

TRANSLATION FROM BRAILLE MUSIC MARK-UP LANGUAGE TO DAISYXML

Nadine Baptiste Jessel / Javier Asensio Cubero
IRIT, Université Paul Sabatier
118 Route de Narbonne
Toulouse Cedex 9
FRANCE

ABSTRACT

As result of the Contrapunctus European project the design of the Braille Music Mark-up as an XML representation of a music scores in Braille has been carried out. We propose a design of a prototype system for translating these kinds of files into spoken music encoded in DAISYXML. In this way any blind musician may be able to memorize any Braille score using a DAISY reader. Therefore the dependency of reading BMML files in front of a computer would be eliminated. This is a first work on feasibility which will be improved and managed by a working group.

1 Introduction

The aim of the Contrapunctus project is to facilitate the access to music for blind people. For accomplish this goal our work has been focused on the creation of BMML (Braille Music Markup Language) (Bortolazzi / Baptiste-Jessel / Bertoni 2008), an XML representation of music scores in Braille. Also a reader software called BMR which is able to interpret this format has been developed. In addition, a state of the art (Chu Chi-Nung / Yu Ting Huang 2004) and a survey (Contrapunctus project – D6.1b 2009) focused on the theme of spoken music and the feasibility to transform BMML files in DAISYXML Format have been produced during this project. This paper has been divided in three sections, the first one concerns a definition of spoken music including several aspects such as who benefits this kind of music presentation, what music is spoken music, how music is spoken ... The second part is a presentation of the BMML format and the third part is a BMML to DAISYXML transformation example.

2 Issues on spoken music

“Spoken music” or “talking score” is the speech representation of music score contents, whichever the source is, a human voice or generated by a computer. After a quick state of the art it is proposed in this paragraph for analyzing the different kinds of designs for this music production type.

The existing description of products concerning talking music can be found in several organizations or companies. We can list:

- The description of the solution which come from RNIB (Crombie / Dijkstra / Schut / Lindsay 2002), (http://www.rnib.org.uk/xpedio/groups/public/documents/publicwebsite/public_musictalkingscores.hcsp).
- The product talking music for Dedicon (Challis 2006), (<http://projects.dedicon.nl/am/talkingmusic.html>).
- The production of spoken music designed by Christina Cotruvo12. Its name is No-C-Notes (<http://www.no-c-notes.com/>).

Three solutions have been analyzed and we propose to list some questions which concern talking music:

Who the talking music users are: The users are blind or visually impaired people who do not know how to read Braille or do not have access to Braille resources. These users may also be blind musicians who want to keep their hands on their instruments while reading scores.

Which kind of music is involved in these products: All music can be described but BIC is interested in testing Spoken Music on non-traditional music or modern music where the Braille transcription is not available. We have recorded the comments of a blind person who want to use spoken music for harmonic chord description.

Which is the information delivered: A music score contains a large list of music objects and some of them may be redundant or useless at some time, therefore it is very important to optimize the information presented in talking form. In order to reduce the number of presented objects Dedicon respects some Braille music rules. For instance “the octave is not marked for the second of two consecutive notes if it is less than the interval of a fourth from the first” when a chord is represented in Braille music.

How the information is delivered: This question involves the possible normalizations of the linear form of the music objects and the difficulty due to the different languages into which we may want to translate the score.

Concerning the linear form of the music objects we can find different forms and orders. Talking music from Dedicon proposes to place the information concerning a note as follows: the octave, the name of the note and the duration. For instance “Third octave A quarter”, for the same information No-C-Notes proposes “Quarter A 3”, where the 3 represents the octave.

Concerning the languages, as in different countries and their languages the terms used for representing music are completely different (“quarter” is in British “crotchet”, in Spanish is “negra” and in French is “noire”), it is mandatory to create different outputs for different languages.

How synchronizations are done with the sound or with Braille: The talking score could be “synchronized” with the score in midi or in wav format. This means that it is possible to hear the sound of a segment of music before or after his speech description. It is also possible to read a segment of music in Braille before or after his speech but, the synchronization in real time with Braille seems not to be appropriate because the reading speeds in both formats is not equivalent.

Which the navigation possibilities are: The navigations possibilities are settled by the structure of the file. Like in a book, a score could be structured in measure, section ... so we can have a navigation:

- measure by measure,
- section by section,
- instrument by instrument or one by hands,
- from music information to music information (objects), as we can search for a word it may be possible to search for a musical object.

All these questions must be taken into account to perform a good design for a talking music transformation.

3 Principle and definitions of BMML code

The aim of the BMML is to store Braille scores in a uniform and exchangeable format. There exist a big amount of languages able to code music information but we are going to focus on three of them. MusicXML, which is a de facto standard format supported by music software market leaders; the norm IEEE1599 which integrates multimedia elements at different levels, and midi, which supports sound production but neither of them is able to code Braille information.

BMML has been designed to:

- Encode Braille music notation
- Facilitate conversion from and to other music encoding like this mentioned above
- Be extended to Braille music variants.

The *score* element is the root of a BMML document. The score contains a *score_header* and *score_data*. The *score_header* contains some meta data and the *score_data* the music information. For the *text_element*, which has no children, the text is written in Braille coded in Unicode Pattern (2800-28FF). The most important element is the note because it contains all the note type information and data. XML attributes are used in BMML to encode music information. In the next example for the key information the name and line attributes will be used to transform the music information into a spoken one. We can also use the name and value attribute in the *note type* element.



Figure 1: Simple score example

A simple example:

```
<?xml version="1.0" ?>
  <score>
    <score_header />
    <score_data>
      <measure id="bmml-Measure-0">
        <clef line="2" name="G">&#x281C; &#x280C; &#x2807</clef>
        <key_signature cancel="False" id="bmml-KeySignature-0"
value="-6"> &#x283C; &#x280B; &#x2823</key_signature>
        <note id="bmml-Note-0">
          <octave value="4">&#x2810</octave>
          <note_data>
            <pitch>33</pitch>
            <duration>1024</duration>
          </note_data>
```

```

    <note_type name="A" value="quarter">&#x282A</note_type>
  </note>
</measure>
</score_data>
</score>

```

4 Example of a transformation module

A very simple prototype has been built to test the complexity of the process. A XSLT document has been produced to convert a simple BMML score to a Dtbook functional document. The Braille linear form is maintained and the attributes are used during this conversion.

For example the code used to return the name of the key is:

```

<xsl:template match="clef">
  clef
  <xsl:value-of select="@name"/>
</xsl:template>

```

An online converter is shown in the next figure; it permits to choose the input file and the type of conversion:

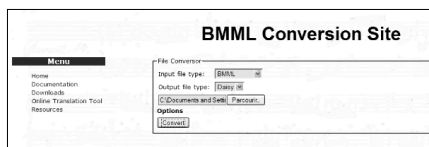


Figure 2: Online transformation tool

The previous example is automatically generated like a DAISY book by the converter.

```

<?xml version="1.0" ?>
<dtbook version="2005-3" xml:lang="en">
  <book>
    <bodymatter>
      <p id="bmml-Measure-0">clef G octave 4 A quarter</p>
    </bodymatter>
  </book>
</dtbook>

```

The structure of the outputted code is simple, inside the book and the bodymatter element every measure is placed inside a p label. In this way every measure will be identified and easily navigable. As this is a prototype a big effort has to be already performed to define how parts and other important elements might be placed inside the dtbook.

5 Conclusion

As BMML code contains music information in attributes it is not so difficult to produce automatically talking books. Of course, an effort must be performed in order to test if this process is efficient and to test the translation into different languages. All the issues concerning the navigation in a score, the level of information which is possible to choose and the sound synchronization are to be studied in deep. To treat these issues, the reader use is more important than the code; the possibilities concerning the configuration of the reader must be taken into account.

References

- Bortolazzi, Enrico / Baptiste-Jessel, Nadine / Bertoni, Giovanni (2008). BMML (Braille Music Markup Language): A Mark-Up Language for Braille Music. In: Proceedings of the 11th International Conference on Computers Helping People with Special Needs (ICCHP 2004), Linz, Austria, pages 310–317
- Chu Chi-Nung / Yu Ting Huang (2004). The design of Spoken Music Web Browser for teaching learning-disabled children: A Chevé system approach to Music notation. In: Proceedings of the 9th International Conference on Computers Helping People with Special Needs (ICCHP 2004), Paris, France, page 626
- Contrapunctus project – D6.1b (2009): Spoken Music: survey among European users. Retrieved from: http://www.punctus.org/public/documents/D6_1_2-Spoken_Music.pdf
- Crombie, David / Dijkstra, Sijo / Schut, Edmar / Lindsay, Natasha (2002). Spoken Music: Enhancing Access to Music for the Print Disabled Source. In: Proceedings of the 8th International Conference on Computers Helping People with Special Needs (ICCHP 2002), Linz, Austria, pages 667–674
- Challis, Ben (2006). Accessing Music Notation through Touch and Speech. In: Proceedings of the 10th International Conference on Computers Helping People with Special Needs (ICCHP 2006), Linz, Austria, pages 1110–1117.