

DIGITAL MEDIA LIBRARIES: BEYOND ONLINE PUBLICATION OF INFORMATION

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EDITORIAL

Information technology is rapidly evolving unmistakable characteristics. It is becoming more advanced, more popular, more standardized, simpler to develop and to deploy, and more empowering. The latter characteristic is perhaps the most important. Similar to the desktop publishing revolution triggered by the popularization of software and personal laser printers, the world-wide web has empowered the individual to easily share information. However, the web has gone beyond being an instant publication and information sharing tool. Publishers and users of that information quickly realized that they needed to be able to organize and find the information in a predictable manner. Thus, several large companies, such as Yahoo and Google, started developing technologies and web sites that provide tools to search the world-wide web and organize the information they find. Soon after, these database-linked technologies became available to individuals allowing them to store their own information in organized databases and offer dynamic web sites that search and fetch that information on the fly. The "net effect" is that the individual became empowered not only to publish information, but to do so in a searchable and dynamic manner that responds to the needs and queries of the user browsing that information. Researchers then started questioning this phenomenon: How can one ensure that online information is easily accessible, accurate, dependable, current, organized, standardized, searchable, secure, efficient, relevant, and connected? These issues would not have been open for investigation if it was not for the maturity and popularity of information technologies that link published information to back-end databases and to software that can search, retrieve, compute, and save this information.

In this Special Issue of ITCon on Digital Media Libraries the reader will find research papers that attempt to address the above issues. Some of the common themes that emerged from these papers are the following. First, the world-wide web has become the de-facto standard platform for online publication. Stand-alone solutions that require the user to download specific software are quickly giving way to web-based interfaces that require nothing more than a modern web browser with a few standard plug-ins. Second, information is no longer limited to text. Databases and web interfaces are capable of searching, retrieving, displaying and reasoning about multimedia artifacts such as images, video, sound clips, and 3D models. Third, to ensure the security and relevance of data, systems must have knowledge about their users. Thus, systems are checking the users' credentials and assigning roles and access privileges such that they offer only relevant and permissible information. Fourth, the world-wide web offers the ability to support collaborative activity. Thus, more recent systems are group-aware such that they enable multiple users to synchronously and asynchronously share and act on information to accomplish a common task. Finally, reasoning about information requires the encoding of more information – meta-information. Metadata has become a crucial research topic for researchers wishing not only to share information in an organized manner, but to also allow systems and users to reason about the information they have.

The first paper, authored by Ann Heylighen, Herman Neuckermans and Mathias Casaer, titled "ICT Revisited", reports on a precedent-based tool called DYNAMO that assists users in learning from design precedents. DYNAMO is inspired by the theory of dynamic memory and conceived as an interactive system that evolves and learns as it is being used. DYNAMO stores and indexes case studies as a mix of files that include text, images, and 3D models. The authors have deployed and tested DYNAMO both in education and practice, but conclude

that despite the evolution of their system and its relevant success in academia, they are unsure about its potential in design practice.

The second paper, authored by Guillermo Vasquez de Velasco and Huihui Zhang, titled "Electronic Pin-Ups: On-line Depository of Graduation Design Projects", describes the relationship among virtual design studios, online design reviews, and digital storage of design projects. The authors were mainly concerned with the reduction of set-up effort and the ease of access to project information. Their three-tier system links an HTML and Javascript web client to a middle layer of business logic that in turn links to an SQL server database. The authors aim to interlink their efforts with others to create digital networks and a collective depository of design projects.

The third paper, authored by Rudi Stouffs, Jan Kooistra and Bige Tunçer, titled "Metadata as a Means for Correspondence on Digital Media", presents research on the development of a new methodology for the exploitation of precedent knowledge in design education. The contribution of this research is the introduction of a theory of adaptive systems, and the application of this theory to the construction of a new kind of digital media library in design education. Based on this theoretical approach, the authors report on the development of the "InfoBase project", a research related to the usage of digital libraries that advance both design education and design research.

The fourth paper, authored by Robert Woodbury, Michael Docherty and Hank Szeto, titled "The Design and Implementation of a Repository for Digital Cultural Artifacts", elaborates on the motivations behind, and implementation of a web-based data repository. The paper describes the experience of designing A•VI•RE. Certain aspects of this ambitious work are similar to earlier work done by the authors, as well as a number of other researchers. The distinctive features of the present work relate to fostering a community around the digital resource.

The fifth paper, authored by Irina Kondratrova and Ilia Goldfarb, titled "Knowledge Portal as a New Paradigm for Scientific Publishing and Collaboration", addresses problems encountered by many research communities, and offers a case study as a generic template. The references to (for example) Onefish and UNESCO illustrate other research communities employing similar strategies. The paper describes the development of a knowledge portal for online resources in the area of environmentally friendly concrete. The focus is directed towards knowledge sharing and technology transfer.

The editors' own experience with systems that support the collaborative submission and review of shared information corroborates and overlaps with much of the research reported here. The ViSTA system (Jabi, 2003) for example uses the metaphor of a slide tray to store, organize and display digital assets. ViSTA has been successfully deployed in the History of Architecture courses at the New Jersey Institute of Technology. CAMEO, which stands for Computer-Aided Membership and Event Organization, is an object-oriented system that enables an academic/scientific organization to administer its members and events. CAMEO was developed as an implementation of a set of conceptual guidelines developed through a historical survey of computer-supported cooperative work. CAMEO is composed of three main applications: 1) a membership management system, 2) a conference registration system, and 3) a double-blind review system. All three systems extensively share reusable components that were developed using a three-tier, object-oriented software development and application server system that enables the creation of interactive web-based software.

CUMINCAD, the Cumulative Index on CAD that was initiated in 1998 (Martens and Turk, 2003), has currently over 6,400 CAAD-related publications recorded and from these nearly 4,000 full papers in pdf-format have been made available. All in all over 2,000 users have registered for this service. Registration for CUMINCAD is free, but download of full pdf-papers is restricted to members of the contributing CAAD-associations ("added value of membership" for nearly 500 individuals). In the framework of the SciX-project, substantial extensions to CUMINCAD could be realized as this repository was run only on a shoestring budget before the start of this project. SciX stands for "Open, Self Organising Repository for Scientific Information Exchange". The project's goal is to analyze the business processes of scientific publishing, to invent new publication models, and through a series of pilots to demonstrate how this should work. CUMINCAD is based on SOPS ("SciX Open Publishing Services" – <http://www.scix.net/sops.htm>) – a set of services from which various electronic publishing resources, such as e-journals, peer reviews, specialized repositories etc., can be set up to support efficient collaboration and knowledge management. SOPS is multilingual and exists in English, German and Slovenian languages. Upon agreement of the software license, SOPS can be used for free. However, the customization of a specialized

SOPS-solution can not be realized for free, as manpower is needed. In most cases setting up a new service does not require specific input other than filling out a web form. OAI compatibility (Open Archives Initiative) allows data to be transported to any other service platform, if so required. The entry, manipulation and consolidation of data is handled in the sense of self-organization: activists take care, for example, of the recording of annual proceedings. Minimal training is necessary to get this operational.

Other systems used for online submission and review of information stress hierarchy, competition, and social-unawareness as important but often ignored aspects of assuring the scientific integrity of published information (Martens, Jabi et.al., 2004).

In conclusion, the body of research presented here leads to the inevitable inference that more communication among researchers is needed to avoid duplication. This can be achieved by inventing, sharing, and interconnecting a more open, standardized, and modular software architecture and associated repositories of information that can enable developers to build on and extend the work of others. Yet, this information will be hard to reason about without a well-developed association with metadata to ensure its semantic clarity. That is why efforts such the Semantic Web and the development of the XML standard are so important to the development of digital media libraries.

REFERENCES

- Jabi, W. (2003). Reflections on Computer-Supported Cooperative Design Systems, *CAAD Futures 2003 Proceedings*, Kluwer Academic Publishers, Netherlands, pp. 169-180
- Martens B., Jabi W., Cerovsek, T. and Penttilä, H. (2004). *Web-Based Platforms for Collaborative Submission and Review of Shared Information*, CAADRIA 2004 – Proceedings of the 9th International Conference on Computer Aided Architectural Design Research in Asia, pp. 49-63
- Martens, B. and Turk, Z. (2003). *Cumulative Index of CAAD: Current Status and Future Directions*, in: Int. Journal of Architectural Computing – Volume 1: Issue 02: July 2003, pp. 220-231