Chapter 4

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ABSTRACT
The purpose of this chapter is to explore fuzzy logic based methodology for computing an adaptive interface in an environment of imperfect, vague, multimodal, complex nonlinear hyper information space. To this end, based on fuzzy linguistic modelling and fuzzy multi level granulation an adaptation strategy to cognitive/learning styles is presented. The granulated fuzzy if-then rules are utilized to adaptively map cognitive/learning styles of users to their information navigation and presentation preferences through natural language expressions. The important implications of this approach are that, first, uncertain and vague information is handled; second, a mechanism for approximate adaptation at a variety of granulation levels is provided; third, a qualitative linguistic model of adaptation is presented. The proposed approach is close to human reasoning and thereby lowers the cost of solution, and facilitates the design of human computer interaction systems with high level intelligence capability.

INTRODUCTION
The growing amount of information on the WEB and the heterogeneous characteristics of Web users have lead to a considerable attention to web-based adaptive hypermedia systems (WAHS) by the research community (Brusilovsky, 1996, 2001). The power of hypermedia of web technology is in its capability to support non-linear navigation in hyperspace and multimedia presentation of the web content. WAHS offers an alternative to the traditional “one-size-fits-all” hypermedia and Web systems by adapting to the goals, interests, and knowledge of individual
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The chapter is organized as follows. First I present a brief description of WAHS and fuzzy logic theory in WAHS. The description of cognitive and learning styles is given. Navigation and presentation preferences of users are presented. The adaptation process, examples of fuzzy granulation of input and output linguistic variables, and an inference mechanism of adaptation are presented. The next section is devoted to description of a simulation example to illustrate the proposed approach. Finally, we present conclusions and future work.

WEB-BASED ADAPTIVE HYPERMEDIA SYSTEMS AND FUZZY LOGIC THEORY

WAHS can be defined as the technology that allows personalization for each individual user of hypermedia application. The process of personalization customizes the content and structure of a