

## A. Eliëns: research (intelligent) multimedia

Over the past six years, our research efforts have focussed on developing models and software architectures for multimedia and hypermedia applications. For describing the research we make a distinction between three (related) sub-projects, respectively *structured hypermedia*, *interactive visualisation*, and *intelligent multimedia*.

### structured hypermedia

principal researcher: J. van Ossenbruggen

promotion: 10/4/2001

thesis: Structured hypermedia – a matter of style

supervision: dr. A. Eliëns, prof. dr. J.C. van Vliet

collaboration(s): dr. L. Hardman and dr L. Rutledge (CWI)

status: finished

**project description** The project started with the construction of a software framework for developing web-based hypermedia applications, the *hush* library. A number of prototype multimedia applications were built, exploring the extension of web-based hypertext with for example music and video. In cooperation with members of the CWI Multimedia Group, work was done on developing models for hypermedia applications. This cooperation resulted in the formalization of the Amsterdam Hypermedia Model, an extension of the Dexter Hypertext Reference Model.

### selected publications

**HUSH** A. Eliëns., Hush – a C++ API for Tcl/Tk., The X Resource, Issue 14, April 1995, pp. 111-155

**Time** J. van Ossenbruggen en A. Eliëns., Music in Time-based Hypermedia., Proc. European Conference on Hypermedia Technology 1994, pp. 224-227

**Music** J.R. van Ossenbruggen and A. Eliëns, Bringing music to the Web, Proc. of the Fourth International World Wide Web Conference – The Web Revolution, December 1995. World Wide Web Journal, O’Reilly and Associates, Inc., pp. 309-314

**Animate** Anton Eliëns, Jacco van Ossenbruggen, and Bastiaan Schönage, Animating the Web — An SGML-based Approach, In: The Internet in 3D — Information, Images and Interaction Academic Press, 1997 pp. 75-96

**Jamming** Anton Eliëns, Martijn van Welie, Jacco van Ossenbruggen, and Bastiaan Schönage, Jamming (on) the Web, Proceedings of the 6th International World Wide Web Conference — Everone, Everything Connected, O’Reilly and Associates, Inc., April 1997, pp. 419–426

**Style** Jacco van Ossenbruggen, Lynda Hardman, Lloyd Rutledge, and Anton Eliëns, Style Sheet Support for Hypermedia Documents, Hypertext'97 — The Eighth ACM Conference on Hypertext ACM Press, 1997, pp 2 16-217

**Markup** J. van Ossenbruggen, A. Eliëns, L. Rutledge and L. Hardman, Requirements for Multimedia Markup and Style Sheets on the World Wide Web, Proceedings of the Seventh International World Wide Web Conference (WWW7), in Computer Networks and ISDN Systems, volume 30, Elsevier Science B.V., April 1998, pp 694-696

### **interactive visualisation**

project funding: USF SINS

principal researcher: S.P.C. Schönbage

promotion: 8/5/2001

thesis: Diva: Architectural Perspectives on Information Visualization

supervision: dr. A. Eliëns, prof. dr. J.C. van Vliet

collaboration(s): ASZ Research and Development

status: finished

**project description** The theme of the subproject concerned the use of animations and visualisation to display business process simulation results in a hypermedia context. During the project the focus shifted towards visualisation, in particular business visualisation. Also, explorations were done to investigate interactive visualisation in 3D. In Schönbage's thesis several case studies can be found illustrating the use of visualisation to support business processes and in particular decision making processes.

### **selected publications**

**Simulate** A. Eliëns, F. Niessink, S.P.C. Schönbage, J.R. Vosse, P. Nash, Support for BPR – simulation, hypermedia and the Web, Proceedings Euromedia'96, Euromedia, London 1996

**DIVA** B. Schönbage, A. Eliëns, Multi-user visualization: a CORBA/Web-based approach, Int. Conf. on Digital Convergence: the future of the Internet and WWW, British Computer Society, Bradford, UK, 20-23 april 1998, 9 pgs

**Users** B. Schönbage, P.P. Bakker, A. Eliëns, So many users, so many perspectives, IFIP 12.2 Working Conference on Designing Effective and Usable Multimedia Systems, Fraunhofer Institute. Stuttgart Germany, Sept. 8-10, 1998, Kluwer Academic, pp. 159-172

**VRML** B. Schönbage and A. Eliëns, Dynamic and Mobile VRML Gadgets, In Proc. VRML99, 23 - 26 February 1999, Paderborn, Germany

**Gadgets** S.P.C. Schönbage, A. van Ballegooij, A. Eliëns, 3D Gadgets for Business Process Visualization: a case study, VRML/Web 3D - 2000, Monterey CA, Febr 2000

**BizViz** Bastiaan Schönhage and Anton Eliëns, Management through Vision: a case study towards requirements of BizViz, International Conference on Information Visualization 2000 (IV 2000) London, England 19-21 July, 2000

### intelligent multimedia

principal researchers: dr. A. Eliëns, dr. Z. Huang  
 associated researcher(s): dr. C. Dormann  
 programmer: drs. C. Visser  
 funding: NWO WASP (612-60-003), NWO RIF (612-61-607)  
 cooperation(s): drs. A. van Ballegooij (CWI), dr. L. Rutledge (CWI), prof. dr. P. de Bra (TUE/CWI), dr. Z. Ruttkey (CWI)  
 status: ongoing

**project description** We are developing a high-level platform for 3D virtual environments based on agent-technology, using the languages DLP, Java, and VRML. This work is done in the context of the NWO WASP and RIF projects. Our goal is to study aspects of the deployment and architecture of virtual environments as an interface to multimedia information systems. As demonstrators we have developed a distributed soccer-game prototype with intelligent autonomous avatar-embodied agents as players.

**research directions** The *intelligent multimedia* research theme may be regarded as continuing the subprojects described before. In addition it combines research wrt. *intelligent agents* and *virtual worlds*, as defined for respectively the WASP and RIF projects. Currently, our efforts are directed towards realizing the technology needed for developing *intelligent multimedia* applications. This technology is intended to be used, among others, for student projects. In particular, we aim for developing demonstrators in the area of *persuasive technology*, and thus explore design methods and patterns for the realization of emotionally charged virtual worlds. This work is being done in cooperation with dr. C. Dormann and dr. Z. Ruttkey from CWI.

### selected publications

**DLP** A. Eliëns, Distributed Logic Programming for Artificial Intelligence, AI Communications Vol. 4 No. 1, 1991, pp. 11-21

**Taxonomy** Zhisheng Huang, Anton Eliëns, Alex van Ballegooij, Paul De Bra, A Taxonomy of Web Agents, IEEE Proceedings of the First International Workshop on Web Agent Systems and Applications (WASA '2000), 2000.

**VirtualContext** Lloyd Rutledge, Alex van Ballegooij and Anton Eliëns, Virtual Context - relating paintings to their subject, Culture Track of WWW9 in Amsterdam, The Netherlands, Tuesday, May 16th, 2000

**Language** Cees Visser, Anton Eliëns, A High-Level Symbolic Language for Distributed Web Programming, Internet Computing 2000, June 26-29, Las Vegas

**NBQ** A. van Ballegooij and A. Eliëns, Navigation by Query in Virtual Worlds, Web3D 2001 Conference, Paderborn, Germany, 19-22 Feb 2001

**Architecture** Zhisheng Huang, Anton Eliëns, and Paul De Bra, An Architecture for Web Agents, Proceedings of the Conference EUROMEDIA 2001, 2001.

**Avatars** Zhisheng Huang, Anton Eliëns, and Cees Visser, Programmability of Intelligent Agent Avatars, Proceedings of the Agent'01 Workshop on Embodied Agents, June 2001, Montreal, Canada