Music-to-Knowledge (M2K): A Prototyping and Evaluation Environment for Music Digital Library Research

J. Stephen Downie  
Graduate School of Library and Information Science  
University of Illinois at Urbana-Champaign  
jdownie@uiuc.edu

Andreas F. Ehmann  
Department of Electrical and Computer Engineering  
University of Illinois at Urbana-Champaign  
aehmann@uiuc.edu

Xiao Hu  
Graduate School of Library and Information Science  
University of Illinois at Urbana-Champaign  
xiaohu@uiuc.edu

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1. INTRODUCTION

This demonstration introduces the M2K (Music-to-Knowledge) music digital library (MDL) and music information retrieval (MIR) prototyping and evaluation environment to the digital library research community. M2K is being developed as part of the International Music Information Retrieval Systems Evaluation Laboratory project (IMIRSEL). The goal of the IMIRSEL project is the creation of standardized tools and datasets for the scientific evaluation of MDL and MIR systems. M2K plays a central role in the upcoming Music Information Retrieval Evaluation eXchange (MIREX) contest being held over the spring and summer of 2005. MIREX participants will be using M2K to prototype and then submit for formal evaluation their novel approaches to such MDL tasks as artist identification, genre classification, etc. The MIREX participants will be meeting in September, 2005 at the 6th International Conference on Music Information Retrieval (ISMIR 2005) in London, UK to compare and contrast the success and failures of their techniques. MIREX information is available at: http://www.music-ir.org/mirexwiki.

2. M2K FEATURES

The computational backbone of M2K is the Data-to-Knowledge (D2K) machine learning and data mining environment developed by the Automated Learning Group (ALG) of the National Center for Supercomputing Applications (NCSA) at the University of Illinois at Urbana-Champaign (UIUC). The D2K framework is one where developers “wire” together computational modules into programs called itineraries which represent dataflow between modules. These itineraries can then be run, or nested within other itineraries and used as modules, allowing for the development of itineraries with arbitrary complexity.

The IMIRSEL team decided to base M2K on D2K because the D2K framework:

1. provides a visual, modular programming environment shown to cut development time (see Fig. 1);
2. supports distributed computing across multiple processors;
3. simplifies code reuse and sharing;
4. is written in Java for maximum portability; and,
5. comes prepackaged with a comprehensive set of machine learning/data mining modules including most of those used by MDL researchers such as neural nets, Bayesian classifiers, decision trees, support vector machines, etc.

Figure 1. An M2K real-time spectral analyzer itinerary built for the exploration of audio music files prior to classification (put together in less than five minutes!).

M2K is being released as an open source distribution to encourage the development of MDL-specific modules. Information about M2K is available at http://music-ir.org/evaluation/m2k. Information about D2K (needed to run M2K modules and itineraries) is available at http://alg.ncsa.uiuc.edu/do/downloads.

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