MELOVIZZ: A WEB-BASED TOOL FOR SCORE-INFORMED MELODY EXTRACTION VISUALIZATION

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ABSTRACT

We present in this paper a web-based tool for the visualization of melodic information, with a focus on symphonic music recordings. Melody and instrumentation have been found to be specially relevant to create a 'simplified musical score' for people with limited musical knowledge, and can be automatically estimated from audio and score information. Two melody extraction methods are considered: the first is based on audio analysis, and the second additionally incorporates score information. The estimated sequence of pitches is visualised in a piano-roll canvas, together with the instrument/s playing the melody.

1. INTRODUCTION

In the context of the PHENICX [1] project [6], we have identified the need of providing listeners (specially those without music knowledge) with a visualisation of a simplified musical score, displaying the melody (or melodic lines), as well as instrument information.

Melody has been defined in the Music Information Retrieval community as *the single (monophonic) pitch sequence that a listener might reproduce if asked to whistle or hum a piece of polyphonic music, and that a listener would recognize as being the 'essence' of that music when heard in comparison* [9]. Automatic melody extraction has mainly focused on the identification of the pitch of the single instrument which is playing the melody. However, in symphonic music the melody is usually played by instrument sections, often alternating, sometimes harmonised, and commonly not energetically predominant. This poses many challenges to current algorithms, whose accuracy is generally much lower when dealing with such data. [3]. One advantage of symphonic music is that musical scores are commonly available in a digital form. Assuming they can be aligned to the audio either manually or automatically [8], it is possible to use this additional information to identify the melody and the instrument/s (sections) playing it with more accuracy. In this paper we present *melovizz* [2] a prototype dealing with the visualisation of estimated melody pitches and instrument/s playing the melody.

[1] http://phenicx.upf.edu/

2. MELODY EXTRACTION

The proposed tool visualises the results obtained with two melody extraction approaches. The first one has been submitted to MIREX 2015 [1], and is based on a source-filter model [4, 5], combined with a method based on pitch contour characteristics [10]. The second one takes advantage of the aligned music score to guide the melody estimation. Both methods are still under research. The probability that each of the instruments is playing the melody (P_i) is automatically estimated using audio and score information, although automatic estimation from audio [2] will be considered in the future.

3. VISUALISATION STRATEGY

The proposed visualization tool allows playing the analyzed musical piece, and following the estimated melody in a piano-roll canvas (see Figure 1). A scrolling curve shows pitch values (y-axis), while time is represented horizontally (x-axis). A different colour is used for each instrument (or section), allowing the user to easily visualise which instrument is predominant at each time. Additionally, the intensity of each colour is variable, and is mapped to the estimated probability of the instrument (P_i). Another possibility would be to map it to the estimated instrument energy. A vertical line refers to the current playing time, and pitches estimated in a short time window around it are displayed, both in the past and future. Variable size text labels are additionally displayed at the top, showing the instrument/s that contribute to the melody. The name of the instrument considered predominant is displayed in its corresponding colour.

Figure 1 (left) shows estimated melody pitches in the first movement of Beethoven's Eroica. In this example, we observe the vibrato from the flute at current playing time, which is the only instrument contributing to the melody. Figure 1 (right) shows that both clarinet and violin contribute to the estimated melody, but the violin is considered predominant.

[2] http://repovizz.upf.edu/phenicx/melovizz

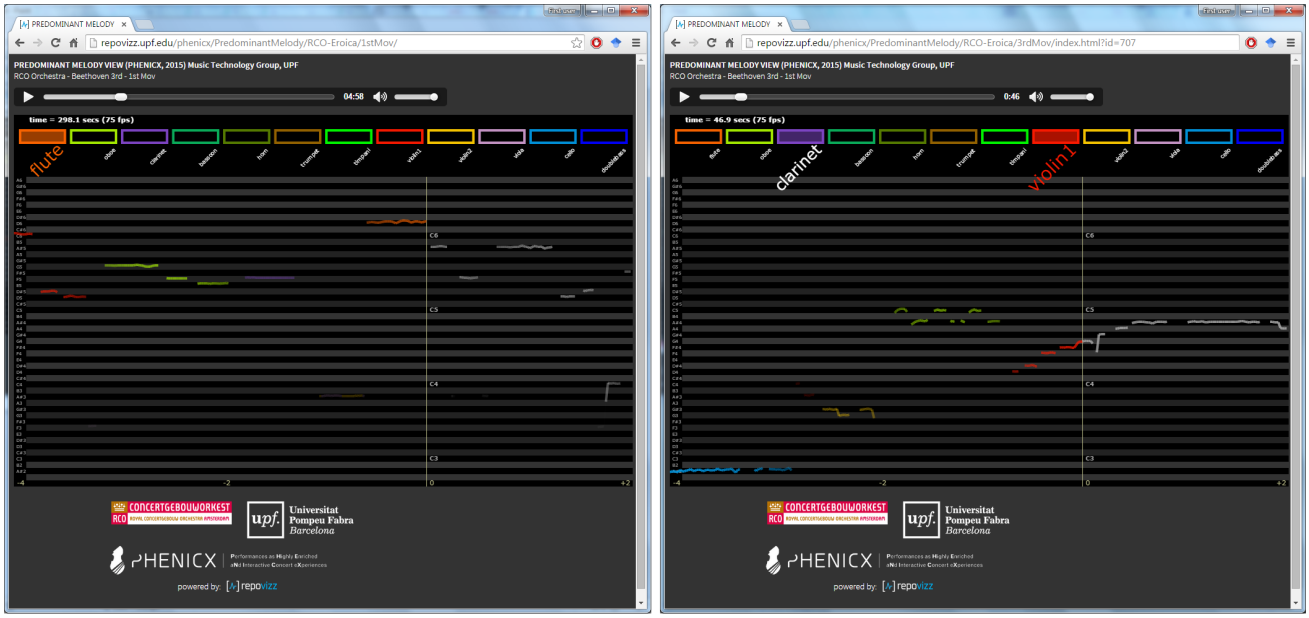

Figure 1. Screenshots of *melovizz*, a web-based tool for melody extraction visualisation. The images correspond to estimations from the first (left) and second (right) movements of Beethoven's 3rd Symphony (Eroica), recorded by the Royal Concertgebouw Orchestra.

The prototype is implemented in HTML5 to be run in any modern browser. It gathers data through AJAX calls from the online repovizz repository [7] using its RESTful API. In order to visualise a given piece, data files with estimated melody pitches and instrument probabilities need to be previously computed, and uploaded into a repovizz datapack.

4. REFERENCES

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