Chapter 14

A Multi-Actor Ontology-Based Assistance Model: A Contribution to the Adaptive Semantic Web

Gilbert Paquette
Télé-université, Canada

Olga Marino
Télé-université, Canada

ABSTRACT

Adaptivity plays a central role for Web-based assistance to work and training processes. In the last decade, learning and work systems have evolved, from single-user sequential scenarios to multi-actors rich learn-flows and workflows. Within the Semantic Web, resources, activities, and actors are referenced semantically using ontologies, while the user model focuses more on the user’s cognitive state than on simple interface adaptation. The assistance model elaborated in this chapter is composed of a hierarchy of rule-based agents that interacts with semantic annotation of scenario components such as actors, activities, and resources. Ontology-based assistance in multi-actor scenarios is a contribution towards the adaptive semantic Web.

INTRODUCTION

Adaptivity plays a central role for Web-based support to work and training processes. Based on a diagnosis of the activity of a user within an application, an advisor or assistance system compiles some useful advices or explanations and delivers this assistance to a user. There has been a lot of work in this area since the seminal work of Wenger (1987) on Intelligent Tutoring Systems, Winkels (1992) on help systems, Hayes-Roth (1995) on adaptive intelligent system or Brusilovsky, Kobsa and Vassileva (1998) on Adaptive Hypermedia.
All these research orientations share in common the goal to personalize computer-based environments based on some user model.

More recently, recommender systems (Frankowsky and al. 2010) shifted a bit the focus, exploiting various techniques to recommend resources delivered on the Web such as music CDs, movies, news, electronics, travel or financial services. Commercially mature recommender systems have been integrated in popular e-commerce web sites such as Amazon or eBay. Still, various limitations of the current recommendation methods and extensions need to be overcome to provide better recommendation capabilities. According to Adomavicus and Tuzhilin (2005), “these extensions include, among others, the improved modeling of users and items, incorporation of the contextual information into the recommendation process, support for multicriteria ratings, and provision of a more flexible and less intrusive recommendation process”. We will provide here a model proposal pertaining to the first two of these issues, which are also relevant in other application area such as ITS, help desks and adaptive hypermedia.

In this chapter, we use the term “assistance system” to encompass all kinds of services to Web users to help them process task-based scenarios and find resources suited to their knowledge, competency and context of use. We will focus here on personalized assistance given to users based on ontology modeling and semantic Web techniques, an area part of the “Adaptive Semantic Web” (Dolog and al 2003) that we call in this paper “Ontology-based Assistance Systems”. Here, adaptivity is seen as a particular kind of assistance where task or activity scenarios provide the main context of use. The assistance system provides recommendations to extend or personalize such multi-actor tasks/activity scenarios or workflows. 

Our research program on assistance systems has started in 1994 where we built a first assistance system for AGD (Paquette, Pachet, Giroux & Girard 1996), a computerized workbench for course designers. We developed the EpiTalk approach to build it, a generic method that has been applied afterward in other contexts. In the late nineties, we integrated assistance capabilities into Explor@ (Girard, Paquette, Miara and Lundgren-Cayrol 1999), a learning content management system (LCMS) for on-line education. In a third project, this concept of an assistance system was adapted to the ADISA instructional engineering system (Paquette, Rosca, De la Teja, Léonard & Lundgren-Cayrol 2001) again to assist instructional designers. A generic model for assistance systems has also been elaborated (Paquette et Tchounikine 2002; Basque, Dufresne et al. 2003) based on these previous projects. More recently, within the LORNET and PRIOWS projects, a new stream of research for assistance in the context of multi-actor workflows or scenarios has started. This is the focus of this chapter.

In section 1, we will summarize the EpiTalk approach and the concept of epiphyte assistance and we will exemplify this concept in the context of our previous AGD system. In section 2, we will address the problem of advising users in multi-actor workflows, using the TELOS system as a generic host system, focusing first on progress in a specific activity scenario. In section 3, we will extend the assistance model to ontology and competency-oriented user modeling. In section 4, we will address some implementation issues and provide an example. In the concluding section 5, we will situate the model in relation to other work in related research areas.

EPIPHYTE ASSISTANCE FOR A HOST ENVIRONMENT

EpiTalk is a generic method that we designed to facilitate the development of assistance systems that are grafted to a host system. Such a system is called “epiphyte”, a biological term that describes an organism that lives with another called the host, without becoming a parasite that would disturb
Related Content

A Collective-Intelligence View on the Linux Kernel Developer Community
Haoxiang Xia (2012). *Systems Approaches to Knowledge Management, Transfer, and Resource Development* (pp. 188-200).
[www.igi-global.com/chapter/collective-intelligence-view-linux-kernel/68218?camid=4v1a](www.igi-global.com/chapter/collective-intelligence-view-linux-kernel/68218?camid=4v1a)

Dynamic Reconfiguration of Middleware for Ubiquitous Computing
[www.igi-global.com/article/dynamic-reconfiguration-middleware-ubiquitous-computing/43593?camid=4v1a](www.igi-global.com/article/dynamic-reconfiguration-middleware-ubiquitous-computing/43593?camid=4v1a)

Three Novel Methods to Predict Traffic Time Series in Reconstructed State Spaces
[www.igi-global.com/chapter/three-novel-methods-predict-traffic/66813?camid=4v1a](www.igi-global.com/chapter/three-novel-methods-predict-traffic/66813?camid=4v1a)

A Fully Reconfigurable Approach to Emergency Management
[www.igi-global.com/article/fully-reconfigurable-approach-emergency-management/75550?camid=4v1a](www.igi-global.com/article/fully-reconfigurable-approach-emergency-management/75550?camid=4v1a)