

# Towards a software engineering of adaptive hypermedia applications

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## TOWARDS A SOFTWARE ENGINEERING OF ADAPTIVE HYPERMEDIA APPLICATIONS

### Background of the project

Adaptive hypermedia is a research field born in the last ten years from the convergence of two main research streams: Intelligent Tutoring Systems and Hypermedia systems. The issues addressed by researchers in these topics are:

- Exploiting the potentiality of artificial intelligence techniques to make systems “context-aware” in order to support users accomplishing different tasks (information retrieval, learning, leisure activities...).
- Exploiting the new opportunity of hypertext technology to develop richer and more structured spaces of text and multimedia elements.

### Why being Adaptive?

One limitation of traditional “static” hypertexts is that they provide the same content and the same set of links to different users. One way to personalize the browsing experience is by adapting the navigation system of hyperlinks taking into account user’s interests and preferences (Adaptive Navigation support).

On the other hand more local adaptation can be done at the level of content presentation (Adaptive Presentation).

### Open Issues

Despite it has been a while that adaptive applications are developed, there are still few methodologies (Calvi L. & Cristea A, 2002) and tools

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(Cristea A., & Aroyo L., 2002) for designing and authoring Adaptive Hypermedia systems. This situation is probably due to the lack of reflection on methods and models used in Adaptive systems. For this reason there isn't yet any significant standardization process that could help the growth of a stable adaptive technology.

On the other hand some researchers (Brusilovsky P. 1996; Brusilovsky P. & Eklund J. 1998) who have tried to assess the impact of adaptivity on the users' experience have found no significant results of adaptive hypermedia versus traditional hypertext.

In our opinion this apparently discouraging scenario is due mainly to a lack of pre-analysis on the requirements the application should fulfill.

From the beginning this analysis should embrace all the stakeholders that will interact with the application, letting them understand all the dimensions of the system (navigational aspects, structure of contents and adaptive behavior).

Then we stress the need of a strong methodology for designing adaptive hypermedia.

## Research themes and methods

### Objectives

The main aim of the research is to make a step toward a greater involvement of content developers and authors in the design process of adaptive hypermedia on the Web.

In this direction we are interested in methods, techniques and tools to support content providers and authors in managing the complexity of adaptive hypertext and exploiting their adaptive features.

Before facing these questions we want to isolate some real scenarios in which adaptive applications could be found useful.

### Research questions

- What are the functional requirements of an adaptive hypermedia system?
- How to model behaviour and adaptive features of web based adaptive hypermedia systems?
- What kind of modelling primitives are needed?



State of the art: October 2002

Current research: What does mean to Adapt?

The preliminary focus of our research is on collecting functional requirements from different adaptive hypermedia applications in the fields of e-learning, e-publishing, e-commerce and edutainment. This step is currently being accomplished by analyzing real applications and by conducting interviews of potential stakeholders (students, instructors, tutors for educational hypermedia, publishers for e-publishing systems and so forth).

From the results we expect to generalize the functional requirements trying to group them in types of functions. In this way we'll try to sketch out a sort of taxonomy of requirements for hypermedia systems that can be fulfilled by adaptive techniques.

The next steps

After the requirements analysis we want to explore the modeling features which are offered by traditional hypermedia modeling language. In particular we are interested in the HDM approach (Garzotto et al., 1993) to the design of hypermedia applications.

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