MININGSUITE: A COMPREHENSIVE MATLAB FRAMEWORK FOR SIGNAL, AUDIO AND MUSIC ANALYSIS, ARTICULATING AUDIO AND SYMBOLIC APPROACHES

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ABSTRACT

The MiningSuite is a free open-source and comprehensive Matlab framework for the analysis of signals, audio recordings, music recordings, music scores, other signals such as motion capture data, etc., under a common modular framework. It adds a syntactic layer on top of Matlab, so that advanced operations can be specified using a simple and adaptive syntax. This makes the Matlab environment very easy to use for beginners, and in the same time allows power users to design complex workflows in a modular and concise way through a simple assemblage of operators featuring a large set of options. The MiningSuite is an extension of MIRtoolbox, a Matlab toolbox that has become a reference tool in MIR.

1. DESCRIPTION

The MiningSuite is an open source Matlab toolbox composed of a large set of modules corresponding to the different possible types of signal processing representations and audio and music descriptors. These modules are structured into packages related to the different domains of study: signal processing (SigMinr package), auditory modelling (AudMinr), music analysis (MusMinr), video analysis (VidMinr), physics and motion analysis (PhyMinr), sequence processing (SeqMinr) and pattern mining (PatMinr).

Thanks to an innovative syntactic layer, both powerful and user-friendly, designed on top of Matlab, these modules can be easily applied to particular files or batch of files, and the numerous options available for each module can be modified. Modules can be connected and form data flow graphs. As such, complex design of set of audio or music analysis operations can be written in a very concise way through a simple assemblage of operators featuring a large set of options. The MiningSuite is an extension of MIRtoolbox, a Matlab toolbox that has become a reference tool in MIR.

The integration of expertise developed in separate areas of study into common modules encourages further reuse of these individual methods and their intermingling into a common framework.

The MiningSuite is the official continuation of MIRtoolbox [1]. The architecture of the toolbox is much simpler, allowing faster computation and more transparent and clear code. Series of operations can be designed more efficiently and easily. Any signal can be imported and represented as an object of classes available in the MiningSuite. Each result also stores the complete description of the list of operations with all the specified options and parameters. Matrices imported into, used in, and exported from the MiningSuite have their internal structure clarified: the role of each dimension is made explicit using a systematic formalism.

Acknowledgments

This work was partially supported by the Research Council of Norway through its Centres of Excellence scheme, project number 262762. This work was also partially supported by a research fellowship granted by the Academy of Finland during the years 2009–2014.

2. REFERENCES