CSC 400 Assignment: NSF style proposal
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Designing a Framework for Intelligent e-Learning

Summary

In this project we aim to design and implement an “Intelligent e-learning system”. The vast amount of educational data on the web could make it difficult for a user to find an effective learning procedure. The Intelligent e-learning system uses the previous users’ experiences, to suggest a proper learning procedure to a particular user, in a particular field using the similar experience and opinions of other users.

Such a system acts as an information filtering system which helps the user to make choices without sufficient personal experience. , In other word, it personalizes the information based on the interests and needs of a particular user by finding the similar users’ past selection.

Introduction

E-learning in general is defined as using electronic media for teaching. However, today it mostly refers to online learning. There are many institutions that propose online courses. Many people have opportunity to get a 'Distance Education Degree' using online education programs. There is an extensive source of data in the Internet that can be used as education and research materials; including Video courses, books, tutorials, assignments and exercises. However, the material can be used in a more effective way.

Some online websites, like “Coursera”, present a variety of courses in different disciplines. Other institutions present some specific programs, like many universities. The former does not normally use a schedule or sequence for proposing materials and courses. On the other hand, the latter use the experts’ knowledge and experience for improving an intellectual package of courses, assignments, projects and other materials. The experts also may suggest some specific materials and sources as a support for learning, according to the research topic or the students’ need.

The idea of this project is to design an intelligent framework with the purpose of implementing the above process. We can use online materials, including papers, multimedia etc. as education
resource and the feedback of all previous users on them, to filter the most useful ones. We could also pay a particular attention to the experts’ comments. This representation can be mapped as a recommender system usage in e-learning.

This framework can improve e-learning significantly. Although there is a huge amount of information on the Web, many students and researchers complain about being confused by the non-classified data. Intelligent framework for e-learning will provide easy way for the users to find they exactly are looking for.

**Project Description**

The e-learning intelligent systems will be designed in order to be able to use the previous users and experts to suggest a sequence and a set of materials to the future users. They use the users’ similarities to provide the most related and beneficial suggestion for the new user.

An e-learning intelligent system is connected to the infinite web resource. It continuously is updated automatically by the materials on the Web and filters the most relative ones based on users’ interactions with the system. Therefore, although users do not have direct interaction with the open Web, new or different learning materials in the open Web can enrich their learning experiences through personalized paper recommendations.

Another important concern is that in education recommenders, the recommendation materials are not of intrinsic value; the goal is to learn a topic or to be improved in a course. So, recommender systems in education are quite different from recommender systems in e-commerce, as they have to consider not only the learners or the educator’s preferences for a certain material, but also how this material may help them to achieve their goals. In other words the pedagogical aspects of the items should also take into account.

As learning is a process, the order of proposed materials is of importance. For example, when a learner wants to learn about Neural Networks in a four month semester, the related materials should be recommended step by step, and based on the current learner knowledge in the field. Otherwise, it may make perturbation in the learning process

**Research Plan**

The project has two parts: research and implementation.

The research part can be broken into three steps. Firstly, we study and investigate the methods that learn patterns and classes using a static data pool. In this phase we assume that materials are not updated by time. This can contain active learning and semi-supervised learning methods which empower us both for clustering the existent data, and for recommending the next item based on the observed items.
Secondly, we need to extract the pattern of users’ behavior in a learning process. Which texts and multi-media does a user use in a specific subject? Which assignments are beneficial for her/him? What is the sequence of these materials usage?

Lastly, we need to apply the above framework to a dynamic data frame work. In this way we can use new on-line materials as potential educational resources.

The implementation part consists of writing software, and collecting data for a limited range of topics. We will try the software in CS department of University of Rochester, with 20 students as user members and 5 faculties as experts. We will then analyze the results focusing on three phases defined above.

**Intellectual Merit and Broader Impact**

This system will cause a significant improvement on the current e-learning procedures. It makes it possible for us to apply a huge amount of users’ feedback and experience to answer to an individual user’s need. It also empowers us with classifying data. Another merit is to propose a reasonable sequence of materials to a user in the specific educational field he/she needs, instead of a huge bunch of overwhelming material.

This framework can also provide many people with different educational background and interests with proper materials for studying; including bachelor studies, masters, PhD and even other short term courses for specific skills professions. New learners can simply share their background and needs and get the beneficial suggestions which come from analysis of other past experiences.

The other impact could be a more effective sharing system between academic centers and institutions. This system can motivate universities to share their educational materials in a united structure instead of just releasing the materials in the internet. In this way they can search more purposefully.

**References**

