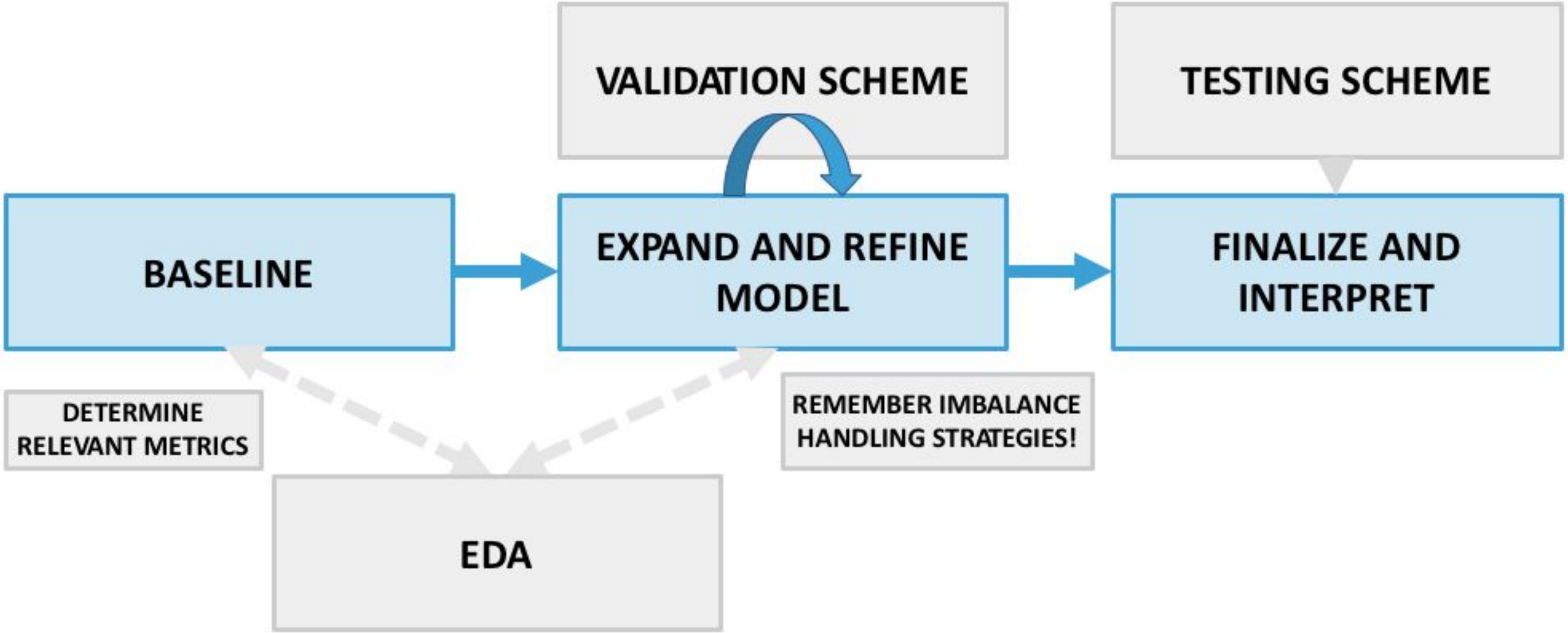
Interpreting Music Genres

Using Song Lyrics and Audio Metadata

Can genre be interpreted using lyrics and music?

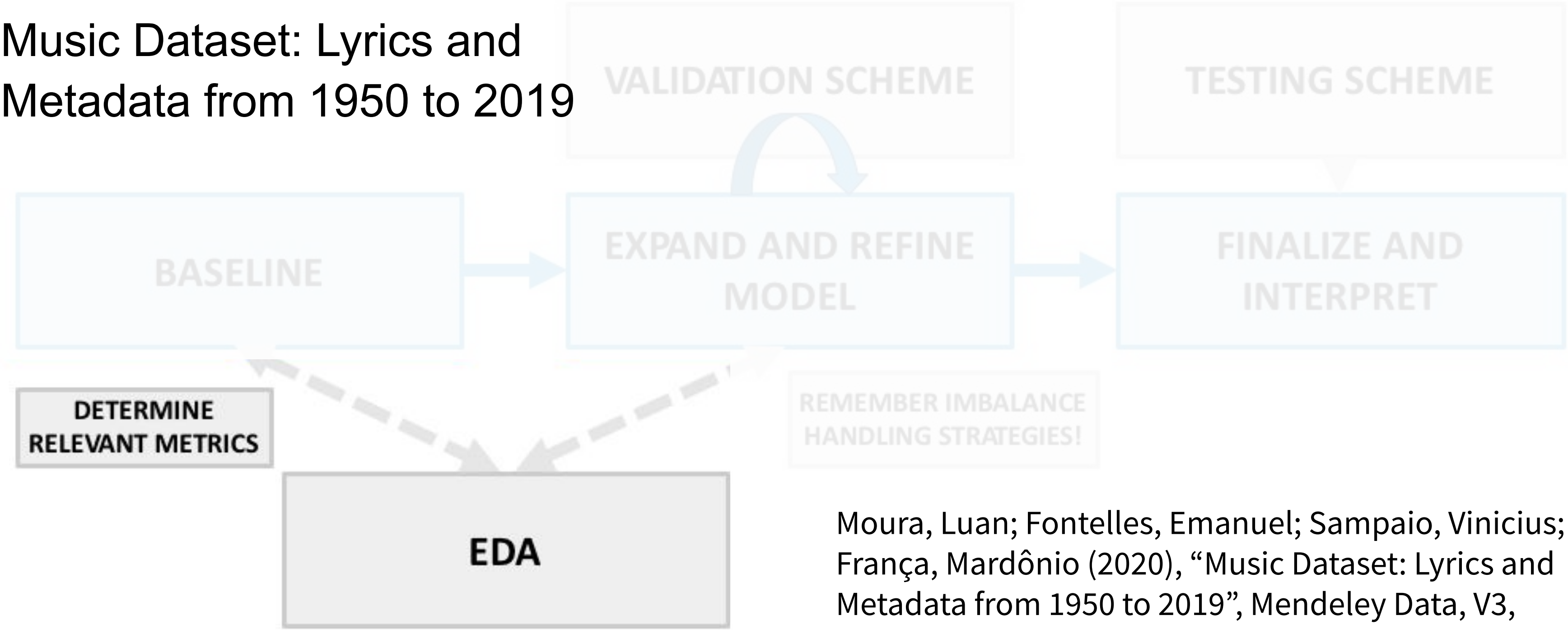
How much difference will the lyrics make to genre classification?

Methodology: Classification Workflow



EDA and Metrics

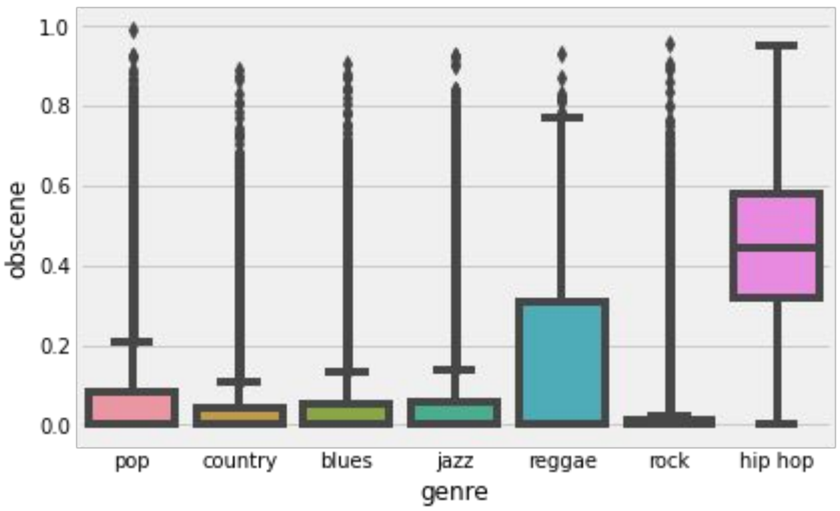
Music Dataset: Lyrics and Metadata from 1950 to 2019

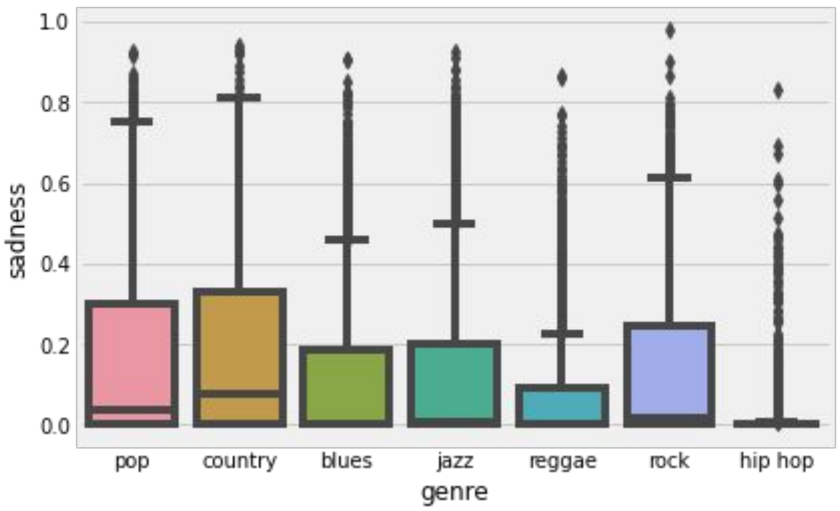


Moura, Luan; Fontelles, Emanuel; Sampaio, Vinicius; França, Mardônio (2020), “Music Dataset: Lyrics and Metadata from 1950 to 2019”, Mendeley Data, V3, doi: 10.17632/3t9vbwxgr5.3

EDA and Metrics

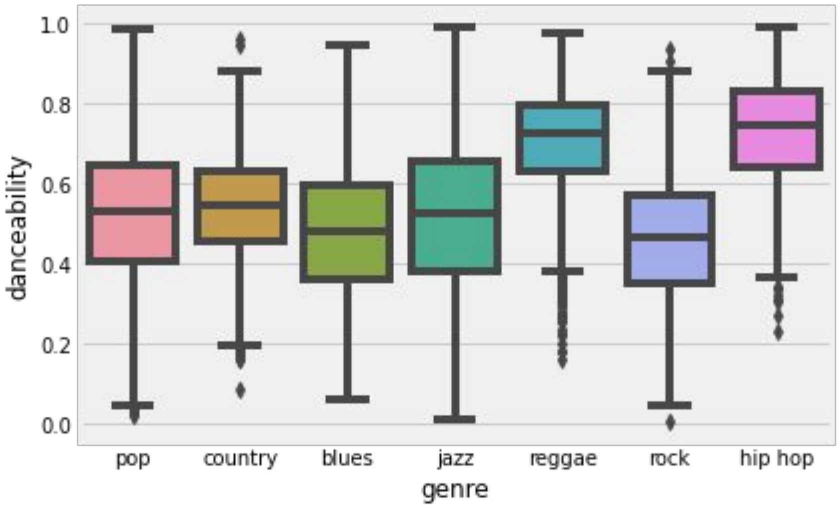
Lyrics: Topic modeling via Natural Language Processing

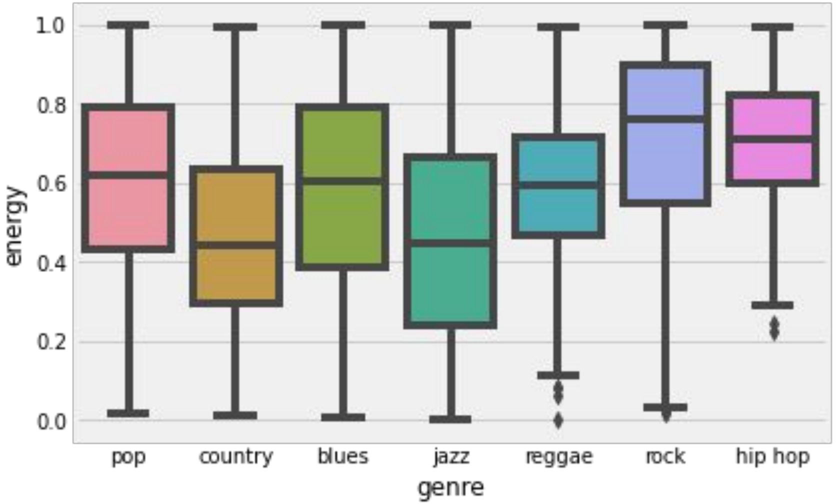


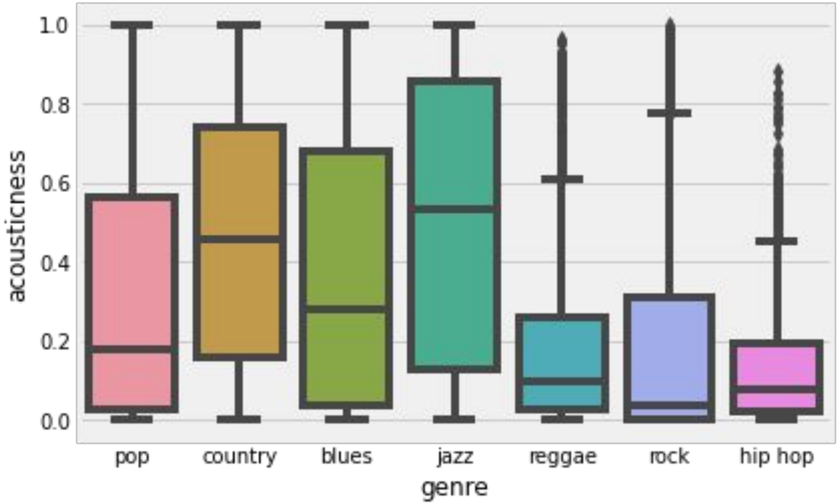


EDA and Metrics

Audio metadata: features from Spotify



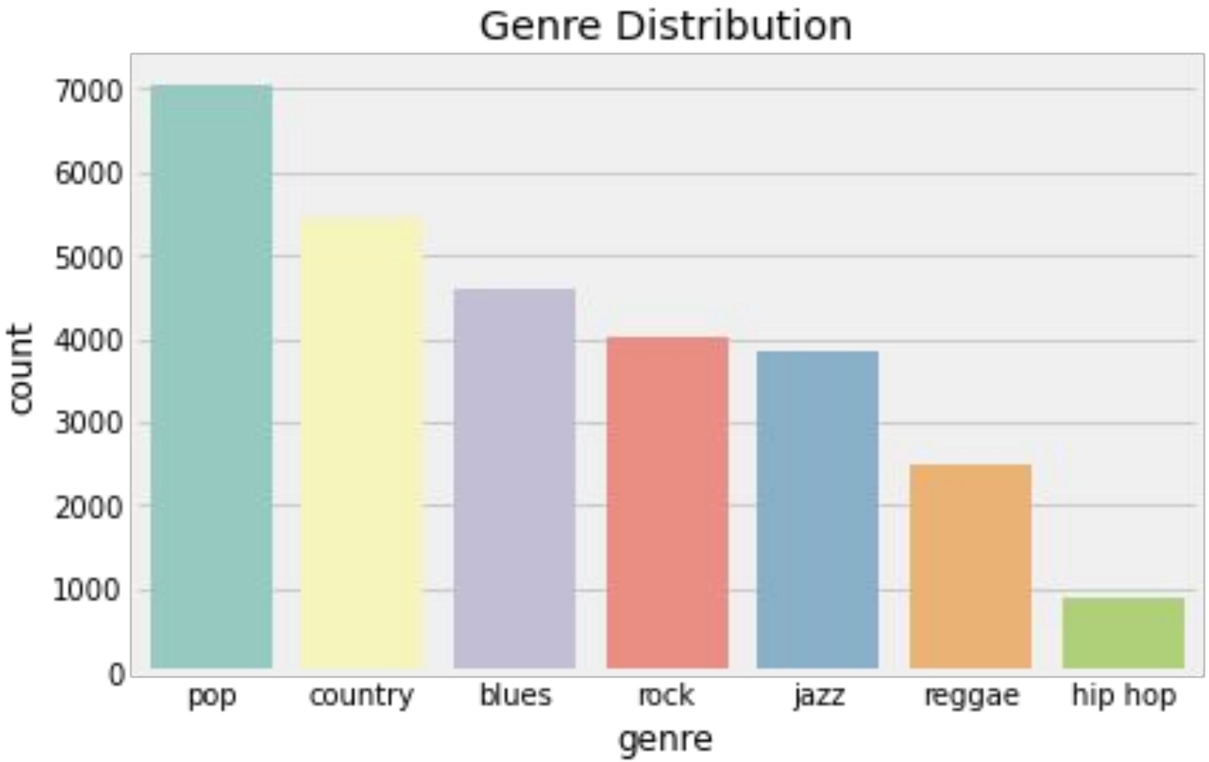




EDA and Metrics

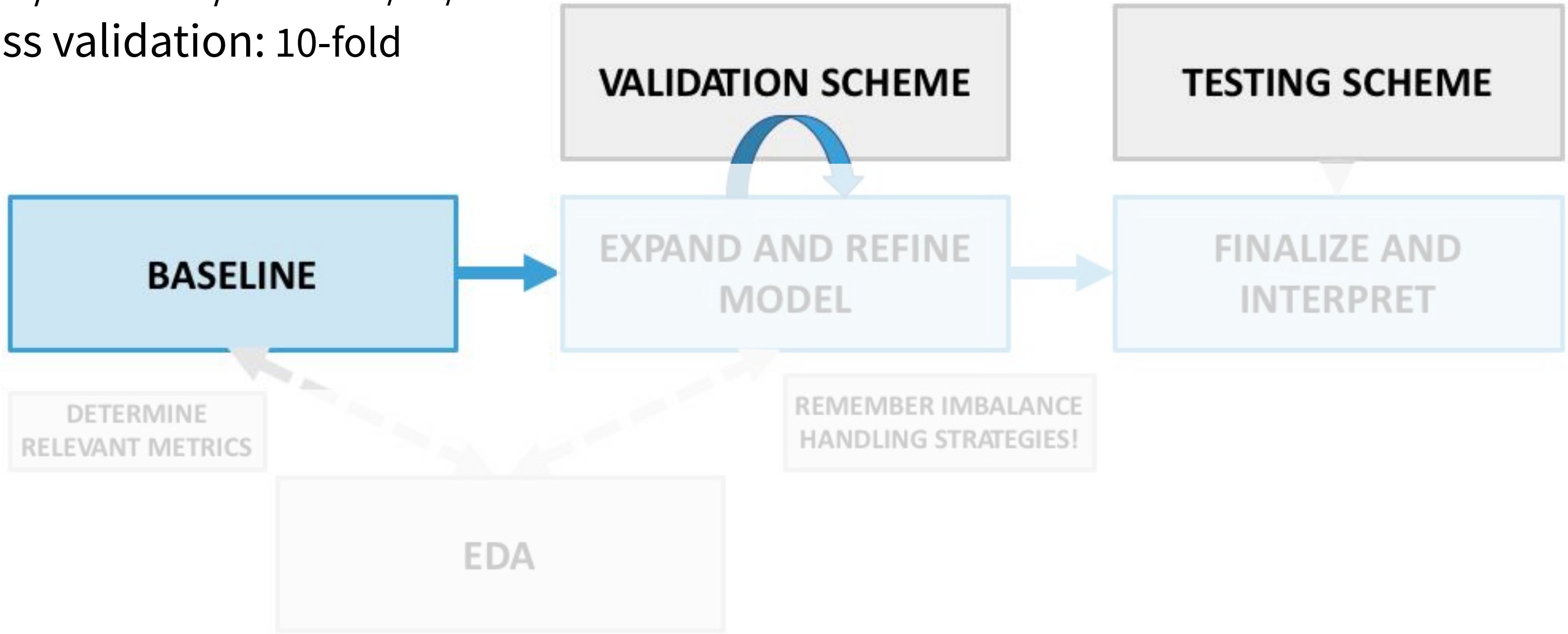
Accuracy:

How well can the model predict 1 of 7 genres using topics and audio features?



Establish Baseline and Validation/Testing Scheme

Train/Validate/Test: 60/20/20
Cross validation: 10-fold

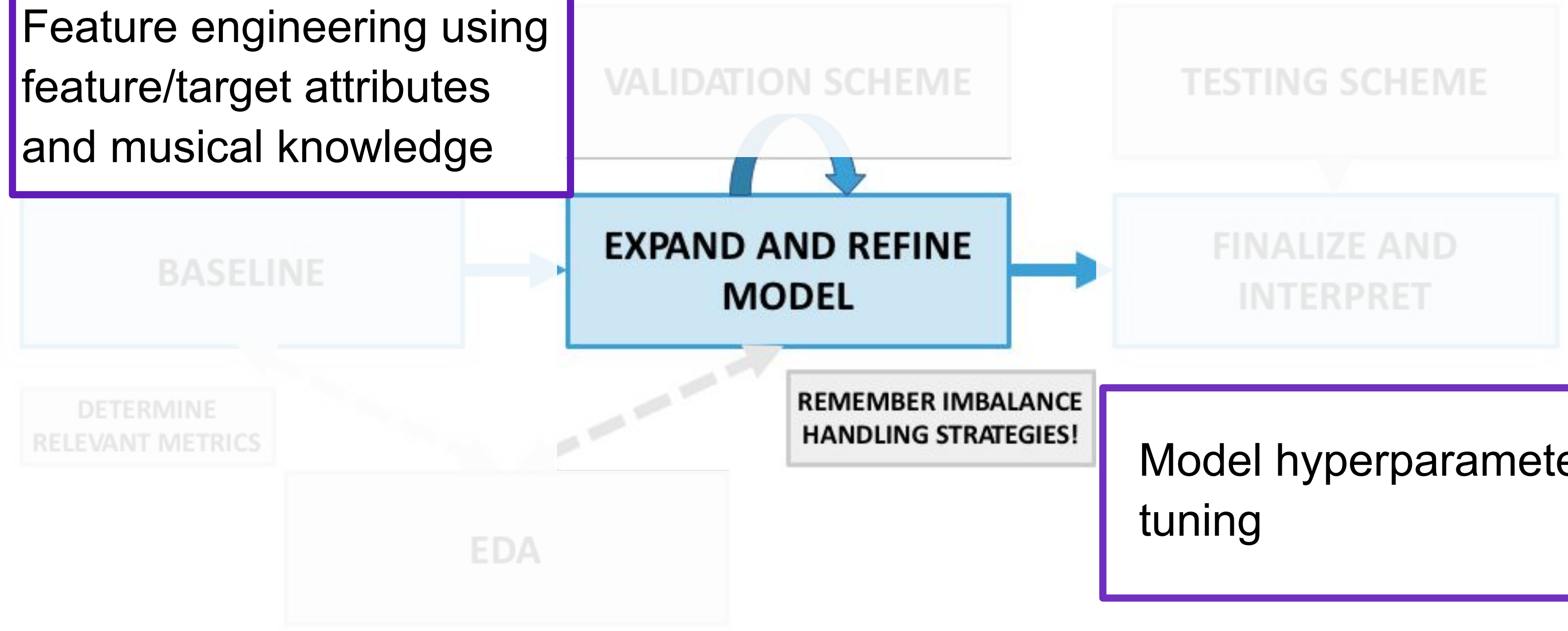


Baseline and Establish Validation/Testing Scheme

Model		Score
• kNN	➔	32.16%
• Multinomial Logistic Regression	➔	37.20%
• Random Forest	➔	41.12%
• Naive Bayes	➔	32.03%

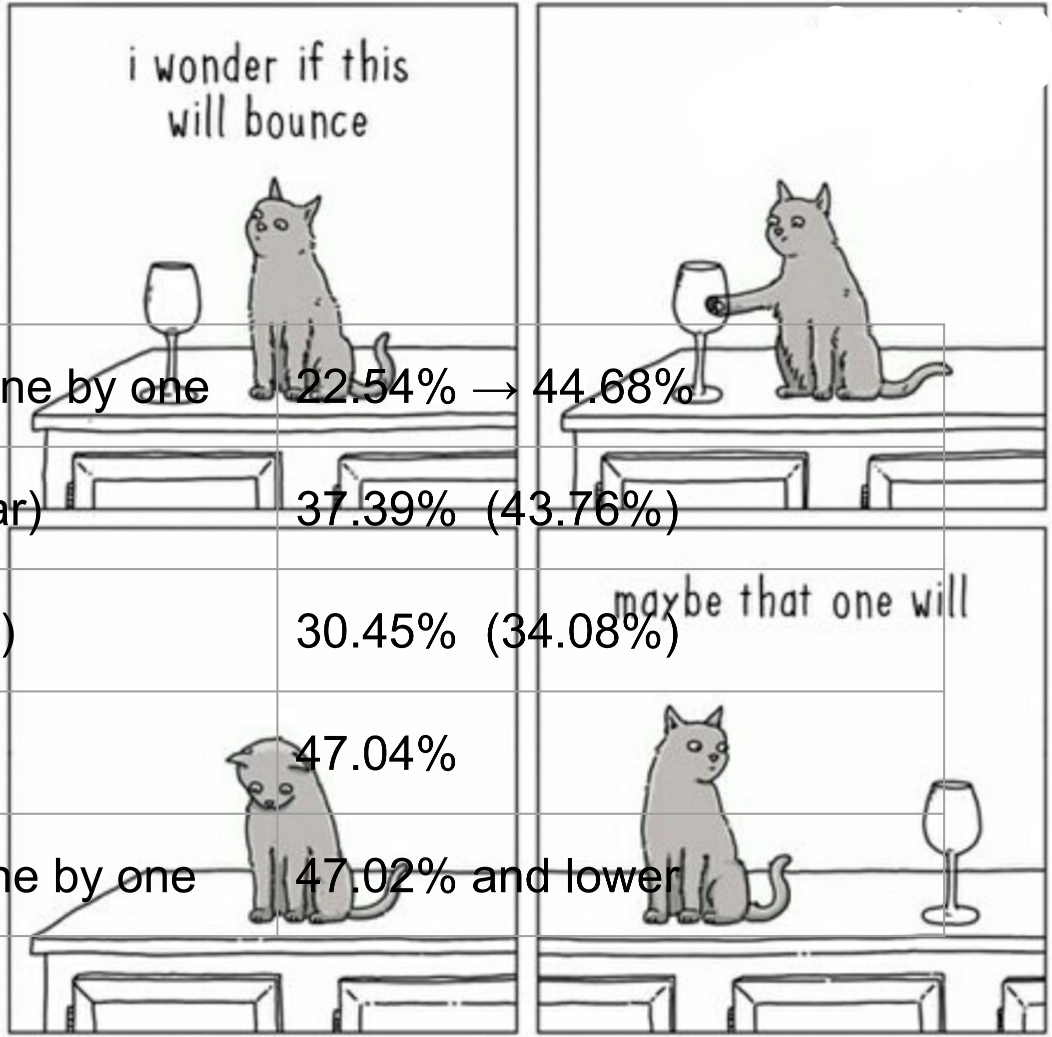
Expand and Refine Model

Feature engineering using feature/target attributes and musical knowledge



Model hyperparameter tuning

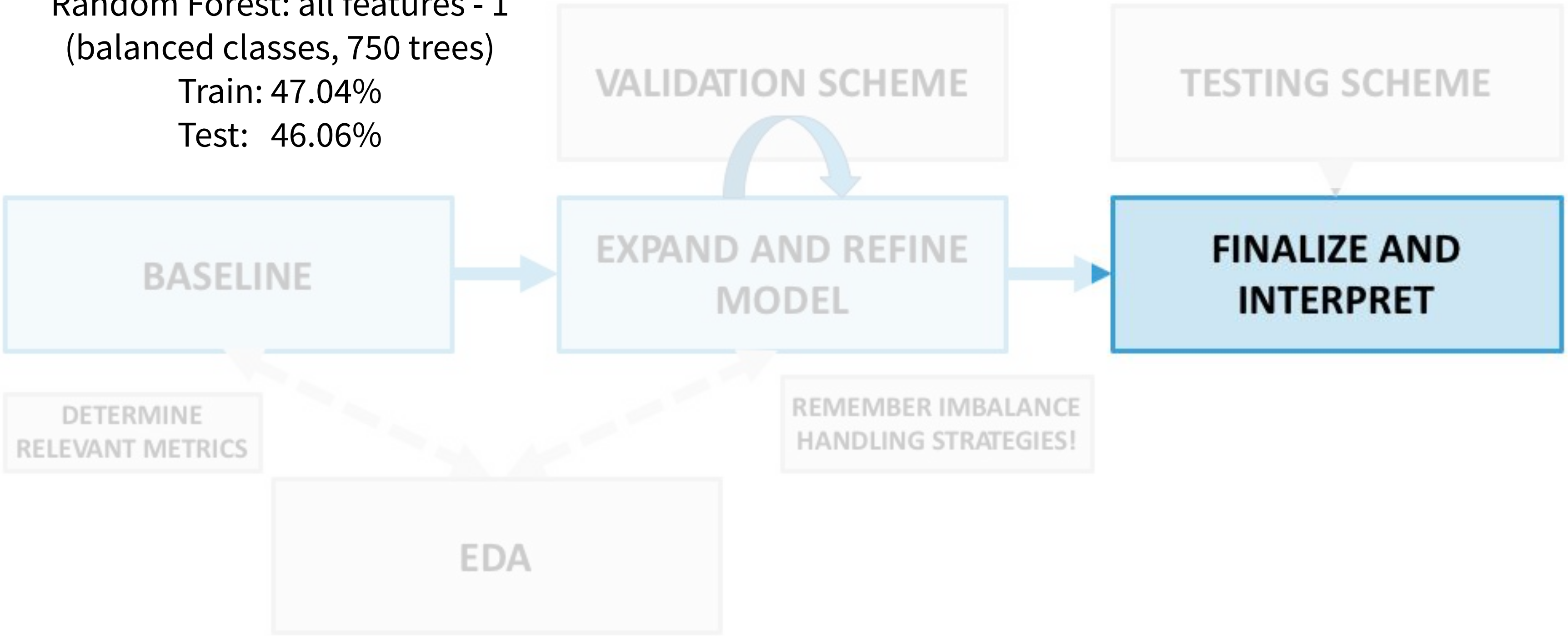
Feature Engineering

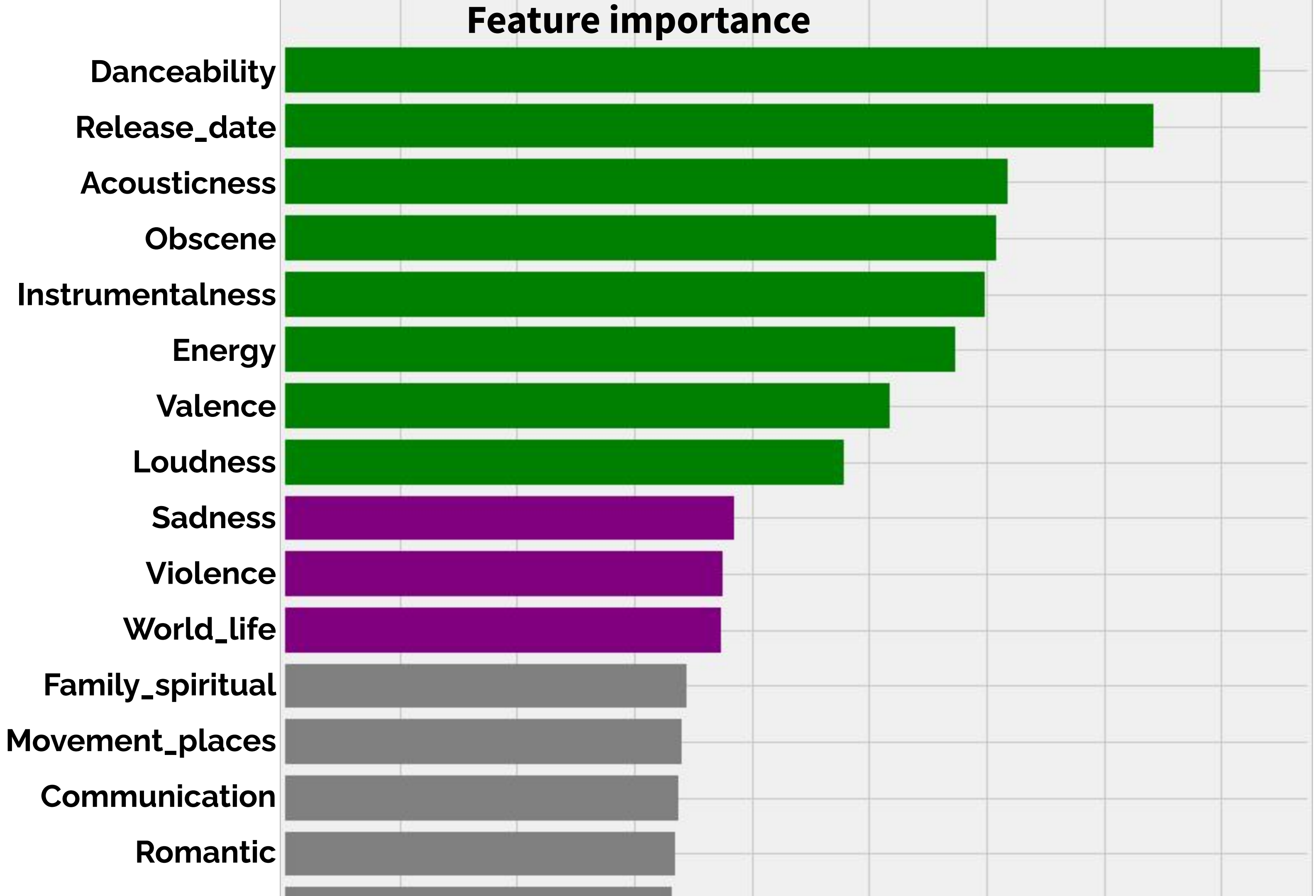


Adding 8 most important features one by one	22.54% → 44.68%
Model only audio features (plus year)	37.39% (43.76%)
Model only LDA features (plus year)	30.45% (34.08%)
Model with all features	47.04%
Remove least important features one by one	47.02% and lower

Conclusions

Random Forest: all features - 1
(balanced classes, 750 trees)
Train: 47.04%
Test: 46.06%





Feature importance
Danceability
Release_date
Acousticness
Obscene
Instrumentalness
Energy
Valence
Loudness
Sadness
Violence
World_life
Family_spiritual
Movement_places
Communication
Romantic

Conclusions

- Intuition good - most features I picked as important actually were
- Lyrics do add value to the genre prediction
- Genres are tricky - lots of crossover
- Given the features and correlated genres, model result isn't horrible at 46%

Genre	**Precision**	**Recall**	**F1-score**
Blues	0.48	0.30	0.37
Country	0.47	0.60	0.53
Hip Hop	**0.65**	0.48	0.55
Jazz	**0.55**	0.41	0.47
Pop	0.40	0.56	0.46
Reggae	**0.52**	0.48	0.50
Rock	0.46	0.32	0.38

Future considerations

- Use a different type of topic modelling for lyrics
- Add more audio features using Spotify API
- Try XGBoost
- Try a different set of songs with different genres

Appendix