Scientific Report of the international workshop "Digital Support for Manuscripts Analysis", Hamburg, 23-24 July 2010.

The purpose of the visit to Hamburg, which took place between the 22nd and 24th of July 2010, was to assist to the COMSt workshop "Digital Support for manuscript Analysis".

In the morning of July 23rd the first round discussion was devoted to digitisation techniques in general.

The first speaker, Prof. Manfred Thaller (Cologne University, Germany) presented an overview of different digital archives, such as monasterium.net and iteranova.be, which collaborates in order to create a virtual research environment. Different research units collaborates, using integrated tools, to acquire pieces of information and then edit, transcript, manipulate and digitise them. Comparing all these different project, it seems necessary to pin down on the role of codicology; moreover, there are no standard software available yet to uniform all the research's unit.

Then Andreas Lammer (Cologne University, Germany) presented a paper entitled "Behind the scenes of the *Digital Averroes Research Environment*". This project started several years ago, beginning from Arabic texts and going on with other languages. Early the difficulty in obtaining manuscripts, the lack of uniformity and the significant linguistic and historical differences have always been huge problems. This project utilizes a TEI editor, the same used by the ARACNE Project, which represents the photographed object giving all the relevant information. Uniformity in texts' segmentation is an essential prerequisite for comparison, within the same language or not. Many questions about the segmentation to be chosen, the enormous amount of textual evidences (partial or complete) are still open and under discussion.

Prof. Johannes den Heijer (Catholic University Louvain, Belgium) presented an overview of the MANUMED Project. This project collects manuscripts coming from Mediterrean areas and all the cultural witnesses of such a region. Flexibility is the most important feature of this work, because there are obstacles due to legal ownership. Moreover, a good balance between images' quality and an easy access should be reached. In other words, the aims are: conservation, digitisation, processing metadata (catalogues). A cue for COMSt activity could be to make an inventory of similar project, in order to unify metadata's standards.

In the afternoon of the same day, the second round discussion was devoted to special cases of digitisation techniques.

Michael Phelps (Early Manuscript Electronic Library) examined 44 palimpsest manuscripts kept in the Monastery of Saint Catherine on Mount Sinai. Then 16 of them were chosen for the study their electromagnetic spectrum. The aim was to maximize data collection, and to create a high-quality data archive. Three modalities of image capturing and two techniques of image processing have been used, since not every frequency generates a recordable image. Pseudo-colors can be created to highlight both texts of the manuscript. A special technique, using a cradle, has been adopted to analyze fragile manuscripts.

Prof. Jost Gippert presented a speech entitled "Perspectives of Multispectral Imaging". From 2003 until 2008 this method has been tested on Gothic palimpsest, ancient Georgian palimpsest and Albanian and Caucasian palimpsest. The MUSIS system is used with the aim of a higher resolution, to extend the software's functions (this last feature has been adopted since January 2010). A special attention is given to the light's sources, and at least three different images are necessary for the resolve analysis. This method allows to read even the erasures. The next target is the collection of Georgian palimpsest, with a particular attention to the one kept in Leipzig.

Steven Delamarter (George Fox University, USA) presented an overview on "The Ethiopic Manuscripts Imaging Project's (EMIP) Digitization Station for Manuscripts and Microfilm". This

project works with dealers and owners in North America and Ethiopia to create a digital proxy for manuscripts and microfilms. Ethiopia's microfilms are often damaged and a great number of originals has been lost. Until now, almost 7000 manuscripts have been digitized.
In the morning of July 24th the third round discussion was devoted to material analysis, focusing on tools and techniques.
Ira Rabin (Federal Institute for Materials Research and Testing, Berlin, Germany) spoke about "Writing materials database as a future dating tool". For the carbon-14 dating analysis a consistent quantity of material should be taken, so it could be of some advantage to examine writing materials and implements, since their use is determined in time. Chemometric is a branch of chemistry which works with statistic and mathematic methods, collecting as much data as possible. Moreover, traces of other materials contained in inks could be helpful for localization, rather than for dating.
Steven Delamarter presented a second contribution on "X-Ray spectroscopy and a Fourier Transform-in frared analysis of Ethiopian Inks". Writing materials should be studied for authentication and dating Black and red inks are traditional, acetate's traces could be a sign of a later add. A pilot-study has been carried on analysing 20 manuscripts, both Christian and Islamic.

Concerning the best practice in a survey of tools and techniques, the less damaging method has been pointed out as the best.
In the afternoon of the same day, the fourth round discussion was devoted to support for codicological and paleographic analysis.
Bernd Neumann (Hamburg University, Germany) presented a speech entitled "Developments in digital-supported paleographic analysis". The work is divided in different points. The first deals with the image restoration and segmentation, to remove back ground variations and noise by anisotropic diffusion. Segmentation could be, instead, pixel-based or of sub-pixel accuracy. The second focus is handwriting identification. State of the art: sophisticated mathematic model have been elaborated to fulfill such aims. Then a case study of handwriting verification was presented: by CEDAR FOX software an attempt has been done with a Hermann Melville's article. This kind of approach could be extended to a comparison of words, and may be also to different alphabets. But it remains an incomplete prototype, not yet applicable to paleographic analysis. To improve such a system, a close collaboration between computer scientist and paleographers could be desirable.
Torsten Schaßan (Herzog August Library, Wolfenbüttel, Germany) presented a contribution entitled "Trends in codicological and paleographic analysis and description". After a full and exhaustive presentation of materials (manuscripts, watermarks, historical bindings) and methods (portals, data structures and research environments) the speaker draw some conclusions: approaches in codicology seems to be more old fashioned than other branches, for this reason the introduction of semantic could change such a situation, even if semantic works are on a very low level of aggregation and exchange of data. Paleography, instead, seems to utilize more advanced approaches, but there are still many steps to do, at least to verify the automatic derived results. Long-term preservation of digital materials is easier the more data is used by a greater number of people, so everybody who publishes material, that can be useful for others, should offer the possibility to use them as services.
Matthew Driscoll and Eric Haswell (Copenhagen University, Denmark) presented "Linking text and images", a contribution presenting the TEI XML language, which allows to link different sections outside and within texts. Another tool is IMT, the most advanced nowadays, it works with pixel and it is an interesting starting point for future researches; also because TEI XML is more complex and needs more demanding supports.

After the concluding discussion the decision of the Workshop an online database has been set up for various project dealing with Oriental (and not only) manuscript studies. The list has parted from

that of projects concerned with digitalisation, as this was the main theme of the workshop, but the list should be continued and elaborated, in order to share as much information as possible.

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