

# MIMESIS: A Semantic-based Approach for a Digital Library of Poetry in Music

Application to the *Repertorio della Poesia Italiana in Musica 1500-1700 (RePIM)* Repository

Ilaria Bartolini<sup>(1)</sup>, Cecilia Luzzi<sup>(2)</sup>, Marco Patella<sup>(1)</sup>, Angelo Pompilio<sup>(3)</sup> and Cesarino Ruini<sup>(4)</sup>

(1) DEIS, University of Bologna, Bologna, Italy, {i.bartolini, marco.patella}@unibo.it

(2) Liceo Musicale of Arezzo, Arezzo, Italy, cecluzzi@tin.it

(3) DISMEC, University of Bologna, Bologna, Italy, angelo.pompilio@unibo.it

(4) MUSPE, University of Bologna, Bologna, Italy, cesarino.ruini@unibo.it

**Abstract**— In this position paper we discuss matters relative to the development of a semantic-based model for an on-line digital library of poetry in music. In particular, we present a general approach called MIMESIS (Multimedia Interoperable Model of poEtry and muSic Sources). Using semantic technologies and methodological solutions, MIMESIS enables different types of users to creatively enjoy digitized cultural resources, not only in the specific case of poetry in music, but also in the general field of the performing arts. The MIMESIS approach is then applied to an existing repository, RePIM (*Repertorio della Poesia Italiana in Musica 1500-1700*), which represents an interesting test case for our study. Other state-of-the-art initiatives utilizing semantic Web technologies for digital collections exist, and some show some encouraging results. Yet although these projects represent an improvement over previous systems, they still fall short in terms of complexity and usability. MIMESIS is built on recent definitions of ontology for cultural heritage, such as FRBRoo (Functional Requirements for Bibliographic Records object-oriented), and explicitly addresses issues of interoperability with current European initiatives.

**Keywords:** Digital libraries, Semantic web, Performing arts, Poetry and Music (1500-1700)

## I. INTRODUCTION

The increasing adoption of digital multimedia technologies is producing massive amounts of cultural content. Wide-ranging initiatives, such as *Europeana* [1] and the realization of a *European Digital Library* (EDL) [2], promise to deliver access to digitized objects, including books, photos, maps, audio, films, and archival records from Europe's libraries, archives, museums and audio-visual collections.

The realization of this new global network of resources has quickly become an inspiration and source for new learning scenarios and challenges. For example: how to handle large sets of raw and edited reference material, and local and remote multimedia content? How to

extract actionable meaning from structured and unstructured information and social interaction patterns? How to provide functionalities across different content types, improving access to information for humans and machines alike? How to enable access to, and engagement with, rich distributed information sources?

Despite covering huge amounts of digital content, these projects have not managed to achieve the anticipated benefits and exposure. Widespread access to these collections and an appropriate level of visibility have been compromised by confusing standards and changing technologies. Many Web sites have poorly developed search and display functions that are difficult to use and, in many cases, fail to appeal to users; and often, multilingual access is not well-developed.

The MIMESIS (Multimedia Interoperable Model of poEtry and muSic Sources) approach discussed in this position paper is aimed at overcoming these limitations. A semantic-based method for developing an on-line digital library model for poetry and music multimedia, MIMESIS is built on recent definitions of ontologies for cultural heritage such as FRBRoo. The MIMESIS approach is applied to an existing repository, *Repertorio della Poesia Italiana in Musica 1500-1700* (RePIM), a digital archive of poetry and music from 1500 to 1700, comprising analytical descriptions of the literary and musical sources of circa 43,000 texts set to music (for a total of about 66,000 musical settings), and digital items, such as images from historical source material and modern editions of the texts, and the music for samples of particular significance.

The MIMESIS approach allows for the development of methodological solutions that enable all users to explore digitized cultural resources, and that explicitly address issues of interoperability with other ongoing European initiatives.

With its strong interdisciplinary nature, MIMESIS bridges the boundaries between cultural heritage, poetry, music and the performing arts, new information technologies and digital libraries. MIMESIS must be considered a pilot project, aimed at achieving the following objectives:

- to ascertain FRBRoo model suitability through the case study under consideration;
- to develop access to digitized content;
- to enable the user to make full use of digitized cultural resources with powerful, streamlined, and creative search and display functions.

The rest of the paper is organized as follows: Section II offers an overview of related work; Section III describes the MIMESIS approach; Section IV concludes the paper.

## II. THE STATE-OF-THE ART

### A. Previous work

Current efforts in digitization have resulted in the creation of international, unified portals which provide access to individual libraries, archives, and museums.

- The *World Digital Library* (WDL) [3], a project fostered by the Library of Congress and sustained by UNESCO, provides Internet access, free of charge and in multilingual formats, to significant primary materials from countries and cultures around the world.
- The *Multilingual Inventory of Cultural Heritage in Europe* (MICHAEL) [4], a ground-breaking project funded by the European Commission, provides access to digital collections from European archives, museums, and libraries.
- *Europeana*, the ongoing European portal launched as a proof of concept in 2008, provides access to as many as two million books, photographs, maps, sound recordings, films, and archival records from libraries, archives, museums, and audio-visual collections, that have been digitized throughout Europe. Its aims are to provide access to all of Europe's digitized cultural heritage by 2025, to improve the quality of the metadata – e.g. detailed description of a digital object's contents – and to make content searches easier [1].

Other important digital collections exist within the Web sites of national cataloguing organizations such as Italy's *Internet Culturale* [5], or large national libraries, such as *Gallica* of the Bibliothèque Nationale de France [6], *Online Gallery* of the British Library [7] and *Münchener Digitalisierungs Zentrum* of the Bayerische Staatsbibliothek [8]. Further examples are *Digital.csic*, the digital library of the Spanish Consejo Superior de Investigaciones Científicas [9]; and *Early European*

*Books* [10] – a digitalization project of printed books in Europe from their earliest origins through the close of the seventeenth century. *Early European Books* complements *Early English Books Online* (EEBO), collected by Biblioteca Nazionale Centrale (Firenze), Det Kongelige Bibliotek (Copenhagen), Koninklijke Bibliotheek (Den Haag) and the Wellcome Library (London).

At present, the most urgent challenge facing the digital library field is the demand for powerful and efficient systems which allow for integrated access to vast amounts of digital content. The current available repositories have not fulfilled expectations from this point of view because of limits in resource description (e.g., *Europeana*, based on Dublin Core) and interoperability (proprietary format). In addition, these initiatives feature poorly developed search and display functions which are difficult to use and which, in many cases, fail to appeal to users. The massive amounts of cultural content in these repositories cannot be captured through the traditional systems, typically based on keywords, that are commonly used to search the Web. Instead, this material could be made more accessible to the user by means of semantic digital library technologies.

### B. Semantic digital library technologies

III. The recent definition of ontologies – those concepts and relationships used to describe and represent an area of knowledge – for cultural heritage developed by the International Council for Museums-International Committee on Documentation (ICOM-CIDOC) and the International Federation of Library Associations and Institutions (IFLA) provide an important contribution to this undertaking.

The CIDOC Conceptual Reference Model (CRM) supplies definitions and a formal structure for describing concepts and relationships used in cultural heritage documentation. It promotes a shared understanding of cultural heritage data by providing a common and extensible semantic framework by which any cultural heritage information can be mapped. In this way, CIDOC CRM fills in the gaps that otherwise occur in large collections of cultural heritage data gathered from various sources, such as museums, libraries, and archives [11].

The FRBR model [12] was originally designed as an entity-relationship standard by a study group appointed by the IFLA [13] during the period 1991-1997, and published in 1998 [14]. FRBR specifies that intellectual or artistic products include four types of entities. In "Group One" entities, the FRBR model distinguishes between immaterial ("work" and "expression") and material ("manifestation" and "item") entities. Work and expression are abstract concepts; the manifestation and the items are concrete objects related to them. In particular, "work" is a distinct intellectual or artistic

creation; and “expression” is an intellectual or artistic realization of a work. A “manifestation” is the physical embodiment of an expression of a work; and finally, an “item” is a single exemplar of a manifestation. FRBR also specifies particular relationships between classes of “Group One” entities: a work is realized through one or more expressions, each of which is embodied in one or more manifestations and exemplified by one or more items.

Initial contacts, in the year 2000, between the two communities (CIDOC and IFLA) eventually led to the formation, in 2003, of the International Working Group on FRBR/CIDOC CRM harmonization. In May 2009, this Working Group published a final complete draft version of FRBRoo; that is, the object-oriented version of FRBR, harmonized with CIDOC CRM [15]. The common goals were to express the IFLA FRBR model with the concepts, ontological methodology, and notation conventions provided by the CIDOC CRM; and to merge the two object-oriented models thus obtained [16].

FRBRoo is a formal ontology intended to capture and represent the underlying semantics of bibliographic information as well as facilitate the integration, mediation, and interchange of bibliographic and museum information. Such a common view is necessary to provide interoperable information systems for those users interested in accessing common or related content.

FRBRoo is an exhaustive ontology that goes beyond the expressive limits of existing systems such as *Europeana*; though, quite obviously, at the expense of a greater complexity. Until now, this model has not been implemented in actual digital collections, such as libraries, museums, archives, research centers, music music stores, and record labels.

### C. *Relevant projects*

Presented below are projects that apply semantic technology to the field of music; efforts which, in many cases, are still at an embryonic stage.

**EASAIER (Enabling Access to Sound Archives through Integration, Enrichment and Retrieval) is a European-funded project aimed at meeting the challenges of the increasing amount of digitized audio and audio-visual material in archives across the UK and Europe.<sup>1</sup> Many digital sound archives still suffer from issues of accessibility. The EASAIER system has been designed with sound and broadcast archives, libraries, museums, and music schools in mind. It has developed access, retrieval, and interactive software – license free – in direct response to the needs of its proposed users. These**

---

<sup>1</sup> This project was funded by the European Commission under project EU-FP6-IST-033902, coordinator Josh Reiss (Queen Mary, University of London).

**users have been defined as anyone, amateur or professional, interested in accessing archived data regardless of the type of archival material involved [17].**

*FictionFinder* is an FRBR-based prototype that provides access to over 2.9 million bibliographic records for fiction books, eBooks, and audio materials described in WorldCat, a union catalog – or combined library catalog describing the collections of a huge number of libraries from all over the world which participate in the Online Computer Library Center (OCLC) global cooperative [18].

*Music Ontology* is a project carried out by Yves Raimond.<sup>2</sup> It provides main concepts and properties for describing music (i.e. artists, albums, tracks, but also performances, arrangements, etc.) in the semantic Web vocabulary, linking a wide range of music-related information in sharing systems like Napster, communities like MySpace, music services like Last.FM or music stores like iTunes. With a goal of helping to create a music-related web of data, *Music Ontology* represents an online community effort to express music-related information on the semantic Web [19].

*Variations3* is a project of the Indiana University Digital Library Program. Developed a digital music library software system for online access to streaming audio and scanned score images, *Variations3* features a flexible access control framework that ensures respect for intellectual property. It also includes analysis and annotation tools which are useful for music teaching, learning, and research. In addition, the *Variations3* project is conducting research on a music metadata model and search system centered on the notion of the musical work, which, as compared to traditional catalog systems, improves the music search experience for users [20].

The Digital Library for Poetry in Music (1500-1700) project could benefit considerably from the use of FRBRoo. This object-oriented model could be used not only as a point of departure for the definition of specialized ontologies in the domains of poetry and music, but also for the exhaustive description of the intellectual content of poetry and music repertoires. The groundbreaking feature of this project will be the application of the theoretical model in order to assess the potential of FRBRoo for providing access to the network of digital projects related to poetry and music from 1500 to 1700.s

MIMESIS will seek to develop methods that put relatively abstract models of FRBRoo into practice. In

---

<sup>2</sup> Raimond carried out the Music Ontology project as a Ph.D. student at the Centre for Digital Music, Queen Mary, University of London; and, from 2008, as Senior Technologist at BBC Research & Development.

addition, MIMESIS aims to demonstrate how these models may be connected to detailed domain ontologies (such as those for poetry set to music, and the performing arts), integrating various types of content under these standards within a system that enables advanced semantic Web reasoning methods.

### III. MIMESIS APPROACH

In practice, the MIMESIS approach will be realized through the implementation of a framework consisting of software tools and the population of a domain knowledge base. It will comprise bibliographical data and digital items relative to Italian poetry by Petrarch and Petrarchist poets set to music in Europe between 1500 and 1700, making the RePIM database available online.

RePIM, a digital archive of poetry and music from 1500 to 1700, represents an ideal setting for the implementation of FRBRoo in a delimited field. As a case study, the use of RePIM restricts complexity while also providing information on the feasibility and scalability of the MIMESIS system.

In the late 1970s, the musicologist Lorenzo Bianconi conceived the idea of a checklist as a means of making an analytical description of Italian poetry set to music from 1500 to 1700. In collaboration with Antonio Vassalli and Angelo Pompilio, the checklist was drawn up on paper support in the 1980s. It was later developed into a database – the *Repertorio della Poesia Italiana in Musica 1500-1700* (RePIM) – edited by Pompilio.<sup>3</sup> The project attempted to identify as many authors of poetic texts set to secular and spiritual vocal music from 1500 to 1700 as possible. And, given that music sources rarely reveal the author of poems set to music, this required a systematic examination of the printed poetic sources of the period. In the first decade of research, the project produced a bibliography of about 2,000 printed literary sources. This allowed the identification of the sources and authors of about 7,000 poems set to music, and prompted the creation of a first checklist on paper support [21].

The development of a database in the early 1990s allowed for better management of the collected information.<sup>4</sup> This database comprises circa 43,000 texts (variant forms and the single parts of a text divided into

<sup>3</sup> The project was mainly implemented at the Dipartimento di Musica e Spettacolo of the University of Bologna: in different phases it has benefited from financial, logistic, and operative support provided by other organizations, such as the Fondo Nazionale Svizzero per la Ricerca Scientifica (FNS), the Italian Consiglio Nazionale delle Ricerche (CNR), Ministero Italiano dell'Università e della Ricerca (MURST, after MIUR), Istituto di Studi Rinascimentali di Ferrara, Dipartimento di Storie e Metodi per la Conservazione dei Beni Culturali of the University of Bologna (seat of Ravenna).

<sup>4</sup> The database project was realized by Angelo Pompilio, with Thomas Walker and Silva de Marchi; and implemented by Livio Aragona, Cecilia Luzzi, Gianmario Merizzi, Roberta Ziosi and Concetta Assenza.

more sections have been included in this estimate), for a total of about 66,000 musical settings. Of the 43,000 texts set to music, approximately 13,000 have been identified through citation in roughly 1,500 literary sources. The electronic collection consists of two different parts: the bibliographical data of the sources of the poems, which are described in detail; and the data relative to some 3,500 music sources.

For the poetry sources, the database provides a complete transcription of the title page, imprint, pagination, and shelfmark of the exemplars consulted; descriptions of introductory texts (dedications, prefaces, printer's notes); the list of poets; a brief summary of literary content; and analytical descriptions of the poetic texts (limited to those set to music). For each text an extended incipit comprising at least the first two verses (and, often, three or four verses; in a few cases, the complete text is reproduced) is provided. In addition, the author's instructions, poetic meter, and the transcription of any titles and inscriptions are recorded. The data referring to music, extracted from existing repertoires [22], revealed some gaps or incorrect transcriptions of the incipit. These therefore require analytical verification of content directly from the sources.<sup>5</sup>

For the musical editions, direct consultation of sources, in original or digital format from archives and libraries throughout Europe, is foreseen. This will ensure that an analytical examination and verification of content be made for each item. An analytical description comprising source content will be provided for each of the approximately 3,500 musical sources indexed. For the moment, the database contains only data relative to the description of the content: extended incipit comprising at least the first two verses, poetic form, musical form, composer, eventual inscription or title of the composition, voices and instrumentation.

<sup>5</sup> The examples of incomplete descriptions of the sources regard mainly the seventeenth century books for more than one voice transcribed by Emil Vogel in which the content was derived only from the table of contents of a single voice's partbook and therefore do not include some compositions. See, for example, the Nuovo Vogel index of *Madrigali concertati a due, tre, quattro e cinque voci*, Venezia, Vincenti, 1627, by Domenico Obizzi (NV 2046) where seven musical settings are lacking (*Poich'a tanti tormenti; Filli, se vuoi ch'io mora; Se sete Beatrice; Porta sul biondo crine; Come poss'io mirare; Mentre la bella mia nemica altera; Se de' miei giusti prieghi*). There are also incorrect or inaccurate transcriptions of the first lines, such as *Dolci leggiadri e belli* instead of *Occhi leggiadri e belli* (NV 2552) or *O speranza fallace a che turbar mia pace* instead of *O speranza fallace dunque sperando a che turbar mia pace*, NV 1884; *Sol per fuggir da voi mio sole amato* instead of *Sol per fuggir Amore da voi mio sole amato* (NV 2235). In other cases, Vogel completed the first line in the table of contents by referencing similar lines of other works: *O d'amor meraviglia, quel dolce canto* instead of *O d'amor opre rare col torme da me stesso* (NV 1534); *Se il dolce sguardo di costei m'ancide* instead of *Se il dolce sguardo del divin tuo volto* (NV 2775); *Cigni bianchi e canori del Mincio a cantar meco* instead of *Cigni bianchi e canori cantate i casti amori* (NV 3002).

The MIMESIS approach will permit researchers to trace the tradition of sixteenth to eighteenth century poetic texts set to music – which have never been studied by philologists because they were contained in musical sources – by basing itself on the FRBRoo model requisites. For each “work” (abstract work), the model will allow for the identification of its morphological anatomy (horizontal scan: the articulation in parts, sections, stanzas, quatrains, tercets, etc.) and its tradition (chronological scan: the different versions and forms the work has assumed over time).

An ontology which satisfactorily accounts for the tradition of poetry set to music from 1500 to 1700 must address the variable nature of the sources which make identification of the poems difficult. The text set to music can vary from the archetype attested to by literary or musical sources. It may be broken up and recomposed; the order of the lines may be changed; the text may be excerpted arbitrarily from a longer poem. Composers, or even poets, may replace one or more words, introducing significant or minor variants. They may also substantially re-arrange a part of the poem. We can offer some instances which better illustrate this variational nature: the madrigal *Chi volesse saper che cosa è Amore* set by Cimello (NV 578) is a cento of the first lines of settings collected in *Il primo libro de madrigali de diversi autori* (RISM 1542<sup>17</sup>). The madrigal by Jachet Berchem *Signor, Lidia son io* (NV 328) omits the first part of the first line of Ariosto’s poem *E cominciò – Signor, Lidia son io* (Orlando furioso, XXXIV,11). The canzonetta *Mia Filli, io non so dire* set by Tommaso Pecci (NV 2164) is a reworking of the madrigal by Battista Guarini published in two different versions: *Mia diva, io non so dire* (in *Rime de’ diversi celebri poeti dell’età nostra*, Bergamo, Comin Ventura, 1587) and *Dov’hai tu nido, Amore* (in his *Rime*, Venezia, Ciotti, 1598). The madrigal *Sospir, dimmi, dimmi che fa quel core*, set to music by Pietro Paolo Torre (NV 2736), is a shortened version of Giovan Battista Marino’s madrigal *Sospir che dal bel petto*.

With this repertory, which contains so much descriptive data relative to this particular poetic and musical tradition, it will be possible to query numerous digital collections at the same time, and access the content on the Web. In addition to the names and professional details of the poet, composer, dedicatee, editor, etc., descriptions of each abstract work, understood as the intellectual or artistic creation free from material entities, and of all its particular manifestations (the various versions of the text) are available. Bibliographic descriptions of the poetic and musical collections to which the various manifestations of the work belong are included; as well as references to single examples of the various manifestations, and to the contents themselves (digital images of sources, transcriptions of the poetic texts, musical texts, audio files in MIDI and MP3 formats). The repertory also comprises a list and

description of the various libraries in which single examples from the poetic and musical collections are conserved; and, of course, relative bibliographic and discographic information.

As an example of the kinds of digital collections to which MIMESIS will provide access, it is sufficient to cite not only the impressive digital library projects mentioned earlier – *Europeana*, *World Digital Library*, *MICHAEL*, *Internet Culturale*, *Gallica*, *Online Gallery*, *Münchener Digitalisierungs Zentrum* and *Early European Books* – but also some projects from the area of lyric poetry studies. *Biblioteca Italiana* (BibIt) [23], *Liberliber* (Progetto Manuzio) [24] contains versions of texts representative of Italian literature from the Middle Ages to the twentieth century. *Antologie della Lirica Italiana* (ALI) [25] of the University of Pavia collects information about anthologies of Italian lyrical works from the sixteenth to the eighteenth century, both handwritten (MAMIR) and printed (RASTA) [26]; and is analogous to the University of Torino project, *Antologie di rime del Cinquecento* [27], [28]. With reference to music, the enormous quantity of digital musical content published online by European national libraries is complimented that of specialized libraries. The Museo internazionale e biblioteca della musica di Bologna [29], for example; and DIAMM (Digital Image Archive of Medieval Music) [30], a portal to information about, and images of, medieval polyphonic music manuscripts dating from circa 800 to 1550 gathered from collections throughout the world. MIMESIS will make it possible to integrate all of the content disseminated throughout the Internet (which may include versions of poetic texts, musical scores, and audio files in MIDI or MP3 format found in music sharing systems, Web communities, or stores) relative to a single theme.

To support interoperability with existing and emerging standards, the MIMESIS approach will develop methods for semantic mapping and tools for interconnections, taking into consideration international and national standards for metadata of cultural artifacts. It will deliver an authoritative and comprehensive semantic knowledge base in the domain of poetry set to music. At project completion, the Repository will contain a domain-specific knowledge base, together with the semantic representation of work, expression, and segmentation of all poems set to music from 1500 to 1700; and of an Italian secular vocal music repertory of these two centuries.

This represents a huge step forward in the state-of-the-art. The MIMESIS project will develop scalable semantic-based algorithms and techniques for exploiting massive distributed repositories and analyzing large volume data streams for actionable knowledge. In particular, it will support semiautomatic semantic annotation of heterogeneous media forms: video, audio, images, etc. The library will explicitly address

interoperability with other European initiatives, and in particular with *Europeana*. All the content and the metadata created in the project will be accessible as well through the *Europeana* portal.

#### IV. CONCLUSIONS

In this position paper we present MIMESIS, a semantic-based approach for the creation of a model for an on-line digital, multimedia library of poetry in music, built on recent definitions of ontologies for cultural heritage such as FRBRoo. We describe the application of the MIMESIS approach to an existing repository, *Repertorio della Poesia Italiana in Musica 1500-1700* (RePIM), a digital archive of poetry and music from 1500 to 1700, which comprises the analytical description of the literary and musical sources of circa 43,000 texts set to music (for a total of about 66,000 musical settings), and digital items such as images of the ancient sources and modern editions of the texts, as well as the music of particularly significant samples. The MIMESIS approach allows for the development of methodological solutions which enable all users to explore and creatively enjoy digitized cultural resources, explicitly addressing issues of interoperability with ongoing European initiatives.

#### REFERENCES

- [1] *Europeana*: <http://www.europeana.eu/>
- [2] *European Digital Library*: <http://www.edlproject.eu/>.
- [3] *World Digital Library*: <http://www.wdl.org/en/>.
- [4] *Multilingual Inventory of Cultural Heritage in Europe* (MICHAEL): <http://www.michael-culture.eu>.
- [5] *Internet Culturale* is the Web portal that provides access to the digitised cultural heritage preserved by the Italian Public Libraries: <http://www.internetculturale.it/opencms/opencms/it/>.
- [6] *Gallica* is the digital library of the Bibliothèque Nationale de France: <http://gallica.bnf.fr/?lang=EN>.
- [7] *Online Gallery* is the digital library of the British Library: <http://www.bl.uk/onlinegallery/tp/tpbooks.html>.
- [8] *Münchener Digitalisierungs Zentrum* (MDZ) handles the digitization and online publication of the cultural heritage preserved by the Bayerische Staatsbibliothek and by other institutions: <http://www.digitale-sammlungen.de/>.
- [9] *Digital.csic* is the digital library of the Spanish Consejo Superior de Investigaciones Científicas: <http://digital.csic.es>.
- [10] *Early European Books* provides scholars with new ways of accessing printed sources from the fifteenth to the seventeenth centuries: <http://eeb.chadwyck.com/marketing/about.jsp>. *Early English Books Online* (EEBO): <http://eebo.chadwyck.com/home>.
- [11] N. Crofts, M. Doerr, T. Gill, S. Stead and M. Stiff, Definition of the CIDOC Conceptual Reference Model, ICOM/CIDOC CRM Special Interest Group, May 2011 ([http://www.cidoc-crm.org/docs/cidoc\\_crm\\_version\\_5.0.3.pdf](http://www.cidoc-crm.org/docs/cidoc_crm_version_5.0.3.pdf)).
- [12] *Functional Requirements for Bibliographic Records*: <http://www.ifla.org/en/frbr-rg>.
- [13] *International Federation of Library Associations and Institutions*: <http://www.ifla.org>.
- [14] K. G. Saur, *Functional Requirements for Bibliographic Records: Final Report*, Munich: UBCIM Publications, 1998 (vol. 19).
- [15] International Working Group on FRBR/CIDOC CRM harmonization, object-oriented version of FRBR, harmonized with CIDOC CRM (May 2009): [http://www.cidoc-crm.org/docs/frbr\\_oo/frbr\\_docs/FRBRoo\\_V1.0\\_2009\\_june\\_.pdf](http://www.cidoc-crm.org/docs/frbr_oo/frbr_docs/FRBRoo_V1.0_2009_june_.pdf).
- [16] M. Doerr and P. LeBoeuf, "Modelling Intellectual Processes: The FRBR-CRM Harmonization", in *Digital Libraries: Research & Development*, First International DELOS Conference, C. Thanos, F. Borri and L. Candela Eds. Berlin-Heidelberg: Springer Verlag, 2007, pp. 114-123.
- [17] *Enabling Access to Sound Archives through Integration, Enrichment and Retrieval* (EASAIER): <http://www.elec.qmul.ac.uk/easaier/index.html>.
- [18] *Online Computer Library Center* (OCLC) <http://www.oclc.org/research/activities/fictionfinder/default.htm>.
- [19] *Music Ontology*: <http://musicontology.com> and Raimond's site, <http://moustaki.org/>.
- [20] *Variations3*: <http://www.dlib.indiana.edu/projects/variations3/index.html>.
- [21] A. Pompilio, "RePIM - Repertorio della Poesia Italiana in Musica, 1500-1700" in *Petrarca in musica*, Proceedings of the International Conference promoted by the National Committee on the Seventh Centenary of the Birth of Francesco Petrarca (2004), Arezzo, 18-20 March 2004, A. Chegai and C. Luzzi Eds. Lucca: LIM, 2005, pp. 391-396.
- [22] E. Vogel, *Bibliothek der gedruckten weltlichen Vocalmusik Italiens aus den Jahren 1500-1700*, reprint Hildesheim: G. Olms, 1962 and Nuovo Vogel, E. Vogel, A. Einstein, F. Lesure and C. Sartori, *Bibliografia della musica italiana vocale profana pubblicata dal 1500 al 1700*, Pomezia: Staderini-Minkoff, 1977.
- [23] *Biblioteca Italiana* (BibIt) is available at: [http://www.internetculturale.it/opencms/opencms/it/collezioni/collezione\\_0061.html](http://www.internetculturale.it/opencms/opencms/it/collezioni/collezione_0061.html).
- [24] *Liberliber* (Progetto Manuzio): <http://www.liberliber.it/libri/>.
- [25] *Antologie della Lirica Italiana*: <http://ali.unipv.it/>.
- [26] See S. Albonico, "Rasta. Raccolte a stampa antologiche del petrarchismo e della poesia italiana dal Cinque al Settecento", in *Il Petrarchismo. Un modello di poesia per l'Europa*, vol. I, L. Chines Ed. Roma: Bulzoni, 2006, pp. 311-348.
- [27] *Antologie di rime del Cinquecento* is available at: <http://www.sursum.unito.it/archivi/>.
- [28] C. Perelli Cippo, "Antologie di rime del Cinquecento: un progetto di schedatura elettronica" in *Il Petrarchismo. Un modello di poesia per l'Europa*, F. Calitti and R. Gigliucci Eds. Roma: Bulzoni Editore, 2006, pp. 583-588.
- [29] Museo internazionale e biblioteca della musica di Bologna: [www.museomusicabologna.it/](http://www.museomusicabologna.it/)
- [30] DIAMM: <http://www.diamm.ac.uk/index.html>.