A Format for Modelling and Managing Integrated Musical Objects

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Abstract. An added value of digital distribution of music and thus of Internet is the possibility of exploiting new functionalities related to the interactivity. To this end, WEDELMUSIC format and model for the storage and manipulation of interactive musical objects have been defined. WEDELMUSIC format is an XML model of music supported by tools for storing, searching, distributing and manipulating musical objects and related components.

1 Introduction

NAPSTER has transformed the distribution of audio files. On the other hand, Digital Music is also music scores, music related documents, music cataloguing management, lyric, music videos, etc. Presently the Internet diffusion of music scores/sheets is a small part of the activity related to digital music. For example, MusicSales and Net4Music distribute images of music sheets that cannot be manipulated by the end users. The acquisition of music sheets by image scanning is the first step to enter in the Internet market and at the same time to save/valorise the cultural heritage. In many cases, the paper-based archives of institutions, conservatories, foundations, and of big publishers contain historical music that risks to be destroyed by the time. This huge amount of cultural heritage should be saved in digital and valorised in digital archives visible on Internet and usable.

2 WEDEL Music Solution

Theatres, orchestras, music schools, music distributors, recording studios, blind people, and libraries needs interactive music; that is, music that can be manipulated: arranged, transposed, modified, reformatted, searched on the context, printed on Braille, etc. These are real needs for preparing performances, studying music, analysing music, learning instruments, etc. This is not possible since music scores are only distributed as music sheets. In order to be manipulated the music has to be in some specific symbolic format. Presently, a large number of symbolic formats for modelling music notation is available. Most of these formats and music notation editors were realised for printing music (e.g., Score, Finale, Sibelius, etc.). The main

obstacles of these formats to be used in the new emerging applications and for saving cultural heritage reside in their model of music: the net distinction from main score and parts, the lack of modelling relationships among music notation symbols, the lack of integration of the several aspects of music related aspects, the lack of a support for protecting music, etc. Some early solutions were proposed as interchanging and Internet formats (SMDL, NIFF, XMLmusic, etc.). As demonstrated by CANTATE and MOODS research projects of the EC ESPRIT IV these formats are unsuitable for supporting the applications of the Internet era.

The real added value of new music archives for music distribution via Internet is the possibility of providing music for exploiting new functionalities with a particular attention to the aspects related to the interactivity. A symbolic description of music sheets allows manipulating music in several manners: transposition for different instruments, content search, formatting, piano reduction, rearrangement of music, etc. in the respect of the owner rights.

In order to cope with the above mentioned problems the WEDELMUSIC (WEB Delivering of Music Scores) project and solutions have been developed (www.wedelmusic.org). WEDELMUSIC has been defined to allow publishers and consumers (theatres, orchestras, music schools, libraries, music shops, musicians) to manage interactive music. WEDELMUSIC is an IST project with partners: DSI, University of Florence, ARTEC, Casa Ricordi, FNB, Scuola di Musica di Fiesole, IRCAM, FHG-IGD, ILSP, CESVIT, Edizioni Suvini Zerboni.

WEDELMUSIC solution proposes techniques for storing, retrieval and distributing multimedia musical objects. WEDELMUSIC objects present an integration of XML format including symbolic notation, images of music sheets, audio files, etc., and a set of protection mechanisms. Each WEDEL object [1] presents several components covering different aspects of a music piece such as identification, classification, protection, printing documents, lyrics, videos, images and audio. WEDEL format is XML compliant. These are strongly related to:

- **Symbolic Music** section describes the scoring information, musical notation symbols, and their relationships.
- **Image of Music Sheets** section allows to integrate images of music scores into the music object. This allows building musical objects to compare original music score with revised and currently used symbolic versions, valorisation of antique music archives.

In each WEDEL object, several relationships among its components can be established. These allow the definition and exploitation of new functionalities (see Fig.1). For example, it is possible to: pass from a music notation symbol to a document, video, image, audio file; listen real audio performance synchronously with the visualisation of images of the music score or the symbolic music notation; modify music notation symbols: formatting, arranging, fingering, adding/deleting notes, transposition, editing multilingual lyric, managing versioning, etc., in the respect of copyrights; print music score or other components; analyse music score, comparing and searching into the database, performing a piano reduction; extract excerpts of the music score, audio, and images of the music score; execute music notation generating MIDI file or audio; edit music for visually impaired people, print music in Braille, get a verbal description of music score; acquire music from other formats FINALE, SCORE, MIDI; searching music into the database on the basis of content (music

melody, lyric, documents, etc.), searching music components and objects on the basis of classification and identification aspects.

Most of the above listed features are innovative and only possible on WEDELMUSIC model. Others classical features have to be considered innovative since in WEDELMUSIC they are allowed in respect of the owner rights. In general, the availability of these functionalities have constrained to design a sophisticated set of tools to protect WEDEL objects and at the same time to permit and control the exploitation of the new functionalities.
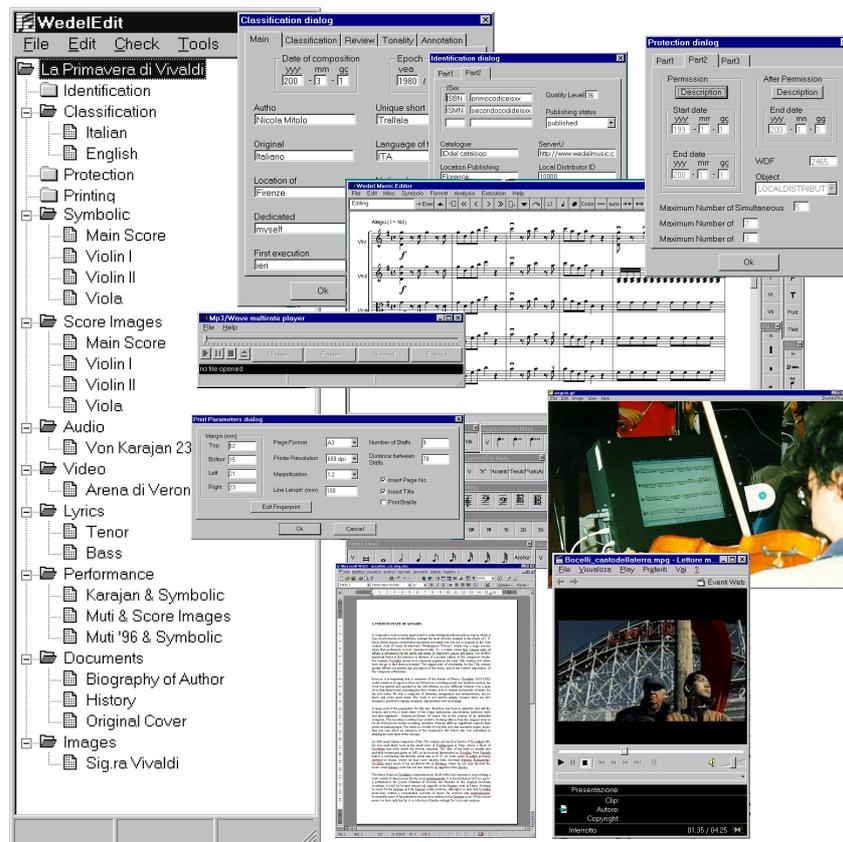

Fig. 1. For the navigation in the WEDEL Music objects, a specific user interface has been implemented.

References

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