

Next-Generation Digital Libraries: Universal Knowledge Environments

Report on Networking Session N 71 (ID 529)

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The networking session on Next-Generation Digital Libraries was one of approximately 70 networking sessions that took place during the IST 2004 Event between the 15th and the 17th of November 2004. It was accepted among almost 160 proposals for such sessions and was attended by roughly 45 persons in a fully-packed room. Professor Yannis Ioannidis of the University of Athens was the convener and coordinator of the session on behalf of the EU-funded DELOS Network of Excellence on Digital Libraries. The agenda of the session was as follows:

<i>Introductory Presentation</i>	
Yannis Ioannidis (U. Athens)	Vision of future Digital Library Systems with respect to both research and practice, reflecting the results of a Brainstorming Workshop organized by the DELOS NoE in July 2004 in Corvara, Italy.
<i>Panel Discussion</i>	
Hans-Jorg Schek (ETH and UMIT) Peter Buneman (U. Edinburgh) Yannis Kliafas (Athens Tech. Center) Peter Doorn (KNAW) Eelco Bruinsma (private consultant)	Presentations elaborating on some more specific aspects of Digital Libraries and what their future looks like, additional topics and perspectives not addressed in the introductory presentation, or refutations of points in it.
<i>Open Discussion with the Audience</i>	

The introductory presentation focused on the new meaning assigned to the term Digital Libraries and correspondingly to the functionality expected from future Digital Library Systems. It outlined the main characteristics of present-day systems and the methodology that has been followed in order to develop them. It then highlighted the major conclusions of the Corvara Brainstorming Workshop: Digital Libraries encompass technologies traditionally associated with Digital Archives, Digital Museums, and other systems managing collections of information organized to be kept for depth of time as well. Future Digital Libraries will be developed in a user-centred fashion, offering diverse and unique experiences to their users. Furthermore, they will not be mere passive repositories of society's information and knowledge, but will incorporate functionality that facilitates collaboration, communication, and information creation. Finally, they will

be created on top of *generic* Digital Library Management Systems, which will already provide all the basic system infrastructures, focusing only on the particularities of their individual environments. The presentation ended with current thoughts about a possible change of the name “Digital Libraries” for the field and the current front-runner, which is “Dynamic Universal Knowledge Environments”.

In the panel discussion, each panellist¹ brought up additional, complementary, and sometimes even contradictory viewpoints to the above vision. Prof. Schek discussed the impact that emerging distributed-system architectures will have on Digital Library development. He focused, in particular, on Grid and Peer-to-Peer architectures and discussed how Digital Library functionality may be supported on top of them, including issues of workflow and service management. He also overviewed the challenges in the area of complex similarity searches, which are critical given the diversity of information forms that may be found in Digital Libraries. Prof. Buneman’s observations had to do with Digital Libraries as an active collaboration tool and the role that annotations and provenance are called to play in this. His motivation was primarily from the needs of physical scientists in their experimental studies. Dr. Kliafas gave an industrial perspective to the future of Digital Libraries. Drawing on the demands that arise in sectors such as media production, banking, and cultural heritage, he emphasized the need for Digital Library design to begin at the user-level functionality and not the information contents. In the same spirit, he also discussed the great importance of personalization in Digital Libraries. Prof. Doorn gave the perspective from the Humanities. He focused on historical information preservation and gave several paradigms of how it should be approached in the future. He also brought present-day Digital Libraries and Digital Archives side by side and elaborated on the synergies and commonalities between them, speculating on the future merge of the two technologies into one. Finally, Dr. Bruinsma analyzed several policy issues that need to be taken into account as the field moves ahead. Intellectual property rights, different cultural perspectives, and other such topics occupied much of his presentation. He drew most of his arguments from cultural heritage applications, especially Digital Museums, but emphasized the genericity of most issues and their applicability to most environments as well.

In the discussion that followed, several members of the audience addressed questions to the panellists, on topics that ranged from scientific issues (e.g., Digital Libraries over the Grid as it is being developed now), to policy issues (e.g., what governments should do in order for multiple organizations to be able to share their collections without losing their current rights), and even to opinions on a possible new name of the field (e.g., the use of “Knowledge” in the name may be confusing given its established meaning in Artificial Intelligence.)

Overall, the session was considered by all a success. Several post-session discussions were started on potential collaborations between DELOS and other organizations. It was clear to many that, indeed, Digital Libraries have the potential to become the universal

¹ Short biographies of the panelists are appended at the end. Due to illness, Prof. Buneman was unable to participate, but the high points of his presentation were brought up during the discussion by Prof. Ioannidis.

knowledge repositories and communication conduits for the future by which everyone will access, discuss, evaluate, and enhance information of all forms.

APPENDIX: Participants

Coordinator

Yannis Ioannidis is a professor at the Department of Informatics and Telecommunications of the University of Athens. His research interests include database and information systems, digital libraries, scientific databases and scientific workflows, e-health systems, and human-computer interaction. He has participated in several research and development projects in the above fields, including including DELOS, BRICKS, and DILIGENT, which are currently active under FP6. Between July 2002 and March 2004 he served as the Information Technology advisor to the Minister of Health of Greece.

Contributors

Eelco Bruinsma has worked as an independent multimedia, developer, interface designer and consultant since 1996. He lectured in Computing in the Humanities at Leiden University during the period 1997-2000. He has served as Director ad interim of the Netherlands Digital Heritage Association (DEN) (1999), has worked on the the TaskForce eCulture that wrote the eCulture vision-document for State Secretary for Culture van der Ploeg, has been member of several jury's to assess the quality of educational and general digital heritage projects. He has also been the co-ordinator of the NWO ICES-KIS consortium, and coordinator and editor of the Dutch national pages following the Lund principles.

Peter Buneman is a professor at the School of Informatics at the University of Edinburgh, a member of Member of [Laboratory for Foundations of Computer Science](#). He is the director of the Data Curation Center and affiliated with the National e-Science Center, both located in Edinburgh. He has done extensive research in several fields of computer science, with a keen interest in data curation, database management, e-science, scientific/biological databases, heterogeneous data integration, data annotation, data provenance, programming languages.

Peter Doorn is head of the Department of Historical Information Science of the Nederlands Instituut voor Wetenschappelijke Informatiediensten (NIWI - Netherlands Institute for Scientific Information Services) of the Koninklijke Nederlandse Akademie voor Wetenschappen (KNAW - Royal Netherlands Academy for Arts and Sciences).
Book: Past, present & future of historical information science.

Yannis Kliafas is the president of Athens Technology Center (ATC). Athens Technology Center S.A. (ATC) is a private consultancy company with expertise in the areas of Software Engineering, Image Processing, and Multimedia. The company has been operating since 1987 and is active in three major areas:

- Information Technology Consultancy: Providing specialist consultancy services to the industrial and regulatory bodies in the fields of its expertise.
- Third party system integration: ATC acts as an independent contractor undertaking the development and assembly of integrated information systems tailored to the end user's requirements (turn-key solutions).
- Electronic publishing: The company specialises in CD-ROM multimedia productions, development of multimedia point of information systems, providing custom solutions for networked image management and archiving and development of Internet and Intranet applications. ATC's customers include major companies in the publishing and media sectors, hospitals and clinics, banks, museums, government, and industry in Greece.

Hans Schek is a professor at the Computer Science Department of ETH in Zurich and a professor and vice-rector at UMIT, the University for Health Informatics and Technology in Tyrol. He has done extensive work in several fields of computer science, leading his group in combining fundamental research and prototype development that evaluates research concepts. He is mainly interested in database systems, transaction management, information retrieval, workflow management, system architectures, image database management, health-information management.