# ENHANCING A FRAMEWORK FOR E-LEARNING SYSTEM USING ONTOLOGY AND FUZZY TREE MATCHING

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## ABSTRACT

E- learning systems are becoming increasingly popular in educational establishments due to the development of web-based information and communication technologies. Most of the fact that many of the recommendation system are providing recommendation for the fired query. But very few are recommending by having continuous stream of exercises for the user to guide them properly. E-learning is being developed to allow educators to assess on-line learning activities. Most data mining algorithms require specific parameters and threshold values to tune the process of discovery, the web usage mining applications of users in the context of e-learning, educators and e-learning site designers. To enhance the process of the recommendation in E learning sector proposed system provides a better way of managing the users query to narrow down the student option to help to select his best course using fuzzy logic which powered with ontology and Tree hierarchy. So proposed methodology put forwards an idea of E learning system by M tree hierarchy which is powered with ontology for semantic relationship by using fuzzy logic.

**Keywords:** Ontology Reasoning, Fuzzy Logic, M-Tree, TF-IDF, Pearson Correlation.

## Introduction

E-LEARNING systems are becoming popular in educational establishments due to the development of communication technologies and web-based information. Knowledge in data mining to use these tools to improve the effectiveness of web-based learning environments. A new web usage mining system dedicated for e-learning is being developed to allow educators to assess on-line learning activities. For an educator using a web-based course delivery environment, it could be beneficial to track the activities happening in the course web site and extract patterns and behaviors prompting needs to change, improve, or adapt the course contents. For example, one could identify the paths frequently and regularly visited, the paths never visited, the clusters of learners based on the paths they follow, etc.

For a learner using a web-based course delivery environment, it could be beneficial to receive hints from the system on what subsequent activity to perform based on similar behavior by other "successful" learners. For example, the system could suggest shortcuts to frequently visited pages based on previous user activities, or suggest activities that made similar learners more "successful". It could also be beneficial if the system adapts the course content logical structure to the learner's learning pace, interest, or previous behavior. Web-based course content is not always presented and structured in an intuitive way.

Service-based architectures take legacy application functionality and expose it to the Internet in a reliable, highly available, scalable, flexible, manageable and secure manner, easy and reliable internet-based method to create and access learning. Web service technology has emerged as a new paradigm of distributed computing. The Service-based architectures are layered on the top of standard transfer protocols for transmitting messages that currently, the most common ones are the XML-based specification Simple Object Access Protocol (SOAP), Universal Description, Discovery and Integration (UDDI) and Web Service Description Language. E-Learning is a general term used to refer to a form of learning in which the instructor and student are separated by space or time where the gap between the two is bridged through the use of online technologies.

Analyzing common traversal paths of the course content web pages or frequent changes in individual traversal paths, the layout of the course can be reorganized or adapted to better fit the needs of a group or an individual. We see two types of data mining in the context of e-learning: off-line web usage mining and integrated web usage mining. Off-line web usage mining is the discovery of patterns with a standalone application. This pattern discovery process would allow educators to assess the access behaviors, validate the learning models used, evaluate the learning activities, compare learners and their access patterns, etc. We have designed and implemented a prototype of such an application as a tool for educators to apply association rules to discover relationships between learning activities that learners perform, sequential analysis to discover interesting patterns in the sequences of on-line activities, and clustering to group similar access behaviors .

Many Universities across the world began their on line learning management system. Traditional teacher-learner centric classes are converted to repeated learner centric courses where reusability is enforced and time, space constraints are broken. Now many learners both students and academicians believe in continuous learning-teaching processes which rely on World Wide Web. Each learner has his/her own traits pace, prior knowledge level in the course, and requirements. Semantic web based learning management system which is adaptive in terms of finding the learners style and provides learning objects or services according to the style of the learner dynamically is the requirement now a days. This kind of LMS that allows learners to determine their learning agenda and control their own Learning is a current necessity. Learners understand and assimilate the concepts learned and apply them in practical solutions. Latest and Future learning systems have to consider this customized learning paths to their design and implementation. Dynamic Composition of e-Learning contents and e-learning services and Semantic Querying for Learning materials and constructing learners preferred courses are the features which to be implemented in the any adaptive e-Learning management system. This process involves building knowledge base and detecting learner's style and composition of workflow of e-learning services. The main objective of the e-learning framework which is proposed in this paper is to develop a

completely new, semantically enhanced, and automatically composed adaptive e-learning system for dynamic learners.

Most data mining algorithms need specific parameters and threshold values to tune the discovery process, the users of web usage mining applications in the context of e-learning, namely educators and e-learning site designers, are not necessarily savvy in the intricate complexities of data mining algorithms. For this purpose we have tried to design new algorithms that need minimum input from the user and automatically adjust to the web log data at hand.

Ontology based semantic web technologies are promising solution to give an explicit definition of conceptualization on a specified domain and assembling learning objects. The ontology integrated with the learner profile generates better results in an e-Learning LMS System and could be used in combination with multi-agent technologies for deriving personalized learning paths instead of Directed Acyclic Graph. The methodology that designs ontology using Protégé and content retrieval through web services is defined in with the limitations of command line interface of implementation. Few of the study highlights the choice of SCORM one of the e- Learning standards for implementing reusable, interoperable, and sequencing navigation of LO. The conceptual Service Oriented Architecture (SOA) of intelligent agent system is defined theoretically with the future focus of implementation feasibility. The research addresses the lacunae present in the existing system with the need of integrated approach which combines all the three points.

With the increasingly demand and acceptance of ontology-based applications, we have witnessed the creation of multiple ontology's describing similar or even identical fractions of real world knowledge. These ontology's, (partly) complementary or redundant, have an impaired collaborative functionality, be- cause of the decentralized nature of their conception. More than rarely, however, the sharing, integration and interoperability of these resources is required in real life application scenarios.

Ontology matching provides mechanisms for the alignment of (the components of) various knowledge resources. The different ontology matching approaches can be classi ed w.r.t. the object, terminological approaches measure the similarity of the concept names, structural approaches rely on the relations that hold between the different concepts and semantic approaches are based on logical methods. These different approaches are often complemented by the use of background knowledge provided by a reference ontology, Permissionto deal with realistic matching cases (e.g. weakly structured models). Another current issue in realistic case ontology matching is the handling of imprecise information and the resulting matching imperfections.

With the fast development of the World-Wide Web (WWW), the increased popularity and use of its tools, the WWW is becoming the most important media for collecting, sharing and distributing information. Many organizations and corporations provide information and services on the Web such as automated customer support, on-line shopping, and a myriad of resources and applications. Web-based applications and environments for electronic commerce, distance education, on-line collaboration, news broadcasts, etc., are becoming common practice and widespread. The WWW is becoming ubiquitous and an ordinary tool for everyday activities of common people, from a child sharing music files with friends to a senior receiving photographs and messages from grandchildren across the world. It is typical to see web pages for courses in all fields taught at universities and colleges providing course notes and related resources even if these courses are delivered in traditional classrooms. The Web is the means of choice to architect modern advanced distance education systems. Distance education is a field where web-based technology was very quickly adopted and used for course delivery and knowledge sharing.

This paper can be classified as follows: Section I is dedicated for introduction, section II is reserve for related work, section III is allocated for system description & finally section IV is done with conclusion.

**Related Work:**
To put forward the idea of Enforcing E-learning Using Ontology and Fuzzy Tree Matching this paper analyse many concept of different author as mention below.

O. R. Zaïane mention a new web usage mining system dedicated for e-learning is being developed to allow educators to assess online learning activities. Using a web-based course delivery environment, it could be beneficial for an educator to track the activities happening in the course web site and extract patterns and behaviours prompting needs to change, improve, or adapt the course contents. For a learner using a web-based course delivery environment, it could have advantage to receive hints from the system on what subsequent activity to perform based on similar behaviour by other "successful" learners. For example, the system could suggest shortcuts to frequently visited pages based on previous user activities, or suggest activities that made similar learners more "successful". It could also be advantage if the system adapts the course content logical structure to the learner's learning pace, interest, or previous behaviour.

J. Luo describe Web-based course content is not always presented and structured in an intuitive way. By analysing common traversal paths of the course content web pages or frequent changes in individual traversal paths, the layout of the course can be rearrange or adapted to better fit the needs of a group or an individual. We see two types of data mining in the context of e-learning: offline web usage mining and integrated web usage mining. Off-line web usage mining is the discovery of patterns with a standalone application. This pattern discovery process would allow educators to assess the access behaviors. We have designed and implemented a prototype of such an application as a tool for educators to apply association rules to discover relationships between learning activities that learners , sequential analysis to discover interesting patterns in the sequences of online activities .

B. Mobasher explain most data mining algorithms need specific parameters and threshold values to tune the discovery process, the users of web usage mining applications in the context of e-learning, namely educators and e-learning site designers. For this purpose we have tried to design new algorithms that need minimum input from the user and automatically adjust to the web log data at hand.

J. Han shows WebSIFT is a set of comprehensive web usage tools that is able to perform many data mining tasks and discover a variety of patterns from web logs. A versatile system, uses data warehousing technology for pattern discovery and trend summarization. However these wideranging tools are not integrated in elearning systems and it is cumbersome for an educator who doesn't have extensive knowledge in data mining to use these tools to improve the effectiveness of web-based learning environments.

Maria-Luiza Antonie introduce a totally non-parametric approach for clustering web sessions. Offline web need mining helps educators put in question and validate the learning models they use as well as the structure of the web site as it is perused by the learners. Integrated web usage mining is a process of discovering patterns that is incorporated with the e-learning application. This encompasses personalization of activities, and automatic recommenders that suggest activities to learners based on their preferences as well as their history of activities and the access patterns discovered from the communal accesses.

W. Wang explains existing system works on the fact of fuzzy tree matching-based hybrid recommendation approach for an e-learning system. The approach develops both a fuzzy tree-structured learning activity model and a fuzzy tree-structured learner profile model. A fuzzy tree similarity measure is presented to evaluate the similarity between learning activities or learners. In the fuzzy tree-structured learning activity model, a fuzzy category tree is defined to specify the categories that each learning activity roughly belongs to, and the fuzzy category similarity measure is developed to evaluate the semantic similarity between learning activities.

### SYSTEM DESCRIPTION:

To enhance the process of the recommendation in E learning sector proposed system provides a better way of managing the users query to narrow down the student option to help select his best course using fuzzy logic which powered with ontology and Tree hierarchy.

It handling user query in natural narration. Student counselling using semantic questionnaires. Decision taking based on tree hierarchy and Fuzzy classification. Enhancing Recommendation using collaboration. Motivation of this is lack of adaptiveness, Lack of Semantic analysis of user query, Prolong counseling of student.

Proposed methodology put forwards an idea of E learning system by M tree hierarchy which is powered with ontology for semantic relationship by using fuzzy logic. Proposed system uses the following steps for providing recommendation for E learning : Preprocessing–Preprocessing the user query, Ontology Reasoning–Providing semantic for the words, M-Tree creation–Creating tree based on semantic relations, Fuzzy logic – Taking the decision based on fuzzy classification, Pearson correlation–Collaborative recommendation is conducting through Pearson correlation.



**Figure1: Overall System Diagram**

Proposed system successfully scrutinizing the user requirement more semantically using ontology and according to this the decisions is taking using Fuzzy tree combination. Then finally the a hybrid recommendation will be provided using collaborative filtering which is powered with Pearson correlation and content based recommendation successfully to the user with high precision results.

### Conclusion:

This paper successfully accumulates most of the techniques of many authors as described in section II of related work. So by analysing all methods it seems to be like no method is perfect in providing solution for enforcing e-learning using ontology and fuzzy tree matching.

As an efforts to this paper tries to improve the concept of enforcing e-learning using ontology and fuzzy tree matching by introducing Preprocessing–Preprocessing, Ontology Reasoning, M-Tree creation, Pearson correlation.

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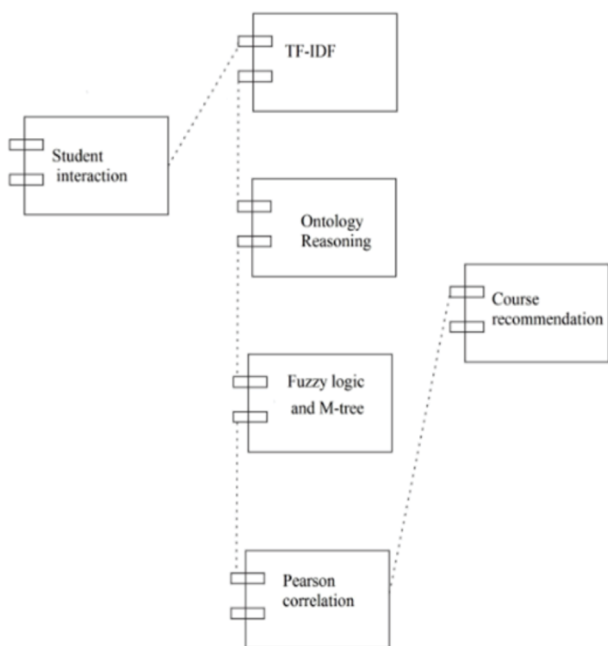9. "Collaborative filtering adapted to recommender systems of e-learning," J. Bobadilla, F. Serradilla, and A. Hernando, Knowledge-Based Systems, vol. 22, 2009.