hiphop
7	blues	hiphop	reggae	hiphop	reggae
8	classical	jazz	jazz	disco	hiphop
9	classical	jazz	jazz	country	blues
10	classical	jazz	jazz	jazz	hiphop
11	rock	hiphop	hiphop	hiphop	reggae
12	rock	hiphop	blues	hiphop	hiphop
13	rock	hiphop	reggae	hiphop	reggae

Table: Comparison of predictions from Random Forest, KNN, Decision Tree, and ANN against true labels.

Table of Contents

Conclusion

- This is an awesome slide with very important information.

References I