ABSTRACT

The popularity of e-learning applications has led to the creation of huge amount of digital educational resources from the perspective of personal computers and the ubiquitous computing devices have influenced the traditional computer based e-learning. Thus, locating learning resources authored in various formats and to deliver for heterogeneous learning devices based on learner’s requirement and context is a big challenge.

In recent years, personalized and adaptive search has created much interest in the e-learning research community, as a means to deliver precise and conceptually relevant results. The goal of adaptation is to tailor search results to a particular user based on that user’s contextual information. The effectiveness of accessing learning material involves two important challenges: identifying and modeling the user context as ontological profile and semantic based description of learning resources.

This thesis presents a framework on context aware adaptive e-learning system, by using the synergetic merger of four different fields: e-learning, context, ontology, and adaptation. Since ontology is the fundamental source of semantic knowledge, this work describes the ontology-based framework for
context-aware adaptive e-learning system, providing detailed discussions on the categorization and modeling contextual information along with the use of ontology to explicitly specify metadata of learning resources.

This study first describes the characteristics of various metadata standards, purpose of ontological approach and context aware delivery in the educational domain. Later, it addresses the device context and the learner context (Learner preferences) detection and semantic rule based adaptation mechanism so as to deliver suitable content in device independent course based e-learning environments. The proposed resource (Learning content) description ontological model called Context-aware Adaptive Learning Resource Ontology (CALRO) is particularly useful to locate the content as per the context of e-learner.

In order to verify the proposed approaches and to identify the need of device independent course learning, the prototype is developed using a novel architectural model that is based on MVC (Model–View–Controller) design pattern. The proposed system is implemented and its usability verified.