



IDMT Transcription API Documentation

06.01.2016

Fraunhofer IDMT

Hanna Lukashevich, lkh@idmt.fraunhofer.de

Sascha Grollmisch, goh@idmt.fraunhofer.de

Jakob Abeßer, abr@idmt.fraunhofer.de

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1 Introduction

This commandline tool from Fraunhofer IDMT allows to extract

- the main (predominant) melody,
- the bass line,
- the chord progression,
- the key,
- tempo, and
- the beat grid

from audio files.

The analysis results can be exported in different formats like

- XML,
- ABC-Notation,
- MIDI,
- MusicXML, and
- MXL (zipped MusicXML).

2 How-To

2.1 Commandline arguments

This package includes executables for

- Windows 7 (32 / 64 Bit) or higher,
- Mac OS X 10.6 or higher, as well as
- Linux (Fedora 20, 64 Bit or higher).

All **command line options** can be viewed by calling the executable with `-h` and `--help`.

For extracting the **main melody**, call the executable with `-i audio file` (wave or mp3) and `-o output file basename` and `--xml` for writing output only in XML format. This format will be explained in Section 2.2.

Alternative output formats are MIDI and MusicXML. You can generate files in one or multiple of these formats by appending `--xml`, `--midi`, `--abc`, `--mxl`, or `--musicXml` to the commandline call. The output filenames are created by adding `.xml` for xml, `.midi` for midi, `.abc` for abc notation, `.mxl` for zipped MusicXML and `_musicXml.xml` for MusicXML to the *output file basename* specified with `-o`.

Beat grid, **tempo** and **key** information will be always extracted. For getting the **bass line** call the executable with the option `--bass`. For getting the **chord progression** use the argument `--chords`. For getting bass and melody with one call, use both `--melody` and `--bass` as arguments. Both the melody track and the bass track will be added to all output formats.

The argument `--all` extracts everything and outputs it to all supported formats.

Here is an example on how to write the melody, the beat grid, and the key to all supported formats:

```
MusicBricksIDMTTranscriber -i audiofile.wav -o outputFileBaseName --xml --midi --musicXml  
--abc --mxl --melody
```

2.2 XML format

The XML format creates an easy-to-parse document with the following structure:

Listing 1: Example.xml

```

1 <?xml version="1.0" encoding="ISO-8859-1" ?>
2 <!-- key: root note with 0 = C up to 11 = B, mode: mode o f key with 1 = major and
   2 = natural minor -->
3 <song artist="unknown" title="unknown" key="2" mode="2">
4   <!-- all tracks that been transcribed -->
5   <Transcribed_Tracks>
6     <!-- extracted melody -->
7     <Melody flavour="0" instrument="0">
8       <!-- note objects, start (onset) and duration in seconds synced to audio
          , pitch of note in midi and corresponding fundamental frequency value
          in Hz -->
9         <note start="0.447" midi="56" freq="207.652" duration="0.041" />
10        <note start="0.569" midi="65" freq="349.228" duration="0.186" />
11        <note start="0.755" midi="65" freq="349.228" duration="0.07" />
12        <note start="0.824" midi="62" freq="293.665" duration="0.325" />
13        <note start="1.149" midi="62" freq="293.665" duration="0.145" />
14        <note start="1.295" midi="62" freq="293.665" duration="0.099" />
15        <note start="1.48" midi="61" freq="277.183" duration="0.221" />
16        <note start="1.701" midi="62" freq="293.665" duration="0.499" />
17        <note start="2.218" midi="60" freq="261.626" duration="0.348" />
18        <note start="2.937" midi="57" freq="220" duration="0.157" />
19        <note start="3.094" midi="61" freq="277.183" duration="0.023" />
20        <note start="3.332" midi="65" freq="349.228" duration="0.296" />
21        <note start="3.657" midi="62" freq="293.665" duration="0.319" />
22        <note start="4.36" midi="65" freq="349.228" duration="0.093" />
23        <note start="4.452" midi="62" freq="293.665" duration="0.493" />
24        <note start="5.062" midi="60" freq="261.626" duration="0.255" />
25        <note start="5.73" midi="57" freq="220" duration="0.25" />
26        <note start="6.136" midi="60" freq="261.626" duration="0.267" />
27        <note start="6.42" midi="62" freq="293.665" duration="0.192" />
28        <note start="6.658" midi="64" freq="329.628" duration="0.157" />
29      </Melody>
30      <!-- extracted baseline -->
31      <Bass flavour="2" instrument="0">
32        <note start="0.447" midi="38" freq="73.4162" duration="0.354" />
33        <note start="0.801" midi="38" freq="73.4162" duration="0.325" />
34        <note start="1.155" midi="38" freq="73.4162" duration="0.313" />
35        <note start="1.469" midi="38" freq="73.4162" duration="0.714" />
36        <note start="2.2" midi="38" freq="73.4162" duration="0.331" />
37        <note start="2.572" midi="38" freq="73.4162" duration="0.377" />
38        <note start="3.152" midi="29" freq="43.6535" duration="0.099" />
39        <note start="3.274" midi="38" freq="73.4162" duration="0.319" />
40        <note start="3.622" midi="38" freq="73.4162" duration="0.308" />
41        <note start="3.976" midi="38" freq="73.4162" duration="1.004" />
42        <note start="5.033" midi="38" freq="73.4162" duration="0.325" />
43        <note start="5.399" midi="38" freq="73.4162" duration="0.551" />
44        <note start="6.008" midi="24" freq="32.7032" duration="0.081" />
45        <note start="6.107" midi="33" freq="55" duration="0.302" />

```

```

46     <note start="6.449" midi="33" freq="55" duration="0.348" />
47     <note start="6.798" midi="45" freq="110" duration="1.004" />
48     <note start="7.854" midi="33" freq="55" duration="0.279" />
49     <note start="8.214" midi="45" freq="110" duration="0.569" />
50     <note start="8.824" midi="28" freq="41.2034" duration="0.104" />
51     <note start="8.928" midi="33" freq="55" duration="0.273" />
52     <note start="9.265" midi="33" freq="55" duration="0.29" />
53     <note start="9.625" midi="45" freq="110" duration="0.459" />
54   </Bass>
55 </Transcribed_Tracks>
56 <!-- beat grid of song and bpm -->
57 <BeatGrid bpm="170.56">
58   <!-- quarter beats, onset in seconds, 4/4 measure, index is beat index in
        bar -> first beat index = 1, last beat index = 4 -->
59     <beat onset="0.104" numerator="4" denominator="4" index="1" />
60     <beat onset="0.453" numerator="4" denominator="4" index="2" />
61     <beat onset="0.801" numerator="4" denominator="4" index="3" />
62     <beat onset="1.161" numerator="4" denominator="4" index="4" />
63     <beat onset="1.509" numerator="4" denominator="4" index="1" />
64     <beat onset="1.858" numerator="4" denominator="4" index="2" />
65     <beat onset="2.206" numerator="4" denominator="4" index="3" />
66     <beat onset="2.554" numerator="4" denominator="4" index="4" />
67     <beat onset="2.914" numerator="4" denominator="4" index="1" />
68     <beat onset="3.262" numerator="4" denominator="4" index="2" />
69     <beat onset="3.611" numerator="4" denominator="4" index="3" />
70     <beat onset="3.971" numerator="4" denominator="4" index="4" />
71     <beat onset="4.319" numerator="4" denominator="4" index="1" />
72     <beat onset="4.679" numerator="4" denominator="4" index="2" />
73     <beat onset="5.027" numerator="4" denominator="4" index="3" />
74     <beat onset="5.375" numerator="4" denominator="4" index="4" />
75     <beat onset="5.735" numerator="4" denominator="4" index="1" />
76     <beat onset="6.084" numerator="4" denominator="4" index="2" />
77     <beat onset="6.444" numerator="4" denominator="4" index="3" />
78     <beat onset="6.792" numerator="4" denominator="4" index="4" />
79     <beat onset="7.14" numerator="4" denominator="4" index="1" />
80     <beat onset="7.5" numerator="4" denominator="4" index="2" />
81     <beat onset="7.848" numerator="4" denominator="4" index="3" />
82     <beat onset="8.197" numerator="4" denominator="4" index="4" />
83     <beat onset="8.545" numerator="4" denominator="4" index="1" />
84     <beat onset="8.905" numerator="4" denominator="4" index="2" />
85     <beat onset="9.253" numerator="4" denominator="4" index="3" />
86     <beat onset="9.601" numerator="4" denominator="4" index="4" />
87     <beat onset="9.95" numerator="2" denominator="4" index="1" />
88     <beat onset="10.31" numerator="2" denominator="4" index="2" />
89     <beat onset="10.658" numerator="2" denominator="4" index="3" />
90 </BeatGrid>
91 <!-- chords aligned to beat grid with onset in seconds, NC = no chord found due
        to silence, noise, etc. -->
92 <Annotations>
93   <event onset="0.104" label="Amin" />
94   <event onset="0.453" label="Dmin" />
95   <event onset="0.801" label="D" />

```

```
196      <event onset="1.161" label="Ebmin" />
197      <event onset="1.509" label="Dmin" />
198      <event onset="1.858" label="D" />
199      <event onset="2.206" label="D7" />
200      <event onset="2.554" label="D" />
201      <event onset="2.914" label="Bb" />
202      <event onset="3.262" label="Dmin7" />
203      <event onset="3.611" label="D" />
204      <event onset="3.971" label="Dmin" />
205      <event onset="5.027" label="Amin" />
206      <event onset="5.375" label="Dmin" />
207      <event onset="5.735" label="D" />
208      <event onset="6.084" label="Dmin" />
209      <event onset="6.444" label="F" />
210      <event onset="7.848" label="D" />
211      <event onset="8.197" label="Amin" />
212      <event onset="8.905" label="NC" />
213      <event onset="9.601" label="F" />
214      <event onset="9.95" label="NC" />
215      </Annotations>
216 </song>
```

3 Python Wrapper

The subfolder `python` contains the Python file `MusicBricksIDMTTranscriberXMLConverter.py`, which provides a class to

- Read the analysis results from the `MusicBricksIDMTTranscriber` tool into a Python data format (dictionary)
- Export the analysis results into CSV files, which can be imported as individual (note and time instant) annotation layers in to the Sonic Visualiser software ¹ for visualization purpose

You can execute the python script for a demonstration on an example XML file. Please see the class docstrings for more details.

¹<http://www.sonicvisualiser.org/>