An Adaptive Function for Hypermedia-based Advanced Learning Technology

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Abstract
We address this issue of how to formally model the adaptive component used to tailor the content found within Adaptive Hypermedia (AH) learning systems. We take a structure-oriented approach in which emphasis is placed on the structures used to specify documents and their meta data, rather than their content.

1. Introduction and Motivation

AH research aims to increase the functionality provided by hypermedia systems by empowering users to tailor their interaction with them. The approach taken is to enhance such systems with personalisation features that may be user or system-initiated. AH systems are assumed to be useful in the area of advanced learning technology where learners often have different information seeking goals, histories and preferences [1].

Whilst AH research has produced a variety of educational systems, little work has been directed towards modelling the functionality that could be provided by the adaptive component of such systems. Furthermore, it is often unclear how the adaptive component is realised. The challenge which the research [2,3] underlying this paper aims to meet is how to model, at a suitable level of abstraction, the adaptive functionality that could be provided by the adaptive component.

We define a set of tailorable hypermedia structures (i.e., hyperpages and associated meta-data). Induced from these structures is a language for their personalisation that provides actions to tailor hyperpages. Following this, we model an adaptive function that enables adaptivity (i.e., system-initiated personalisation) to be, in principle, as expressive as personalisation.

2. Architecture of the adaptive function

We model a hyperpage as a sequence of chunks, each comprised of a content specification (e.g. text, video, etc.) and a rendering specification, which defines how the content is to be rendered by a user interface (e.g. a WWW browser). A chunk may be associated with a set of entry points (e.g. URLs) and exit points (e.g. hyperlinks). Induced from this definition is a set of annotation possibilities. Annotations pair a hyperpage specification with notes (i.e., user-generic attributes) of interest to the user. Their existence enables the personalisation of hyperpages. Personalisation is the process of enabling the user to annotate or rewrite hyperpages.

The architecture of the adaptive function consists of a user model, decision theory and an active database of tailorable hyperpages. The user model contains a set of information goals and a user history. An information goal specifies how information should be tailored for a user. A user history characterises what is known by the user about the hypermedia system, based upon previous interactions.

A decision theory is modelled as the background knowledge used by an adaptive function to derive information by applying a set of active rules to extensionally stored data.

A syntactic characterisation of an active database component for an adaptive function has been modelled. This active database representation of tailorable hypermedia structures is the subject of the adaptation process.

3. References

