

1. Content index

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2. Document object

This document will show a prototype of the applications that will be developed by the UPF for the OpenDrama project.

3. Information on the web

Updated information of this development can be seen at UPF's OpenDrama web: <http://www.iua.upf.es/mtg/opendrama>. There're a Java Applet version of the mock-ups (with *tooltips* to help in understanding the functionality).

4. General view of the applications

UPF will develop two applications: OperaTutor and MDTools:

The **OperaTutor** application takes the idea of the "karaoke", but will focus in singers' formation rather than in entertainment purposes due to the Opera context of the project. So we'll suppose that the user will have some knowledge in the singing discipline, and this application will give some tools to analyse his performance and improve his technique.

OperaTutor is enclosed in the WP5.1 and WP6.1.

The **MDTools** (Multimedia Description Tools) application will provide a visual environment to integrate multimedia information (audio & video files, etc.) and its metadata following an

MPEG-7 compliant structure. It will be possible to generate MPEG-7 XML files as an interchange format with other applications, databases (for our case in the object area), etc.

MDTools is enclosed in the WP3.1 (Digital Object Storage).

About the mock-ups

All the functionalities we show in this document are the desirable targets for the project, we've tried to be exhaustive with the goals in the mock-ups. Nevertheless, there're some points that may be not reachable (as, for example, the *timbral morphing* or the *automatic segmentation*) due to their complexity.

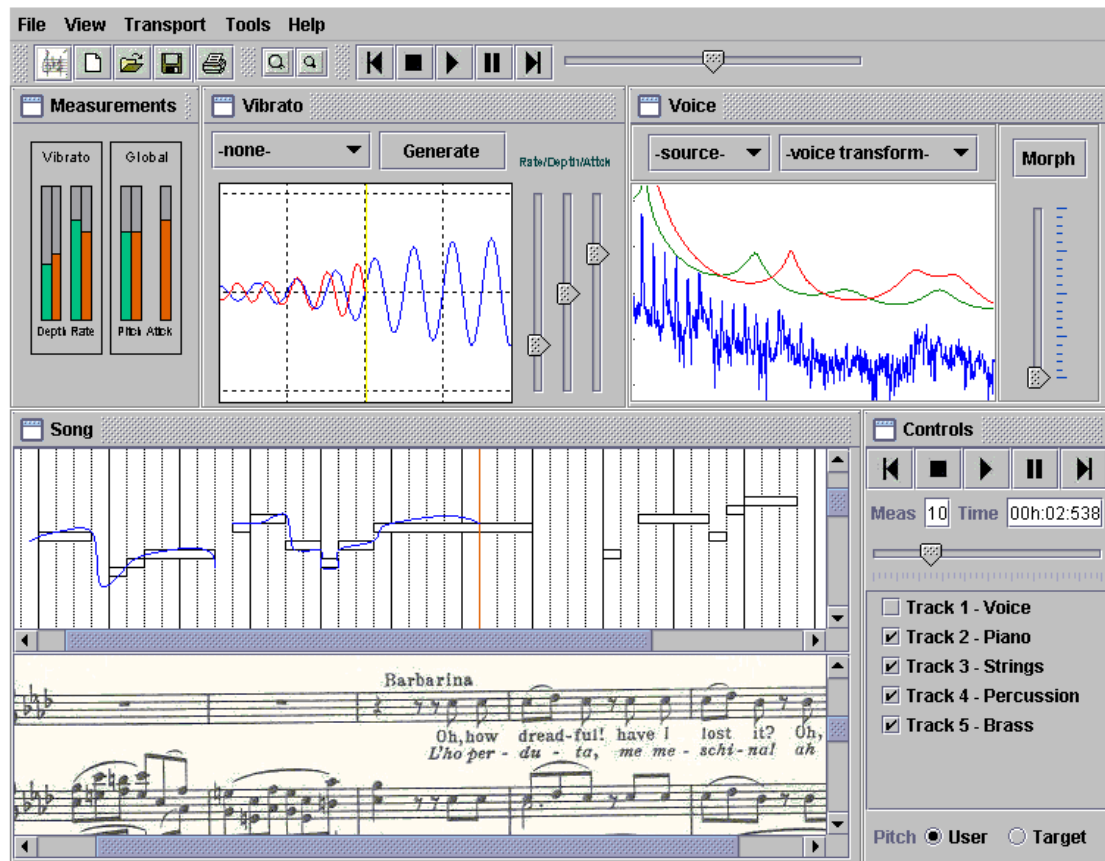
The applet version that can be seen in the web is only for prototyping purposes, we think that the final application will be developed in C++ using CLAM¹ object technology from UPF.

5. OperaTutor

As commented before, OperaTutor application will focus on the formation of singers. The basic idea is a "karaoke" in the Opera context, letting the user do some analysis of vibrato, pitch and spectral envelope (formants). A comparison with a pre-analysed professional singer reference (target) will be available in order to help the singer.

Some kind of transformations and effects will be possible to do with pitch, vibrato and spectral envelope.

¹ C++ Library for Audio and Music



Features:

?? Visualization:

- o Score: synchronised with audio (collaboration with Glasgow University).
- o Piano-roll display of the score or the professional singer reference and the user pitch being performed.

?? Controls:

- o Transport.
- o Tracks: can be muted.

?? Pitch control: target pitch can be used to correct the user's performance.

?? Measurements: a set of measurements of the user performance will be available (pitch, power, etc.).

?? Vibrato section:

- o Visualization of the vibrato in real-time (detailed pitch waveform and parameter extraction as rate, depth, ...).
- o Addition of vibrato to user performance with the target reference or a synthetic generated waveform.

?? Voice section:

- o Analysis and visualization of spectral shape of the user and target.
- o Source: possibility of removing the excitation signal of the user and substitute it by a template one (Bass, Baritone, Tenor, Contralto, Mezzo, Soprano). That

can remove some noisy components of the user and let him do a cleaner performance.

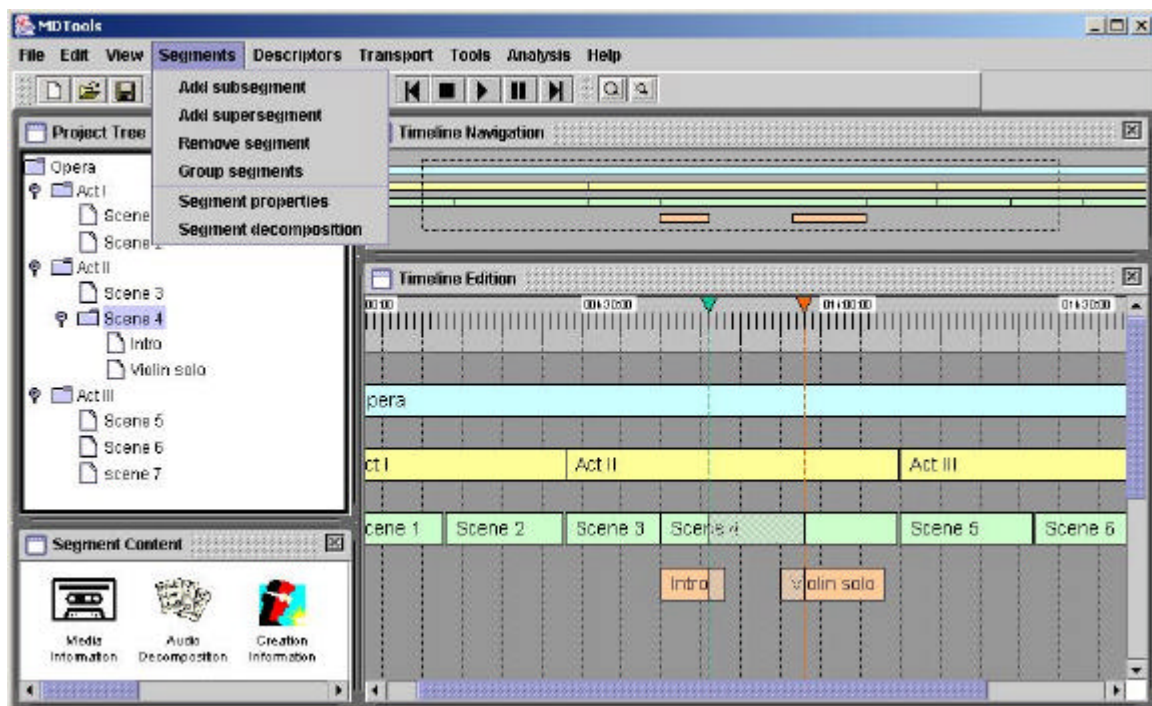
- o Voice transformations: some kind of effects will be possible as enhancing the singers' formant.
 - o Morph: a timbral morph between user and target's timbre.
- ?? Performance registration: the user performance can be stored for an analysis or evaluation, or to be used as reference for other singers.

6. MDTools (Multimedia Description Tools)

The MDTools application will let us to generate MPEG-7 XML files with multimedia information and its associated metadata. The main tools that will integrate are:

- ?? Timeline/segment edition.
- ?? Classifications.
- ?? Audio analysis and segmentation.

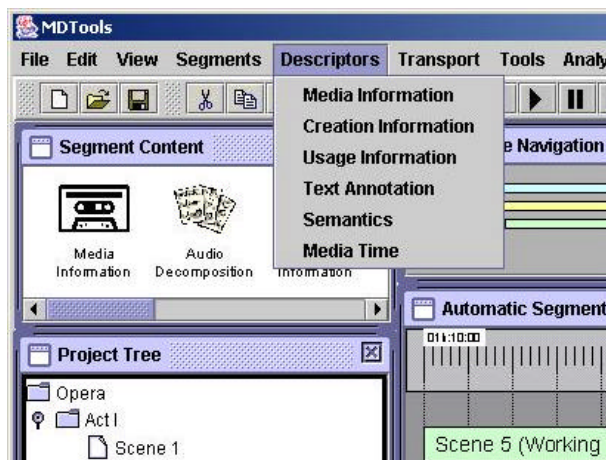
Timeline/segment edition



In that edition mode, segments of multimedia content can be edited, synchronised and re-segmented by hand if needed. We can associate media information to the segments (audio, video, score files, etc.), create links between them, and add MPEG-7 metadata (descriptors, semantics, etc.).

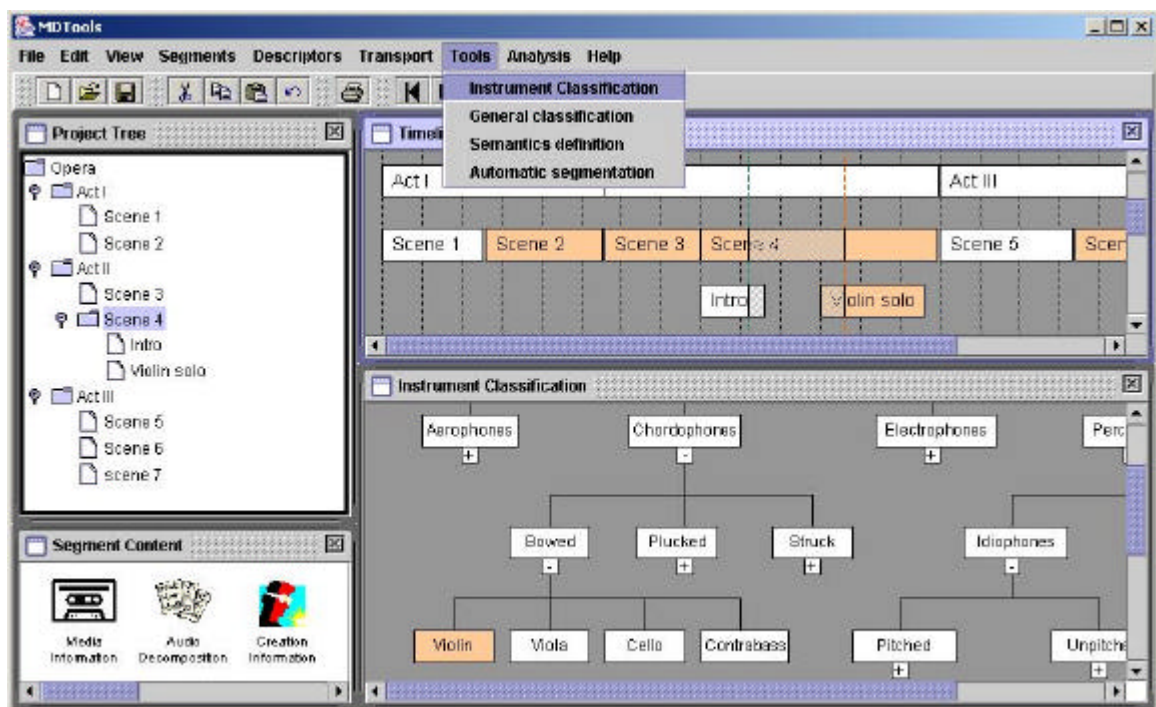
All that metadata can be used to search & retrieval purposes.

MPEG-7 Descriptors



MPEG-7 descriptors (Ds) and descriptor schemes (DSs) will be used to hold the metadata of the content.

Classifications

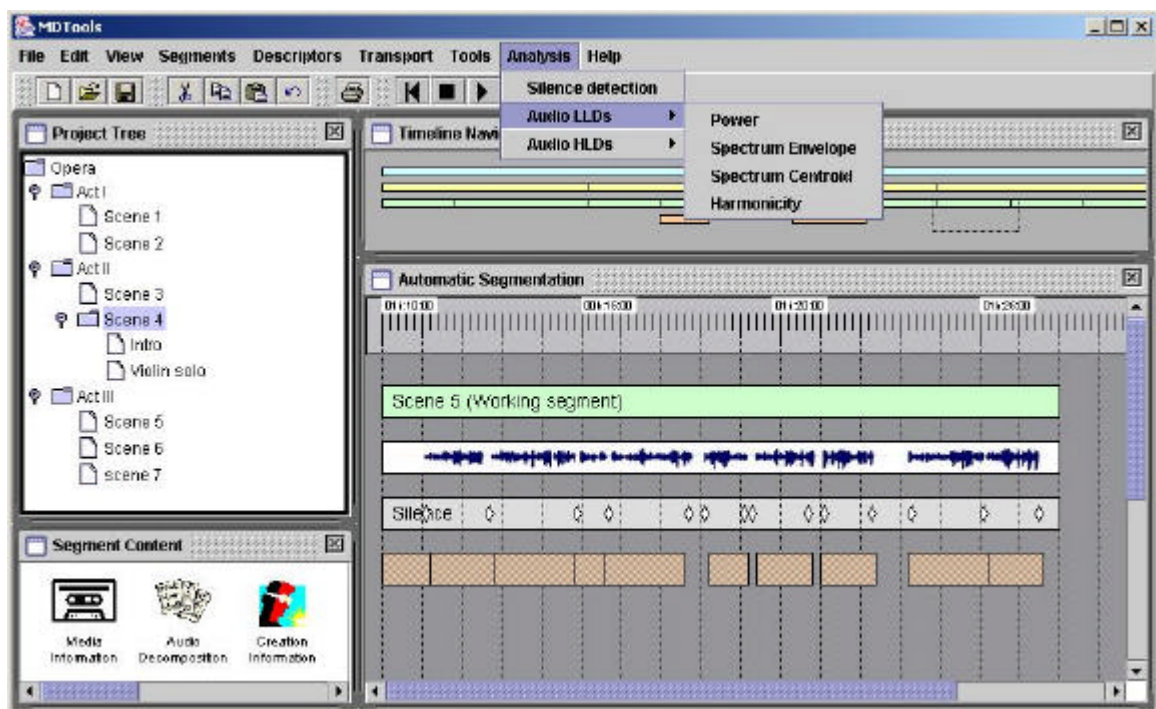


That will be a hierarchical view to create taxonomies. We can link that with the information in the segments. That can be used, for instance, to search the segments that have violins playing.

Audio analysis and segmentation

A set of tools will be added to make audio analysis of MPEG-7 Audio LLDs² and HLDs³. Interesting uses of that tools are automatic segmentation of the content, melody recognition or sound classification.

Some of these tools will be useful to generate the analysis needed for the OperaTutor application and also for audio-score synchronization.



² Low Level Descriptors

³ High Level Descriptors