

The Clavius Correspondence: From Digitization to Visual Exploration of Knowledge

by Matteo Abrate, Angelica Lo Duca, Andrea Marchetti (IIT-CNR)

The Clavius on the Web Project [L1] is an initiative involving the National Research Council in Pisa and the Historical Archives of the Pontifical University in Rome. The project aims at creating a Web platform for the input, analysis and visualization of digital objects, i.e. letters sent to Christopher Clavius, a famous scientist of the 17th Century.

In the field of Digital Humanities, cultural assets can be valued and preserved at different levels, and what is considered a knowledge resource can greatly vary depending on its peculiarity and richness. Within the Clavius on the Web Project we consider mainly two kinds of knowledge resources: contextual resources associated to digitized documents and manual annotations of cultural assets. For each of these knowledge resources, we implemented a different software: the Web Metadata Editor for contextual resources and the Knowledge Atlas to support manual annotation.

Semi-automated enrichment of catalogs: the Web Metadata Editor

Over the last years, a great effort has been made in the field of Digital Humanities to digitize documents and catalogs in different formats, such as PDF, XML, plain texts and images. All these documents are often stored either in digital libraries or big digital repositories in the form of books and catalogs. The process of cataloguing requires also the creation of a knowledge base, which contains contextual resources associated to documents of the catalog, such as the authors of the documents and places where documents were written. Information contained in the knowledge base can be used to enrich documents details, such as metadata associated to documents. Most of the existing tools for catalog creation allows to build the knowledge base manually. This process is often tedious, because it consists in editing well-known information about a document, such as the author's name and date of birth. In addition, this process is repetitive, because many documents are written by the same author and in the same place thus requiring to write the same information twice or more. In general this manual effort produces three main disadvantages: a) the probability of introducing errors increases, b) the whole process is slowed down because it is not automatic, c) inserted information is isolated, i.e. not connected to the rest of the Web.

In order to mitigate the described disadvantages in the context of the project, we developed the Web Metadata Editor (WeME) [1], a user-friendly Web application for building a knowledge base associated to a catalog of digital documents. Figure 1 illustrates a snapshot of WeME. While the application is envisaged for archivists/librarians, it can also be used by users without a specific background. WeME helps archivists to enrich their catalogs with resources extracted from two kinds of Web sources: Linked Data (DBpedia GeoNames) and traditional Web sources (VIAF).

WeME is published as an open source software on GitHub [L2]. WeME was tested by 31 users, of which 45,2% females and 54,8% males. Almost the half of testers was older than 35 years (48,

4%). In a scale ranging from poor (1) to excellent (5), the overall score about WeME was 4 for the 50% of testers, 5 for the 20%, 3 for the 23,3% and 1 or 2 for the remaining. Tests indicate that WeME is a promising solution for reducing the repetitive, often tedious work of archivists.

Visual exploration of knowledge: Knowledge Atlas

Creating a catalog and digitizing the assets from the archive, while fundamental, soon proved not to be sufficient to support scholars, teachers, students, or the public at large in understanding the richness of the knowledge the archive contains. We thus started the development of *Knowledge Atlas* [L3], a user interface designed with the following principles:

- 1) **Visualization and interaction** - *Content presentation should take advantage of the visual expressiveness and interactivity of modern web technologies.* An example consists in the interactive recreation of instruments made of rotating wheels of paper, called *volvellae*, which also enables scholars to investigate about their purpose without risking to damage the original artifacts.
- 2) **Depth and details** - *Content presentation should explicitly show many different layers of analysis and highlight portions of interest.* For example, a representation of the Kunyu Wanguo Quantu chinese map is displayed with highlighted toponyms and cartouches, with which the user can interact to read Chinese transcriptions and Italian translations. Each text can then be further explored to reach information about specific Chinese graphemes (Figure 2).
- 3) **Context and links** - *The presentation of the main content should be complemented with presentations of contextual information.* Such presentations should enable navigation from content to context and vice versa. For example, senders, recipients and cited historical characters related to the figure of Christophorus Clavius [2] constitute a graph of correspondents, which can be navigated by itself or starting from a specific passage of a letter. The set of evolving mathematical or astronomical conceptualizations and the related lexical terms in Latin, Italian or Greek are other examples [3].
- 4) **Divulcation and correctness** - *The presentation of content should feature specific design choices aimed at capturing the attention of students or casual readers, by leveraging powerful visual languages and a systematic organization.* The power of providing a structured and intuitive overview should be used as a gateway to lead to the most complete and correct information available. As an example, the representation of the context of the already mentioned letters by Galilei about the model of our Solar System is a visual diagram making use of a distorted scale. Still, the actual distances and sizes of the objects can be appreciated by accessing detailed data.

Our current platform, in active and open development on Github, implements this design without being too tied to the specificity of the content. By following this methodology, we believe that our software will prove to be useful in contexts beyond the mentioned projects. We are already experimenting with other content, such as more maps, books, or paintings, but also with models of buildings or complex structured data about the Internet.

Links

[L1] <http://claviusontheweb.it>

[L2] https://github.com/alod83/metadata_editor/wiki

[L3] <http://atlasofknowledge.it>

References

[1] LO DUCA, A. et. al. "Web Metadata Editor: a Web Application to Build a Knowledge Base Based on Linked Data". 2017. Third International Workshop on Semantic Web for Scientific Heritage, Portoroz, Slovenia, May 29th.

[2] ABRATE, Matteo et al. "The Clavius on the Web Project: Digitization, Annotation and Visualization of Early Modern Manuscripts". AIUCD Annual Conference, 2014.

[3] PICCINI, Silvia et al. "When Traditional Ontologies are not Enough: Modelling and Visualizing Dynamic Ontologies in Semantic-Based Access to Texts". DH 2016.

List of Figures

Figure 1 A snapshot of WeME.

Figure 2 A screenshot of Knowledge Atlas showing information about a Chinese radical.

Contact Address

Andrea Marchetti

+39 050 315 2649

andrea.marchetti@iit.cnr.it

Selected Record

Here you can visualize, modify, delete the record you selected and visualize the associated ones.



Michelangelo Buonarroti



Info

Birth Date: 06/03/1475

Birth Place: Caprese

-

Death Date: 18/02/1564

Death Place: Rome

Bio

Michelangelo di Lodovico Buonarroti Simoni ([mike'landzelo]; March 1475 – 18 February 1564), was an Italian sculptor, painter, architect, poet, and engineer of the High Renaissance who exerted an unparalleled influence on the development of Western art. Considered to be the greatest living artist during his lifetime, he has since also been described as one of the greatest artists of all time. Despite making few forays beyond the arts, his versatility in the disciplines he took up was of such a high order that he is often considered a contender for the title of the archetypal Renaissance man, along with his fellow Italian Leonardo da Vinci. A number of Michelangelo's works in painting, sculpture, and architecture rank among the most famous in existence. His output in every field of interest was prodigious; given the sheer volume of surviving correspondence, sketches, and reminiscences taken into account, he is the best-documented artist of the 16th century. Two of his best-known works, the Pietà and David, were sculpted before the age of thirty. Despite his low opinion of painting, Michelangelo also created two of the most influential frescoes in the history of Western art: the scenes from Genesis on the ceiling of the Sistine Chapel in Rome, and The Last Judgment on its altar wall. As an architect, Michelangelo pioneered the Mannerist style at the Laurentian Library. At the age of 74, he succeeded Antonio da Sangallo the Younger as the architect of St. Peter's Basilica. Michelangelo transformed the plan, the western end being finished to Michelangelo's design, the dome being completed after his death with some modification. In a demonstration of Michelangelo's unique standing, he was the first Western artist whose biography was published while he was alive. Two biographies were published of him during his lifetime; one of them, by Giorgio Vasari, proposed that he was the pinnacle of all artistic achievement since the beginning of the Renaissance, a viewpoint that continued to have currency in art history for centuries. In his lifetime he was also often called Il Divino ("the divine one"). One of the qualities most admired by his contemporaries was his terribilità, a sense of awe-inspiring grandeur, and it was the attempt of subsequent artists to imitate

Associated Places



Caprese



Rome



Roma

Associated Cho



Tondo Doni

Figure 1

水



Atlas > Projects > Totus Mundus > Language > Radicals

水

WATER
Radical

85 radical number

4 stroke count

水 variants

shuǐ pinyin

IT
EN

acqua
water

57 弓 gōng bow	58 彳 jì snout	59 彡 shān bristle	60 彳 chì step	61 心 xīn heart	62 戈 gē halberd	63 戶 hù door	64 手 shǒu hand
65 支 zhī branch	66 支 pī tap	67 文 wén literature	68 斗 dǒu dipper	69 斤 jīn axe	70 方 fāng square	71 无 wú negative	72 日 rì sun
73 日 yuē say	74 月 yuè moon	75 木 mù tree	76 欠 qiàn owe	77 止 zhǐ stop	78 歹 dǎi death	79 殳 shū lance	80 母 mǔ do no
81 比 bǐ compare	82 毛 máo hair	83 氏 shì clan	84 气 qì steam	85 水 shuǐ water	86 火 huǒ fire	87 爪 zhǎo claw	88 父 fù father
89 交 jiāo intertwine	90 片 piàn splinter	91 片 piàn slice	92 牙 yá fang	93 牛 niú cow	94 犬 quǎn dog	95 玄 xuán dark	96 玉 yù jade
97 瓜 guā	98 瓦 wǎ	99 甘 gān	100 生 shēng	101 用 yòng (chǔān)	102 田 tián	103 疋 pǐ	104 疒 nè

Figure 2