Current Trends of

Artificial Intelligence

Phase 5

Progress

For this phase, we looked for a method to improve our feature selection. After some more research and reading we found the following paper: http://ismir2011.ismir.net/papers/PS3-6.pdf

This method describes the methods used by a certain toolkit music21. This toolkit is also compatible with our MusicXML input. The toolkit contains an algorithm, which calculates a amount of feature based on the input. In this phase we used this tool for our feature selection and gave this features to our SVM. We can also request those calculated features from the toolkit. Here are some examples of the calculated features:

'Initial_Time_Signature_0', 'Initial_Time_Signature_1', 'Compound_Or_Simple_Meter', 'Triple_Meter', 'Quintuple_Meter', 'Changes_of_Meter', 'Most_Common_Pitch_Prevalence', 'Most_Common_Pitch_Class_Prevalence', 'Relative_Strength_of_Top_Pitches', 'Relative_Strength_of_Top_Pitch_Classes', 'Interval_Between_Strongest_Pitches', 'Interval_Between_Strongest_Pitch_Classes',…

After running the experiments, we saw better results for Instrument, Style and Year predictions.

Results

Note Frequency (Old Best Result)

Error performance (lower is better)

Performer prediction 29;29;27;29;31 => 145
Instrument prediction 20;21;21;21;21 => 104
Style prediction 24;25;24;23;23 => 119
Year prediction 532;547;498;507;539 => 2623
Tempo prediction 2662.2;2238;3114.1;2416.3;2227.6 => 12658.2

Note Duration

Error performance (lower is better)

Performer prediction 35;34;34;33;35 => 171
Instrument prediction 20;21;21;21;21 => 104
Style prediction 24;25;24;23;23 => 119
Year prediction 532;518;498;507;539 => 2594
Tempo prediction 3223.6;2199.5;3216.9;2646.8;2451.9 => 13738.7

We noticed immediately is the same results for the Style and Instrument Prediction. After taking a look closer to the data we saw that both prediction algorithms predict for all Styles *Postbop* and instruments *ts,* which is the reason of this result.

We see a small improvement for the year predictions, but there is no general improvement.

Note Pattern

Error performance (lower is better)

Performer prediction 28;30;29;30;31 => 148
Instrument prediction 17;18;17;19;18 => 89
Style prediction 23;24;22;22;19 => 110
Year prediction 510;523;466;515;564 => 2578
Tempo prediction 2963.2;2357.9;2953.7;2796.8;2565.7 => 13637.3

These results are also interesting . We see an improvement for the Instrument,Year, Style Predictions. Certainly an improvement.

Tempo Formula
Error performance (lower is better)

Performer prediction 28;30;29;30;31 => 148
Instrument prediction 17;18;17;19;18 => 89
Style prediction 23;24;22;22;19 => 110
Year prediction 510;523;466;515;564 => 2578
Tempo prediction 720.2;611;651.3;764.2;588 => 3334.7

Fp-growth
Error performance (lower is better)

Performer prediction 34;33;32;34;34 => 167
Instrument prediction 19;20;20;20;20 => 99
Style prediction 23;24;23;22;22 => 114
Year prediction 527;536;493;502;526 => 2584
Tempo prediction 2582.9;2305.1;3469.3;2977;2276.7 => 13611

music21-feature selection
Error performance (lower is better)

Performer prediction 32;25;28;30;30 => 145
Instrument prediction 10;9;8;8;11 => 46
Style prediction 24;22;17;20;18 => 101
Year prediction 385;488;369;390;454 => 2086
Tempo prediction 2541.5;2130.5;2605.5;2491.4;2221 => 11989.9

Best Results for the Moment

Error performance (lower is better)

Performer prediction 29;29;27;29;31 => 145 *(Note Frequency)(has less mistakes on the bins than music21)*
Instrument prediction 10;9;8;8;11 => 46 *(Music21)*
Style prediction 24;22;17;20;18 => 101 *(Music21)*
Year prediction 385;488;369;390;454 => 2086 *(Music21)*
Tempo prediction 2662.2;2238;3114.1;2416.3;2227.6 => 3334.7 *(Tempo Formula)*

To run the code

Run the following command to install all necessary libraries:

pip install -r requirements.txt

To install fpgrowth you must run:

python pyfim/setup_fim.py install

The pyfim library can be downloaded from http://www.borgelt.net/pyfim.html

To run the program, use command:

perl crossvalidate.pl .