Chapter 4

The Extended Abstract Categorization Map (E-ACM)

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Abstract

This chapter presents the Extended Abstract Categorisation Map, which provides a conceptual tool to evaluate the coverage of adaptive hypermedia methods, concerning their modelling mechanisms. The design of modern hypermedia systems requires an integrated approach contemplating modelling principles, evaluation frameworks, and reference models. Several approaches and methods exist, but it is difficult to comprehend how they complement or interfere among themselves during a design effort. The E-ACM considers the relationship among four complementary modelling perspectives related to adaptive hypermedia design: services, traditional concerns, abstraction levels, and goal conditions. In this chapter, the E-ACM is used to compare modelling mechanisms of two adaptive authoring systems. It could also be used to support the application of designing methods and mechanisms. The proposed map is a step towards the integration of modelling perspectives that are not usually combined.

Introduction

Adaptable and adaptive hypermedia (AAH) systems are difficult to design. Adaptation requirements of such systems aggravate design instability, mainly due to the lack of structure in systems with a strong human-computer interaction nature (Fischer, 1989). One of the main reasons behind the difficulty in developing and evaluating AAH systems is the absence of a *reference* (normative) *model* for describing them from different perspectives. The proposal in this chapter provides some clues toward this missing type of model.

Models are mediating artefacts in the activity of design. They provide designers with the ability to represent and record their abstract perceptions about a domain, allowing them to cope with requirements at different stages of the life cycle. *Reference models* are important because they present common abstractions and provide a basis for the design of a specific type of application. *Frameworks* present conceptual structures aimed at the improvement of applications, as well as the generalisation and reuse of results. Frameworks enable a better understanding of system components, easing the evaluation with more exact hints for failures and false inferences than a simple global vision (Karagiannidis & Sampson, 2000).

A *method* guides the production of models through a development process. Many methods have been proposed for the design of databases, knowledge representation, and software systems. Selecting suitable methods is important for exploring, testing, recording, and communicating designs (Benyon & Imaz, 1999), which are essential activities for proper evaluation of AAH systems (Weibelzahl, 2003). Some methods oriented to hypermedia established a development paradigm for information-based systems. Hypermedia introduces ad hoc modelling requirements not found within conventional modelling, with issues such as data navigation, perception, and interaction (Tobar & Ricarte, 1999), which are important for HCI applications.

In this chapter, different and complementary modelling perspectives are highlighted through an analysis of previous work on modelling methods, reference models, and frameworks, all of which were proposed to orient design and assessment of systems with adaptation or hypermedia requirements. Modelling perspectives are used to present the Abstract Categorisation Map (ACM), a graphical tool to assess and compare existing specification mechanisms in methods for hypermedia modelling. The Extended ACM (E-ACM), oriented to adaptive hypermedia, is not a tool to model applications, but to perceive different aspects of AAH systems and models. Different paths on this map support the comparison, choice, and application order of designing methods and mechanisms.

Background

Existing approaches to the development of AAH systems take different points of view, such as perceiving it a new paradigm for programming, an architecture, modelling

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