Incunabula Basilea: a Web 2.0 application as research tool to early prints

Lukas Rosenthaler, Patrick Ryf; Imaging & Media Lab, University of Basel; Basel, Switzerland

Abstract

While the digitization of books offers great values by facilitating access, the careful design of the access-software can greatly enhance the value of a digital library. The access-software of many digital libraries just mimics the behavior of printed editions. Using the new features that the Web 2.0 (collaboration, AJAX, DHTML, dynamic web-pages, JavaScript etc.) and the multimedia-based characteristics of hyper textual linking offers, the access-software can be enhanced to a full-fledged research tool that goes way beyond just displaying digitized pages of text. Within the research project "Incunabula Basilea: Late-medieval doctrine as image and text reading", an interdisciplinary research project by the imaging & media lab and the Department of Art History of the University of Basel, such a enhanced web-application will be developed (An incunabulum is a book, single sheet, or image that was printed - not handwritten - before the year 1501 AD). The web-application will implement an expert's Wiki-concept which allows to interconnect books, pages, parts of pages, images and image-regions with rich, commented links. When populated, this web of links allows an in-depth analysis the relationship between the different works represented in the database.

In our case, this will be exemplified by the works of Sebastian Brant (1457-1521), a humanist and satirist from Basel/Strasbourg who published 1494 AD an allegory called "Das Narrenschiff" (the fools ship). This work was very influential and incorporated many engravings by Albrecht Duerrer. Within the framework of our web-application, experts worldwide will have the possibility to link pages or areas of pages to other works, pages, page-areas or images, available either in- or externally, in a intuitive manner using a GUI and comment these links. The general user will have the possibility to follow these commented links and perform network analysis in order to find non-obvious connections between the different works. The web-application is developed using code-igniter, a PHP-based model-view-controller framework and makes heavy use of advanced AJAX and JavaScript/CSS technology.

Introduction

The main goal of this approach is to use all the technical possibilities that a modern, dynamic web application offers to support conventional analysis for historical and art-historical research. Research in these two domains is usually based on the analysis of authentic documents, on edited and printed ones as well as on facsimile editions. For particular analysis, it might be necessary to analyze the authentic document. But most historical and art historical research already uses common printed editions in various ways.

Many researches working on projects still use the computer as typewriter only or as a facility to find printed editions in libraries. Working with printed editions implies that the retrieved information is only available in the order already given. This order might fit the topic of the book but it does not complement the topic of the researcher. To find adequate information for your own topic, you have to gather it. You never get this information quickly and clearly arranged. With our approach it will be easier to get the searched information instantly after having found one topic. The information the researcher has searched for can be symbolized by bookmarks that automatically retrieve further bookmarks in the same book matching the initially set bookmark.

In the Incunabula Basilea project, the bookmarks described do not only correspond to common text but also to images or parts of images. With our web 2.0 application we are going to connect a bookmark system to an information network. The system will be comfortable and also useful for the researcher. Hence, it will bridge the gap between technological possibilities and the needs and wishes of researchers.

Aim of the Project

Incunabula, that is *printed* books that were produced before the year 1501 AD, are often compilations of fragments of other – printed or handwritten – books and are therefore intrinsically linked to a wide variety of other original work. In the center of this research project is the allegory "Das Narrenschiff" which was published 1494 AD by Sebastian Brant, a humanist and satirist from Basel/Strasbourg. This work is a compilation of text and images, many of them engraved by the artist Albrecht Duerrer, about morality and virtue. In fact, there is evidence that it is basically an illustrated book where the texts accompany the images and not vice versa. Both the images and the accompanying texts are often arranged copies from other sources. The book "Das Narrenschiff" war probably one of the first bestsellers in the history of printing and had a wide influence on other works.

The goal of our project is to make the "Narrenschiff" and the most important works by which it was influenced and the works it influenced itself available as digital facsimiles and to create a tool to navigate and research the entanglement of cross-references. The cross-references will include text-text, text-image and image-image relationships. The cross-references itself which connect the different items will be annotated and should thus be considered as *rich links*. Therefore the hyper textual and multimedial character of the web makes a web application a natural choice for such a task. However the complexity of information that must be presented to the user make modern web-technologies such as AJAX (Asynchronous JavaScript And Xml) and dynamic programming using JavaScript mandatory in order to create a simple user interface with a positive user experience. In addition, we expect
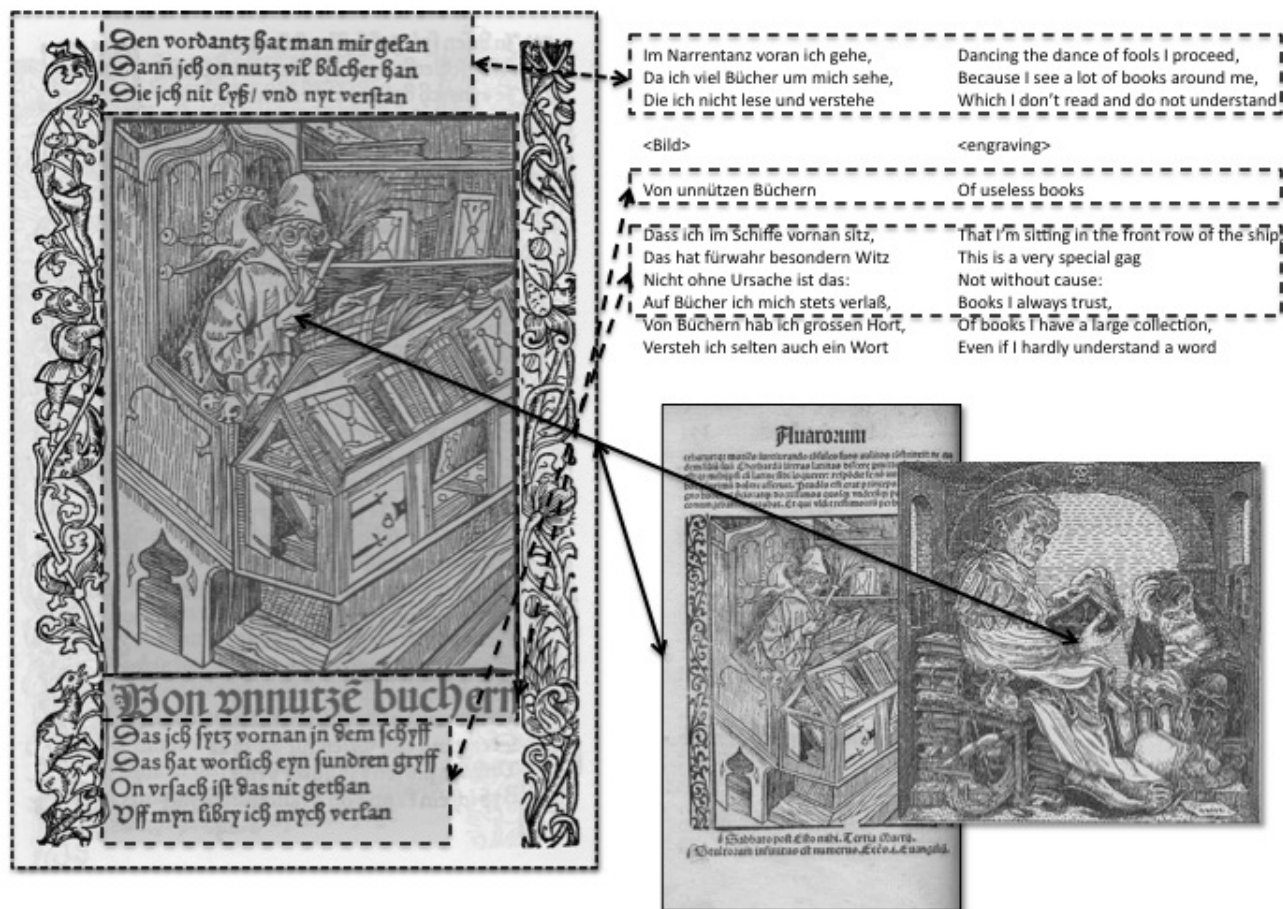
Figure 2 *The dashed arrows depict cross-references between text regions in the digitized page and their transcripts. The solid arrows depict cross-references to other works. All of the arrows have associated information and form as such rich links. All this information is represented in the database and accessible through an easy to use user interface.*

that while using the tool experts will add new references to it. Therefore a user concept and user authentication has to be implemented in order to add new references, upload images and scans etc. . Thus the application will have the character of a highly dynamic Web2.0 application using the most recent web-technologies. While the application is being developed based on Sebastian Brant's "Das Narrenschiff" and related works, the design will be flexible enough that it can be used for other groups of works. In parallel to the development of the Web2.0-application, the University Library of Basel will digitize the "Narrenschiff" and related works.

Implementation

The implementation is roughly based on the LAMP (Linux, Apache, MySQL, PHP) architecture. As such, it is easily portable to different computer architectures (Linux, legacy Unix systems, Apple's OS X and Windows). In addition, the use of open source components will facilitate the distribution of the application to other institutions.

Data Model

Since MySQL is used as a database engine, a relational data model has been chosen. However, the underlying structure of the real world objects (books, pages, images etc.) and cross-references (rich links) imply that some aspects of a Resource Description Framework (RDF-Model as proposed by the W3C) have to be implemented on top of the relational model. In addition the database is designed to support multilingual texts and translations of original texts. Since images or rectangular parts of images ("regions") can act as start- or end-points of cross-references, some image-specific positional data has to be incorporated. This task is facilitated by the support of geospatial data types in the latest MySQL versions. The database tables can be grouped into categories dealing with user authorization, sources (books, paintings etc.) and their digital representation, transcripts and rich links.

Software Frameworks

On the server side, we are using the PHP-based toolkit Codeigniter [1] that implements a MVC (model-view-controller) framework with a very small footprint. On the client side (JavaScript, AJAX), we are working with jQuery [2], an extensible JavaScript (AJAX framework. The web pages will conform to the XHTML 1.1 standard.

User Interface

In order to overcome the traditional limitations associated with web-based application (slow reloading of web pages, little interactivity, rather static appearance) the user interface makes intense use of the dynamic features that are offered by JavaScript in conjunction with the Document Object Model (DOM). The editor interface allows defining hierarchical regions of interest within the digitized facsimiles that may be linked to other sources in order to create commented cross-references. These regions may also correspond to the appropriate regions of transcribed texts (if available).

Conclusion

The web-based application we are developing goes well beyond the presentation of digitized content on the web. Using the latest web-based technologies and implementing rich links, it will offer new research possibilities such as network analysis in order to find non-obvious connections between the different works.

The goal is create a novel research tool that allows to combine expert knowledge about art history and literature and to unearth up to now hidden relationships between more or less loosely related works. The Web 2.0 characteristics assist collaboration between the researchers and allow to dynamically expanding the knowledge base. The early Basle prints are an ideal test case for such an application. However the application is being designed in a way that it can be used for other, alike works.

References

[1] http://codeigniter.com
[2] http://jquery.com

Author Biography

Dr. Lukas Rosenthaler, got 1987 a Ph.D. in Applied. From 1988 to 1992 he worked as postdoc at the Swiss Institute of Technology in Zürich in image analysis, 1992 to 2001 he worked in the field of computer graphics, visualization and movie film restoration. Since 2001 he is a full time staff member of the Imaging and Media Lab of the University of Basel, Switzerland.

M.A. Patrick Ryf studied history, computer science and east european history at the University of Zurich with the focus on network analysis of social networks in mediaeval Zurich of the 14th. century. Since 2008 Patrick Ryf works as Ph.D student in the Incunabula Basilea project, a Swiss National Science Foundation project.
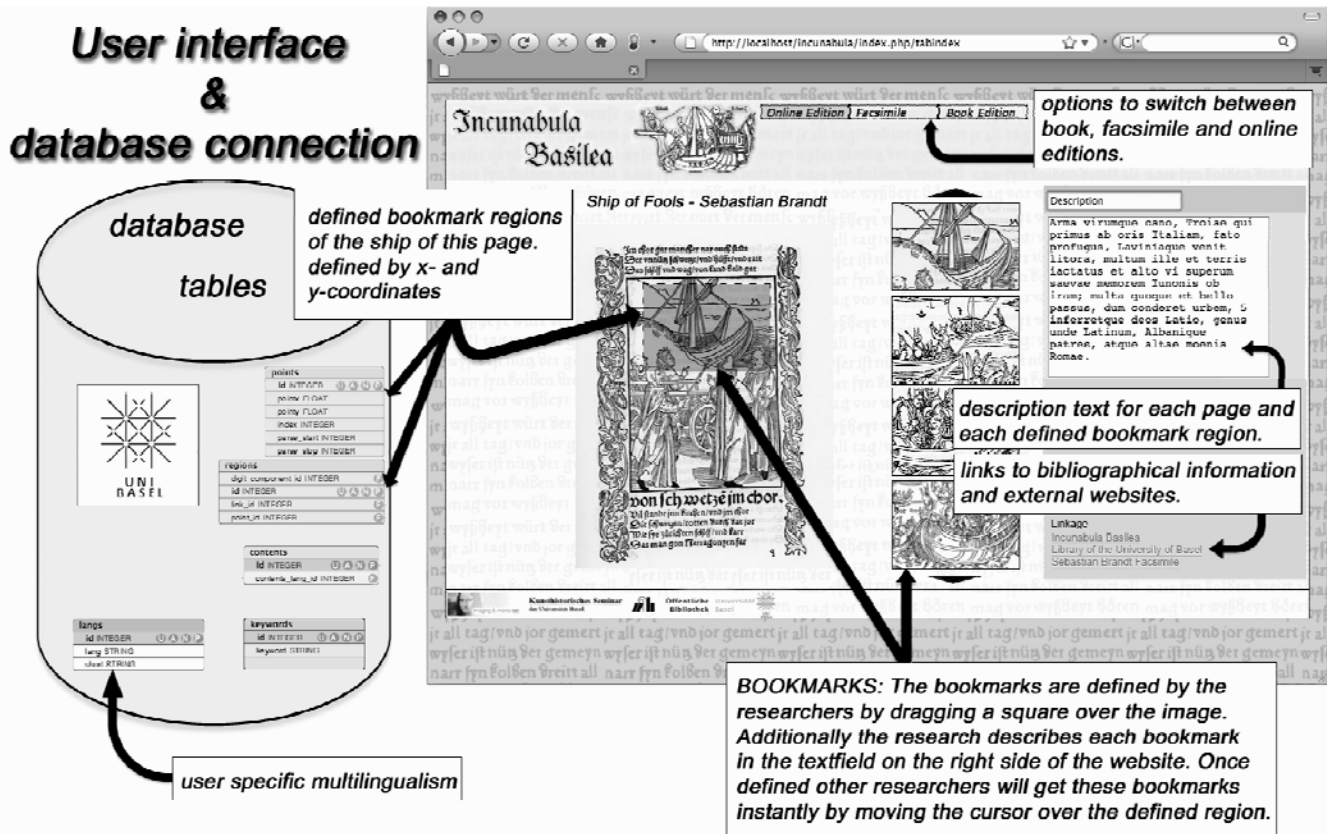
Figure 2 *Overview of the user interface concept that will be used. Using AJAX and JavaScript to create a highly dynamic user interface, the interface will be very easy to navigate and be very responsive and thus guarantee a high efficiency and productivity for the user.*