Adaptive Mobile Learning System by using the Semantic WEB

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Abstract

A directed graph represents an accurate picture of course descriptions for online courses through the computer-based implementation of various educational systems. The Learning Path Graph (LPG) represents and describes the structure of domain knowledge, including the learning goals, and all other available learning paths. Here, we propose an adaptive m-learning system architecture and a conceptual framework that uses the Semantic Web to obtain the students’ data from other educational institutions. This process will enable the educational institutions to communicate and exchange students’ data, and then use this information to adjust the students’ profiles and modify their learning paths. The Semantic Web will create a more personalized dynamic course for individual students according to their ability, educational level, and experience.

Introduction

Throughout the most recent decades, various research has examined the possibilities of changing the educational instruction model from the customary one-size-fits-all instructing model to a more adaptive and customized learning instruction model. Most of the techniques calculate the optimal learning path depending on the characteristics in the student’s profile to make the course more personalized. However, we have not seen any technique updating the profiles dynamically using the Semantic Web to exchange the information between educational institutions. One of the most challenging tasks for Adaptive Mobile Learning is to create an Adaptive Course.

Adaptive m-learning System Architecture

Typically, any System Interface contains an Admin Interface Module (AIM), an Instructor Interface Module (IIM) and Student Interface Module (SIM). This interface allows administrators, instructors and students to access our AML system.

1. System Interface.  
   • Admin Interface Module (AIM) 
   • Instructor Interface Module (IIM) 
   • Student Interface Module (SIM)
2. Student Profile Module (SPM)
3. Learning Style Module (LSM)
4. Domain Concept Module (DCM)
5. Course Content Module (CCM)
6. Learning Path Generation Module (LPM)
7. Student Assessment Module (SAM)
8. Adaptive Engine Module (AEM)

The Adaptive Engine Module performs two tasks: the first task is to find all the personal learning paths using adaptive algorithms according to the student’s profile. The second task is to retrieve the related teaching material according to the student’s learning style.

Proposed Conceptual Framework

Using TURTLE syntax, it can be written as follows:

```
@prefix foaf:  <http://xmlns.com/foaf/0.1/> .

SELECT ?Last ?First ?City ?State
WHERE {
  student person:givenName ?First ;
  person:familyName ?Last ;
  person:address ?postalAddress
  ?postalAddress
  address:locality ?City;
  address:region ?State;
  address:addressRegion "CT";
}
```

The language that is used to query ontologies is SPARQL (SPARQL Protocol and RDF Query Language) which is a set of W3C standards for querying and updating data conforming to the RDF (Resource Description Framework) model.

We used the dotNetRDF, were dotNetRDF Project aims to create an Open Source .Net Library using the latest versions of the .Net Framework for providing a powerful and easy to use API to work with RDF (Resource Description Framework), SPARQL and the Semantic Web. The primary goal is to provide an efficient method to work with reasonable amounts of RDF in .Net[4].

Proposed Conceptual Framework- continued

In the Semantic Web, ontologies are formal definitions or representations of vocabulary or knowledge to allow the user to define resources classes, resource properties, and relationships between resource class members [2].

Conclusion

The presented approach is expected to improve the performance of adaptive mobile learning and provides a learning experience to students that is more personalized and dynamic.

References