
IASONAS ANTONOPOULOS

INSTITUTION: NATIONAL & KAPODISTRIAN UNIVERSITY OF ATHENS, GREECE
DEPARTMENT: INFORMATICS & TELECOMMUNICATIONS
DIVISION: TELECOMMUNICATIONS & SIGNAL PROCESSING
SUPERVISOR: PROFESSOR SERGIOS THEODORIDIS
SUBJECT: SUMMARY OF RESEARCH PROPOSAL

CONTENT BASED RETRIEVAL IN THE CONTEXT OF GREEK TRADITIONAL MUSIC

Problem Statement

The continuous growth of music traffic and distribution over the internet has clearly pointed out the need for an improved method of storing and retrieving information concerning the music content. The existed methodologies are based upon meta-data that mostly address general information about the song(s). This presupposes an efficient knowledge regarding the artist, song name, music genre, etc. In addition, this kind of music representation has been proven poor for certain musicological and retrieval applications (web-based or not).

It is obvious that lack of some information may cause the failure or the misplacement of a quest. This lack of information is more obvious in older music genres that have not been or are at the moment digitized, like the greek traditional music. So, it is important to develop and extract powerful meta-data for representing audio, in order to provide an unconstrained and efficient music information retrieval system. Previous work has indicated that the content-based retrieval is a very promising research area, manifesting the need for a further continuation. Two of the main topics that will be addressed are audio parameterization and the applications of content-based retrieval.

Methodology

Audio parameterization- Feature Extraction: The audio parameterization of raw polyphonic audio is of prime interest and it is the cornerstone of the subsequent processing. Spectral and timbral features (Spectral Centroid, Flux, Mel-Cepstrum Coefficients, Chroma, etc), potentials as well as their combinations, must be tested in an effort to represent music and reveal or discard certain characteristics of the music content.

Content – Based Retrieval & Applications: Emphasis will be given on methods for extracting information from the parameterized audio content itself, and not on the metadata that accompany the audio content. Music genre classification, music analysis as the beat and meter, audio segmentation, melody spotting, spectral similarities, as well as advanced queries are some of the applications that will be considered. Directions to approach the above include DTW, HMM's and statistical classifiers like SVM, etc.

Literature

- [1]. George Tzanetakis, Perry Cook, "Musical Genre Classification of Audio Signals", IEEE Transactions on Speech and Audio Processing, vol.10, no.5m July 2002
- [2]. A. Pikrakis, S. Theodoridis, D. Kamarotos, "Recognition of Isolated Musical Patterns using Context Dependent Dynamic Time Warping", IEEE Trans. on Speech and Audio Processing, Vol. 11, pp. 175-184, 2003.
- [3]. Agif Ghias, Jonathan Logan, Brian C. Smith, "Query by Humming - Musical Information Retrieval In Audio Database", ACM Multimedia 95 - Electronic Proceedings
- [4]. Feng Yahzong, Zhuang Yueting, Pan Yunhe, "Query Similar Music by Correlation Degree", Advances in Multimedia Information Processing - PCM 2001 : Second IEEE Pacific Rim Conference on Multimedia
- [5]. Alexandra Uitdenbogerd, Justin Zobel, "Melodic matching techniques for large music databases", International Multimedia Conference Proceedings of the seventh ACM international conference on Multimedia (Part 1)
- [6]. Yuen-Hsien Tseng, "Content-based retrieval for music collections", Proceedings of the 22nd annual international ACM SIGIR conference on Research and development in information retrieval
- [7]. Jyh-Shing Roger Jang, Hong-Ru Lee, Chia-Hui Yeh, "Query by Tapping: A New Paradigm for Content-Based Music Retrieval from Acoustic Input", Advances in Multimedia Information Processing - PCM 2001 : Second IEEE Pacific Rim Conference on Multimedia
- [8]. J. Foote and M. Cooper "Visualizing Musical Structure and Rhythm via Self-Similarity", Proc. International Conference on Computer Music, Habana, Cuba, September 2001.
- [9]. Jonathan Foote, Matt Cooper, and Unjung Nam, "Audio Retrieval by Rhythmic Similarity," in *Proc. Third International Symposium on Musical Information Retrieval (ISMIR)*, pp. 265-266, September 2002, Paris.