Intelligent Tools for Interacting with a Corpus of Lute Music

David Lewis (d.lewis@gold.ac.uk) and Christophe Rhodes (c.rhodes@gold.ac.uk)

Centre for Cognition, Computation & Culture, Goldsmiths College

Goldsmiths UNIVERSITY OF LONDON

ECOLM

An Electronic Corpus of Lute Music

From the late fifteen into the eighteenth century, the Western European lute was one of the most popular instruments and was prominent in both the domestic and public spheres. Its comparatively minor role in modern musicology stems not from its lack of importance, but from the inaccessibility of its notation and the small amount of published transcriptions that are readily available.

ECOLM [1] aims to store and make accessible full-text encodings of lute tablature sources, with the hope of thus raising the awareness of the vital role the instrument plays in music history. ECOLM seeks to make it easier for lute music to be appreciated by non-experts, whilst still providing detailed infomation for scholars as it is needed.

```
M(C/) Qa2b3a6 Ec4 Sd2a3
  b2 Ea2b3a6 d3 Qd1a2 |
Ea1b2b3d5 Sf1a5 d1 Ec1d2d3Xa
  a1a2b3a6 He2f3e4c5 |
Qa1a2b3c4c5a6 Ea2 a6
  d6 a2b3 d2f3 d6 |
b2d3a5 b3 a3d5 c4
  a2a3c5 c4 b4 c1 |
d1a2c4 d3 {^} Ea2 d1c2c4
  c1d2a4 a2 Qe2f3e4c5 |
Ea1d5 Sd3 b3 d3 a2 b2
  d3 Qe2f3e4c5 Ea2b3a4d6 d1 |
c1d3a5 a1b3 a1a3d5 c4 Sc5
  f2 e2 c2 e2 f2 d3 e2 |
Ea1a2c3a6 Sd2 b2 a2 d3 c3 a3
```

Tablature

Lute music is written in *tablature*, a notation that gives graphical instructions for where to place the fingers of the left hand and which courses (*i.e.* strings or ranks of strings) should be struck with the left. In the most common tablature forms, the courses are represented by six horizontal lines on which symbols, letters or numbers, showing frets to play are placed. Above these symbols may be rhythm signs indicating the time interval between the onset of the current chord and that of the next. In addition, there may be indicators for fingering and ornamentation, along with the symbols for mensuration and barlines that are found in staff notations.

There are several differences between the information given in tablature and staff notation: tablature gives no explicit instruction about durations, voicing or tonal function (pitch spelling is absent), but does have indications for performers that cannot be adequately provided by a normal score.

TabCode

Lute tablature is an essentially sequential notation form, which makes it comparatively easy to encode its musical content in an intuitive flat-text format. *TabCode* [2] was designed to be human-readable but terse, allowing fast input.

Each musical event in the score is represented as a ‘tabword’ separated from others by white space. Each tabword may begin with an indicator of the rhythm sign, if present (`H` represents a half note, `Q` a quarter note, etc.). The frets and courses to be played are indicated by letters and numbers respectively (see figure for an example). Barlines are indicated by a pipe character, `|`, whilst bass courses, fingerings, ornaments and other symbols have their own codes.

TabEdit

The TabEdit application is fundamentally a text editor, augmented by syntax analysis facilities [3]. As in other text editors such as Emacs or Notepad, the user types in text: there is no constraint that the contents must always be syntactically valid. However, the text buffer is incrementally parsed at each keystroke (in constant time for the typical case), and any syntax errors are presented to the user.

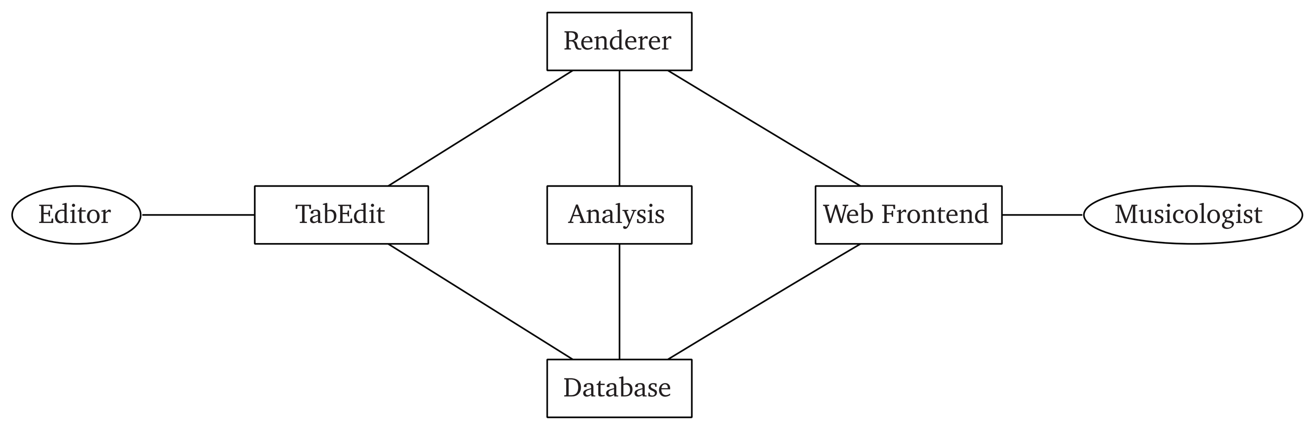
Renderer

The renderer component converts a parsed stream of *TabCode*, whether from TabEdit or from the Database or Web Frontend, and renders it to some other form. In the case of TabEdit, the Renderer generates a tablature window, and uses the incremental parser to update the renderered tablature in constant time for the typical case; the Web Application can request image or PostScript rendering. Additionally, the *TabCode* can be rendered to audio (either in its entirety or, in TabEdit, a suitable fragment). Transcription to Common Music Notation is planned.

System

ECOLM is made up of a number of interconnected components, sharing functionality as appropriate. The core of the system is a database, containing music and metadata, and tools for parsing and processing that data. User interaction comes either through an editor utility for tablature, TabEdit, or through the web front end.

System diagram



Web Frontend

The principal interaction that users are expected to have with ECOLM is through its web front end. The interface allows users to navigate the metadata of the database by browsing and searching. By interacting with the renderer this application will be capable of content-based searching and information retrieval directly on the corpus.

The web interface also allows for distributed data entry and editing, with facility for an international base of contributors, especially those with direct access to primary materials, to provide and validate ECOLM data through a web browser.

Users who log on operate within a personal ‘research environment’, saving lists of pieces in which they are interested for later retrieval. It is planned that they will also be able to save search results and, if they are registered contributors, to enter data for personal reference or group verification before it is made openly accessible.

Database

As well as storing musical transcriptions, ECOLM stores a large amount of related metadata. This is only partly for the purpose of facilitating retrieval: since a principal motivation for ECOLM is to encourage the study of a neglected area of musicology and an under-rated body of music, we hope the web site will become a first point of reference for those embarking on research in the field. To this end, we provide any historical, geographical and biographical information and bibliographical references relevant to the corpus.

Analysis

Computer analysis of music can serve dual purposes: facilitating the retrieval of a given piece, and permitting large-scale musicological investigations. The tools already constructed [4] for this system (but not yet online for general use) include searches for thematicially related material, imitation recognition, and various measures of harmonic motion.

References

[1] Tim Crawford, Michael Gale, and David Lewis. An Electronic Corpus of Lute Music (ECOLM): technological challenges and musicological possibilities. In Richard Parncutt, editor, *Conference on Interdisciplinary Musicology*, pages 118–119, Graz, 2004.

[2] Tim Crawford. Applications Involving Tablatures: *TabCode* for Lute Repertories. *Computing in Musicology*, 7:57–59, 1991.

[3] Christophe Rhodes, Robert Strandh, and Brian Mastenbrook. Syntax Analysis in the Climacs Text Editor. In *International Lisp Conference*, Stanford, 2005. (accepted for publication).

[4] Michael Gale and David Lewis. “La battaglia”: a computer-assisted approach to an extended musical family. Presented at the Annual Conference of the Renaissance Society of America, 2005.