Chapter 4.53
Musical Metadata and Knowledge Management

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INTRODUCTION

Is music a form of knowledge? Probably not, even if music is undoubtedly an important part of our cultural heritage. Music is not a type of knowledge, at least in first approximation, because music has no consensual, shared meaning. One of the main reasons why music has no meaning, as opposed to text or even pictures, is that music is not referential: music is made of elements (notes, chords, sounds) which do not refer to any objects or concepts outside the musical world (Meyer, 1956). Being without meaning, music is not a type of knowledge.

However, our heavily digitized society continuously produces and exploits an increasing amount of knowledge about music. This knowledge, also called metadata, has taken a growing importance in the music industry and deserves a special treatment in this encyclopedia because

of the specificities of music. On one hand, music is ubiquitous and pervasive: there are about 10 million music titles produced by the major music labels in the Western world. Adding the music produced in the non-Western world probably doubles this figure. The music industry is one of the prevalent industries in the Western world today. On the other hand, music is elusive, in that it is difficult to define exactly what music is (for instance, distinguishing music from ambient sounds is not always trivial). To make all this music easily accessible to listeners, it is important to describe music in ways that machines can understand. Music knowledge management is precisely about this issue: (1) building meaningful descriptions of music that are easy to maintain, and (2) exploiting these descriptions to build efficient music access systems that help users find music in large music collections.

BACKGROUND

The issue of building music description is the subject matter of the audio part of the Mpeg-7 standard (Nack & Lindsay, 1999). Mpeg-7 focuses only on the notion of metadata, as opposed to its predecessors (Mpeg-1, 2, and 4), and proposes schemes to represent arbitrary symbolic and numeric information about multimedia objects, such as music or movies. However, Mpeg-7 deals only with the syntax of these descriptions, and not with the way these descriptions are to be produced. Here is, for instance, an extract of an Mpeg-7 description of the music title "Blowin' in the Wind" by Bob Dylan. This extract declares the name of the artist, the name of the song, and its genre (here, "Folk," according to a genre classification indicated in the extract itself).

The first step toward music knowledge management is probably music identification. Robust audio fingerprinting techniques have been developed recently to identify music titles from the analysis of possibly distorted sources, such as radio broadcasts, or direct recordings from cell phone microphones (Cano, Batlle, Kalker, & Haitsma, 2002). Audio fingerprinting is not a knowledge management technique per se, but is a prerequisite to build music collections. This technique has received considerable attention in the last few years, and today very robust solutions have been designed and implemented in real-world systems, such as the MoodLogic Music Browser.

To give a concrete idea of typical music descriptions used in musical knowledge management systems, let us give here three examples and their related use.

Figure 1. An Mpeg-7 extract for describing information about a music title

```
<?xml version="1.0" encoding="UTF-8"?>
<Mpeg7
  xmlns="urn:mpeg:mpeg7:schema:2001"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xmlns:mpeg7="urn:mpeg:mpeg7:schema:2001"
  xsi:schemaLocation="urn:mpeg:mpeg7:schema:2001 mpeg7-smp-2004.xsd">
  <Description xsi:type="CreationDescriptionType">
    <!-- ID3 Track number -->
    <CreationInformation id="track-01">
      <Creation>
        <!-- ID3 Song Title -->
        <Title type="songTitle">Blowin' in the wind</Title>
        <!-- ID3 Album Title -->
        <Title type="albumTitle">The Freewheelin'</Title>
        <!-- ID3 Artist -->
        <Creator>
          <Role href="urn:mpeg:mpeg7:RoleCS:2001:PERFORMER"/>
          <Agent xsi:type="PersonType">
            <Name>
              <FamilyName>Dylan</FamilyName>
              <GivenName>Bob</GivenName>
            </Name>
          </Agent>
        </Creator>
      <!-- ID3 Genre  -->
      <Classification>
        <Genre href=" urn:id3:cs:ID3genreCS:v1:80"><Name>Folk</Name></Genre>
      </Classification>
    </CreationInformation>
  </Description>
</Mpeg7>
```

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