

An intelligent music playlist generator based on the time parameter with artificial neural networks

Ning-Han Liu, Shu-Ju Hsieh, Cheng-Fa Tsai

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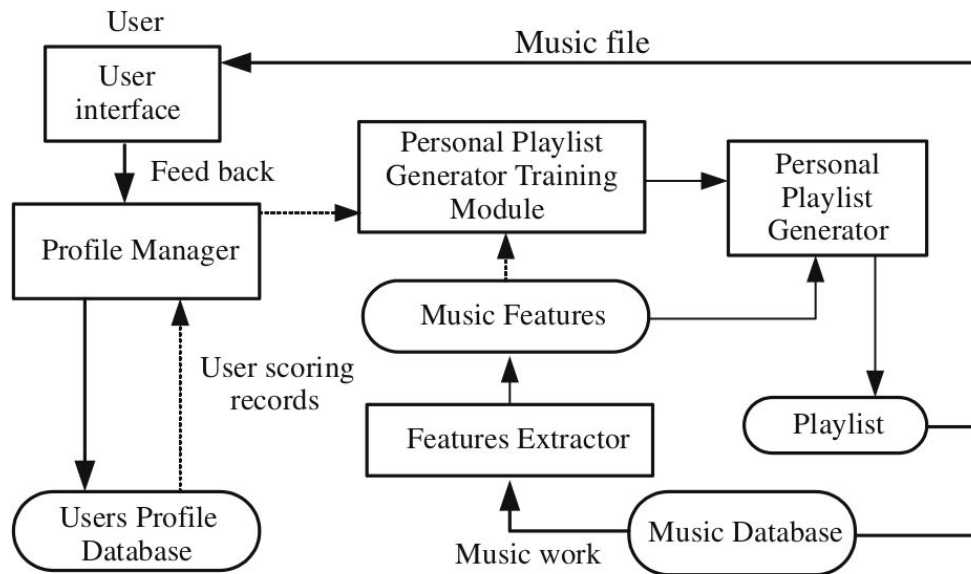
Santiago Bernal
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Synthesis

- **Problem:** Music playlist generators base the decisions on user preferences but not on time of day which may affect the music the user wants to listen.
- **Data sources:** Manually populated musical database with different genres (hip hop, rock, blues, jazz, pop)
- **Goals:** Generate a musical playlist based on user preference during a time of day
- **Scope:** Use characteristics of music's symbolic and wave data, the timestamp when its played and user ratings as features to generate scores that match a users preferences. Use collaborative methods to help with initialization of a new user.

Architecture





Methods

- **Feature extraction using symbolic (MIDI) form:** Calculating Average Pitch, Pitch Entropy, Pitch Density, Average Duration, Duration Entropy, Pitch Interval Entropy
- **Feature extraction using vocal wave form (MP3):** uses formants (frequencies) and Mel-scale frequency cepstral coefficients (MFCC), the data had to be manually segmented to distinguish vocal parts. To reduce complexity two strategies were compared: statistics (avg and stdev) is performed to reduce the dimensions or clustering using k-means
- **Classification:** Artificial Neural Networks (FFNN with 2 hidden layers) based on short term and long term behaviours, to reduce training times. Uses the users score or rating and the timestamp to generate predictions
- **Cold start:** Collaborative method based on different users similarity to avoid a cold start problem with new users. Where users with the same characteristics may share similar tastes

Evaluation

- **Experimental environment:** 300 Music files stored in a database, and two groups of users: one that knows about the experiment so that the suitable parameters can be determined for the wave data. The second to test the performance.
- **Evaluation:** Users score the resulting songs generated with the playlist and the overall performance is measured as:

$$Quality = \frac{N_A}{N}$$

