

ABSTRACT

MARS: A Rule Based System for Recommending Learning Objects in a Given Context

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Learning objects are digital resources that facilitate learning and can be reused in different learning situations. However, learning objects presently lack the semantic descriptions that depict their theme. This information is a critical factor in the reusability of learning objects since it enables practitioners, learning systems, and students to understand the purpose of an educational resource. Learning object reusability has important implications since it affects the amount of money and time needed to create online courses in the E-Learning field. In order to successfully reuse learning objects in different scenarios, the quality of metadata has to be improved such that semantic information is adequately available.

As such, the research undertaken in the thesis set about to examine whether learning objects can be recommended based on an analysis of the context in which they are used in comparison to the context of a user's request. A prototype multi-agent recommendation system called MARS was developed as part of the research to explore the issues involved in making learning object recommendations using context. MARS was engineered using a combination of techniques from Semantic Web research namely ontological modeling, mapping and merging, and from the Artificial Intelligence in Education research, specifically agency, inference rules and recommender systems.

The results produced by MARS demonstrate that learning objects indeed are more reusable when their context of use is adequately described in their metadata using domain ontologies. In addition, inference rules that were used by MARS agents, positioned for the Educational Semantic Web, were shown to perform the task of analysing this semantic learning object metadata efficiently. The results are significant since this research contributes an Educational Semantic Web technique and an agent-based framework that allows learning objects to be reused in different contexts.

Keywords: Phaedra Sarah Mohammed; Learning Objects; Agents; Ontologies; Rules; E-Learning; Recommendation System; Semantic Web.