

USING JWEBMINER 2.0 TO IMPROVE MUSIC CLASSIFICATION PERFORMANCE

BY COMBINING DIFFERENT TYPES OF FEATURES MINED FROM THE WEB

Gabriel Vigliensoni
gabriel@music.mcgill.ca

Cory McKay
cory.mckay@mail.mcgill.ca

Ichiro Fujinaga
ich@music.mcgill.ca

challenge

To provide the jWebMiner cultural feature extraction software with new functionality, namely the ability to extract information based on Last.fm social tags.

To compare the performance of features mined from social tags and general web search strings for music classification.

To improve the performance of jWebMiner by trying different configurations of site weightings, filter words; and synonyms.

jWebMiner 2.0

jWebMiner is a software package for extracting cultural features from the web. It is part of the jMIR automatic music classification research suite, which also includes components for extracting features from audio and MIDI files, as well as a machine learning engine based on metalearning.

The jWebMiner software allows the use of required and excluded filter words, synonyms; and different site weightings.

jWebMiner 1.0 bases its features on Yahoo! web searches only. Version 2.0 also uses the Last.fm API to mine information related to musical social tags entered by millions of users.

To represent the position of a given artist's tag on a normalized scale, we defined a scoring function $S(a,g)$, where $P(a,g)$ is the position of the queried tag and $P(a,i)$ the position for all genre tags:

$$S(a,g) = \frac{1}{P(a,g) \sum_{i=1}^n \frac{1}{P(a,i)}}$$

jWebMiner can extract and display the normalized web search feature score, the normalized Last.fm ranking score, and the averaged results.

experiments

A series of classification experiments were performed in order to investigate the relative performance of features derived from Last.fm social tags, features derived from Yahoo! web searches and the combination of features derived from both sources.

The experiments were conducted using the SAC (Symbolic, Audio and Cultural) dataset. It is divided amongst 10 genres grouped into 5 pairs of similar genres. This arrangement makes it possible to perform 10-class genre classification experiments as well as 5-class experiments on the same dataset by combining pairs of related genres into single classes.

filtering and weighting

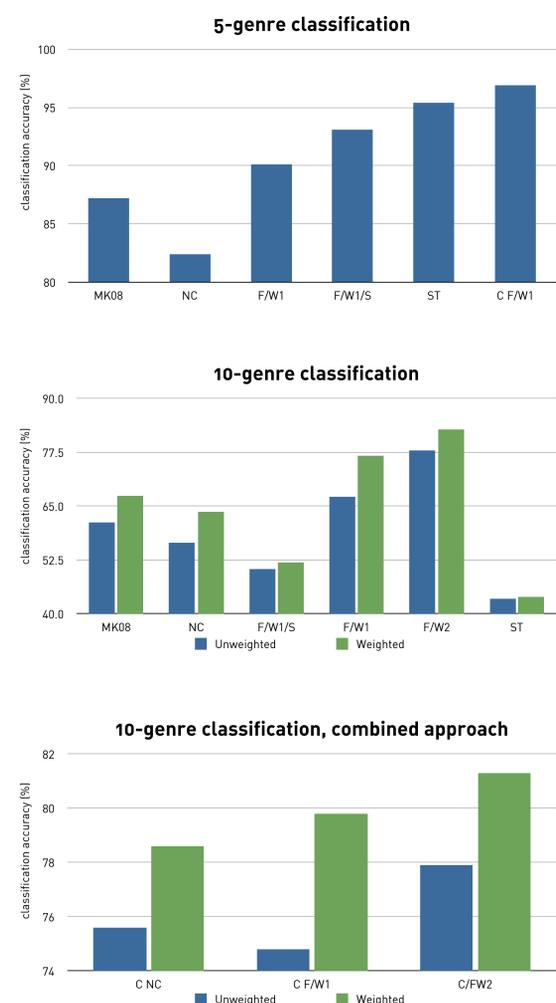
In order to evaluate the effect of different web search feature extraction configurations we tested:

- Various required words filters and excluded word filters
- The use of genre and artist name synonyms (e.g. treating "Charlie Mingus" as "Charles Mingus" as equivalent)
- Various site weighting schemes

configurations

MK08	Previous experiments using only jWebMiner 1.0
NC	No constraints involving weighing, required filter words nor excluded filter words
F/W1	Required word filters and first weighting scheme: 1/6 for wikipedia.org, allmusic.com, and amazon.com; the WWW weighted by 1/2
F/W1/S	Same settings as F/W1, plus a set of synonyms for the genres and artist names
ST	Classification results when using only social tags
C NC	Combined and averaged results using web search with no constraints, as well as social tags
C F/W1	Combined and averaged results using social tags and web search in F/W1 configuration
C F/W2	Combined and averaged results of social tags and web search using required word filters, and a second weighting scheme: 1/3 for wikipedia.org, allmusic.com, and amazon.com

results



conclusions

Using proper filter words and site weightings we achieved improvements of 5.9% and 16.7% in 5- and 10-genre classification respectively compared to earlier published experiments using the same dataset.

Using Last.fm social tags only we achieved an 8.2% improvement in 5-genre classification relative to search-based classification. However, there was a 17.7% performance decrease on the 10-genre taxonomy. It was found that social tags performer very well for broad genres, but lacked precision for more detailed sub-genre classes.

The best results overall were achieved when both social tags and the web search data were combined. We conclude that the information obtained by each approach can be complementary.

more information

The jWebMiner software, jMIR framework, extensive documentation and related publications are available at <http://jmir.sourceforge.net>