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Symbolic Melodic Music Similarity

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Abstract. With an increasing need to classify musical data in terms of their content the question of similarity between musical objects becomes a challange. While there is not a single similarity function to answer all different needs , various approaches have been introduced to the field in recent decades. In our paper , we introduce the approaches which mainly focus on symbolic data , that is , a representation of the content based on an alphabet of symbols and syntax.

1 Introduction

Similarity measures lie at the heart of Information Retrieval. This is also for Music Similarity the case. For a subscriber of a music streaming application like Spotify , Last.fm etc. to recommend latest albums or a musicologist to find related documents in a database , similarity measures are crucial. In comparison to its counterpart Audio Music Similarity , Symbolic Music Similarity algorithms use symbols that represent the data , where in Audio Music Similarity one has pitch-time related values. Within Symbolic Music Similarity we find algorithms that deal with harmony and those that deal with melody. What differs harmony from melody is that by harmony we see chords , that is multiple notes played at a discrete time t that together form a unity.

Representation of music dates back to as early as 2000 BC [1]. Representing music over an alphabet consists in describing the pitch and the rhythm. Since we are mainly concerned with Western music , we can restrict ourselves to 12 tones of an octave , other cultures however may use more or less notes. In Middle Eastern countries ,for instance , we see that there are 9 tones between two notes of an whole tone interval.

In further sections we will introduce some algorithms which implement basic text-similarity related operations to conclude similarity between melodies. That being said , we will also introduce algorithms , that treat musical data different than text-similarity algorithms would treat strings. The MelodyShape Algorithm of J. Urbano [2] and its variations give the best results in MIREX's annual competitions ,an EXchange group for Music Information Retrieval , between years 201 Urbano's MelodyShape forms a spline for the query melody and compares it with other splines to determine similarity between pieces. We will conclude from this , that the field evolved in recent years in such a way that the text-based approaches are less promising for the future of the field.

Other than MelodyShape and its variations we will also present a graph-based approach [4] , which incorporates routines to generalize the melody, that

heavily depend on Music Theory , a geometrical approach which use polygonal chains that are built by projecting the melody onto a plain of pitch and duration.

In our paper we will follow the classification used by Velardo et al. [3]. According to Velardo et al. a melodic music similarity algorithm belongs to either of the four classes (1) Music Theory , (2) Cognition , (3) Mathematics , (4) Hybrid. Hybrid algorithms are usually formed by taking a linear combination of different similarity measures.

Our main emphases are that the field suffers from the subjectivity of music similarity and that one single algorithms fails to answer all needs , which is especially the case when algorithms are tested only against a narrow range of data. In order to reduce these drawbacks we will show how MIREX , an EXchange group for Music Information Retrieval , took statistical approaches to form a Ground Truth for the data , that were collected from experts' evaluations.

2 Algorithms

3 MIREX

MIREX is an E

4 Evaluation

Sth Not so boring tho.

5 Conclusion

References

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