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Vincent Wade  
Helen Ashman  
Barry Smyth (Eds.)

# Adaptive Hypermedia and Adaptive Web-Based Systems

4th International Conference, AH 2006  
Dublin, Ireland, June 2006  
Proceedings

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## Volume Editors

Vincent Wade

Trinity College Dublin, O'Reilly Institute, Department of Computer Science

Dublin 2, Ireland

E-mail: [vincent.wade@cs.tcd.ie](mailto:vincent.wade@cs.tcd.ie)

Helen Ashman

University of Nottingham, School of Computer Science and Information Technology

Jubilee Campus, Nottingham NG8 1BB, UK

E-mail: [hla@cs.nott.ac.uk](mailto:hla@cs.nott.ac.uk)

Barry Smyth

University College Dublin, UCD School of Computer Science and Informatics

Belfield, Dublin 4, Ireland

E-mail: [barry.smyth@ucd.ie](mailto:barry.smyth@ucd.ie)

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# Preface

We live in a world of dynamic information a world of portals and search engines, of Web pages and e-mails, blogs and e-commerce sites, online courseware and interactive tour guides. However, even though we can now avail of unprecedented levels of access to this information world, it is becoming increasingly difficult for users to locate quickly and easily the right information at the right time. For instance, even conservative estimates of the Web's current size speak of its 10 billion documents and a growth rate that tops 60 terabytes of new information per day. To put this into perspective, in 2000 the entire World-Wide Web consisted of just 21 terabytes of information. Now it grows by 3 times this figure every single day.

Adaptive Hypermedia and Adaptive Web Systems represent a critical and rapidly growing area of ICT research. Its focus on pioneering theories, techniques and innovative technologies to provide dynamic personalization, adaptation and contextualization of hypermedia resources and services has singled out the AH Conference series as the premier research event for adaptive Web systems. The conference combines state-of-the-art research investigations with industrial verification and evaluation to provide a unique event for researchers and practitioners alike. The conference series attracts researchers from the areas of knowledge engineering, artificial intelligence, Web engineering, Semantic Web, systems integration and security. In addition to these technology-and theory-oriented researchers, AH also attracts industrial and academic researchers in areas of key vertical markets such as interactive TV, e-learning, Web system, e-commerce and e-government.

It is important to note that research first heralded during the AH Conference series has often become deeply engrained in next-generation Web applications, e.g., personalized e-learning and adaptive information kiosks, personalized mobile portals, and adaptive Web search facilities. The main professional organizations most related to adaptive hypermedia/adaptive Web system have again endorsed the AH Conference Series: International World-Wide Web Conference Committee (IW3C2), the Association for Computing Machinery (ACM), and in particular SIGWEB, SIGIR, AIED Society and User Modelling Inc.

This year's conference saw the continued growth in quantity and quality of research in this key technological area. From the 122 papers submitted to the conference, the Program Committee, after rigorous review, selected 22 submissions as full papers (i.e., 18% acceptance rate) and 19 (i.e., 15%) as short papers. The conference also solicited a Doctorial Consortium to encourage early-stage researchers to present their ideas and proposals within an expert forum. The Doctorial Consortium attracted 26 submissions of which 15 were selected for presentation at the conference. This is a significant increase over previous AH

Conferences and should provide an excellent showcase and feedback opportunity for these young researchers.

Organizing a conference such as AH2006 is a challenging task and we are very grateful to the Program Committee and external reviewers who provided such insightful review comments and constructive feedback on all submissions. This year full paper submissions received four independent reviews, with short papers each receiving three reviews. We would like to sincerely thank the entire Program Committee and external reviewers for ensuring a high-quality conference which will hopefully be enjoyed by both attendees and readers of this proceedings.

A subset of the Program Committee focused on the Doctorial Consortium submissions and provided extensive, formative feedback to all DC submission authors. We would like to single out the effort of the DC Chairs (Peter Brusilovsky and Lorraine McGinty) for their excellent work in both promoting the Doctorial Consortium and stewarding their review feedback. This year's conference also saw a strong portfolio of workshops in key areas of emerging adaptive technology research. Again our thanks to the workshop Chairs, Alexandra Cristea and Stephan Weibelzahl, for their organization of these events.

Local organization of international conferences is a very difficult task and we would like to thank our fellow Organizing Committee members. In particular would like to mention Declan Kelly (Local Chair), Shauna Cassidy (Local Administrator), Eugene O'Loughlin (Industrial Chair), and Mark Melia (AH Website Administrator) for all their efforts in making AH2006 a success. We would also like to thank Alex O'Connor, Shay Lawless and Ian O'Keeffe for their help in finalizing the typesetting of the proceedings and indexes.

And finally to you, the delegate and reader of this volume. The research presented in this book represents a wide and insightful view of the direction and state of the art in personalization and adaptivity of hypermedia and Web-based systems. We hope that you enjoy the papers and that they provide a considerable contribution to your interest and future endeavors.

June 2006

Vincent Wade  
Helen Ashman  
Barry Smyth

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AH2006 was jointly organized by Trinity College, Dublin, University College Dublin and the National College of Ireland (Dublin).

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# Knowledge-Driven Hyperlinks: Linking in the Wild

Sean Bechhofer<sup>1</sup>, Yeliz Yesilada<sup>1</sup>, Bernard Horan<sup>2</sup>, and Carole Goble<sup>1</sup>

<sup>1</sup> University of Manchester, UK

{sean.bechhofer, yeliz.yesilada, carole.goble}@manchester.ac.uk  
<http://www.manchester.ac.uk/cs>

<sup>2</sup> Sun Microsystems Laboratories

bernard.horan@sun.com  
<http://research.sun.com>

**Abstract.** Since Ted Nelson coined the term “Hypertext”, there has been extensive research on non-linear documents. With the enormous success of the Web, non-linear documents have become an important part of our daily life activities. However, the underlying hypertext infrastructure of the Web still lacks many features that Hypertext pioneers envisioned. With advances in the Semantic Web, we can address and improve some of these limitations. In this paper, we discuss some of these limitations, developments in Semantic Web technologies and present a system – COHSE – that dynamically links Web pages. We conclude with remarks on future directions for semantics-based linking.

## 1 Introduction

The World Wide Web (Web) is the most successful hypertext ever, with recent figures<sup>1</sup> suggesting that more time is now spent in the UK surfing the Web than watching television. It is only natural and appropriate that hypertext research, and its researchers, would thus adapt to the Web and its ways, despite the fact that the underlying hypertext infrastructure is simple (good) and limited (bad). The model is based almost entirely around nodes with links playing second fiddle – embedded and difficult to author, maintain, share and adapt. Approaches such as Open Hypermedia go some way toward addressing this issue.

The Semantic Web (SW) is based on the notion of exposing metadata about resources in an explicit, machine-processable way. By doing so, we open up the possibility of using machine processing in order to help us search, organize and understand our data. So far this has largely been used to provide more effective search, describe Web Services and drive applications like enterprise integration. We must not forget, however, that the Semantic Web is still a *Web* and that query by navigation, via links between documents, is still fundamental to the

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<sup>1</sup> e.g. see The Guardian March 8, 2006:

<http://technology.guardian.co.uk/news/story/0,,1726018,00.html>