Chapter 93

Semantic Retrieval of Documents From Digital Repositories and Twitter Integration in the Moodle Environment

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ABSTRACT

Virtual learning environments represent an important step in enabling distance and blended education. Moodle's structure for content enables the identification of well-defined learning contexts. Nevertheless, Moodle currently does not provide standard features to leverage the use of such contextual information, nor does it provide a standard built-in search facility. This chapter presents a context-sensitive Moodle plug-in for the search of external resources that allows semantic-based retrieval of documents from any external repository that offers an OAI-PMH standard compliant interface. As a way to increase their potential use, the plug-in also retrieves Twitter messages (known as tweets), since social networks are shown as an important tool to support education. Retrieved resources are presented in order of importance according to both the query terms provided by the user and the current context derived from the Moodle content structure. Searches are semantically expanded by evaluating the query terms according to a specific ontology associated with the context.

INTRODUCTION

Virtual learning environments represent an important step in enabling distance and blended education. Moodle's structure for content enables the identification of well-defined learning contexts. Nevertheless, Moodle currently does not provide standard features to leverage the use of such contextual information, nor does it provide a standard built-in search facility. This work presents a context-sensitive Moodle plug-in for the search of external resources that allows semantic-based retrieval of documents from any external repository that offers an OAI-PMH standard compliant interface. As a way to increase their potential use, the plug-in also retrieves Twitter messages (known as tweets), since social networks are shown as an important tool to support education. Retrieved resources are presented in order of importance according to both the query terms provided by the user and the current context derived from the Moodle content structure. Searches are semantically expanded by evaluating the query terms according to a specific ontology associated with the context.

Moodle (Modular Object Oriented Distance Learning) (Moodle, 2014) is an open source system that enables learning in virtual environments and is widely used around the world. It supports the administration of educational activities aimed at creating online communities in virtual environments with a focus on collaborative learning. Through online courses, Moodle allows iteration between students and teachers in a very simplified way. Furthermore, it has a set of tools that enables the use and publication of resources for collective use. However, these are limited to the resources introduced by the teacher for that specific course.

Social networks have proved to be important tools to support the educational process, since they bring the reality of today's world connected to the classroom. Twitter in particular has a number of useful features that enhance its use as a tool to support education. We know that Twitter messages (known as tweets) have several metadata that allows a good level of recovery and organization, including the date, location, information about the responsibility of the message and may have hashtags that allow catalog and connect tweets related to a specific topic.

However, semantic analysis allows new possibilities related to recovery of tweets to be achieved. As each tweet has a limited number of characters (140 characters), the semantic analysis process can be something quite promising and challenging.

This work describes the implementation of a context-sensitive Moodle plug-in for the search of external resources, which allows the semantic retrieval of documents from any digital repository that offers an OAI-PMH (Open Archives Initiative – Protocol for Metadata Harvesting) standard compliant interface (OAI, 2014). As a way to increase their potential use, the plug-in also retrieves Twitter messages, since social networks are shown as an important tool to support education. The document retrieval process in this proposal is performed considering the Portuguese language. However, the proposed approach also applies to other languages with similar characteristics (e.g. western languages).

The defined context-sensitive Moodle plug-in retrieves a list of tweets and documents from several external digital repositories. User supplied queries are semantically expanded to take into account the Moodle context in which the user is currently interacting. This expansion is performed using an ontology associated to that specific context.

In this work, context is defined using Moodle's own structure (organized in courses, subjects, topics etc.), which allows the identification of well-defined contexts, and ontologies. An ontology is a data model that represents a set of concepts and their relationships within a knowledge domain. They allow

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