

An Intelligent System for Generating and Managing FAQs in Online Education

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Abstract: With the development of the Web, online course delivery is gaining its popularity everyday. But no matter how courses are delivered, there are two things that never change in education. For students, they will need to have their questions answered, and for the teachers, they will have to answer the questions students raised. It is often that in a course the same questions are asked again and again, probably with certain variations. In this paper, we report an intelligent system that was designed and implemented for teachers to build up lists of frequently asked questions and answers, and use the FAQs in online course delivery.

Keywords: intelligent system, problem-driven learning, online education

1. Introduction

With the development of the Web, online course delivery is gaining its popularity everyday. But no matter how courses are delivered, there is one thing that never changes in education. For students, they will have to get all the questions answered, and for the teachers, they will have to answer all the questions students raised. In this sense, having a well developed list of questions and answers will definitely help not only students, but also teachers. Especially, because it is often that in a course the same questions are asked again and again, it makes more sense to have those questions answered in an automatic or a semi-automatic manner than answered by the instructors again and again. That's how lists of frequently asked questions and answers became necessary and very useful in education.

In generating and using FAQs for an online course, we are facing two difficulties. Firstly, we often don't have a complete list of questions and answers ready for a FAQ at a given time. Even if we have, it is time consuming to make the list accessible in electronic form for students online.

There are systems that can help you to quickly develop a long or short list of FAQs [2][3][4]. They may even have some very nice features such as easy, yet powerful online administration. However, because these systems are not integrated into online course delivery system, it is not convenient for instructors to use. Experience shows that users usually don't like to switch from an LMS to a different application just for adding a FAQ item.

Therefore, it is obvious that we need to integrate a FAQ management system into a learning management system. However, even that is not enough. We all know that it is really tedious to type and edit on computers. It would be ideal if FAQ items can be generated automatically without a burden to the instructors. That is what we have achieved with the FAQ system integrated in EduPalace, and that is what this paper is about.

In the rest of the paper, we will first briefly talk about EduPalace, in order to draw a big picture of where the intelligent FAQ system reported in this paper will fit. Then, we will present the details

of various aspects of the FAQ system, including the system architecture and its components, how FAQ items can be automatically generated, and how the Q-A base can be well maintained.

2. EduPalace – the host of the intelligent system for FAQ management

The intelligent system reported here for generating and managing frequently asked questions and answers is an integral part of EduPalace – an integrated system for Web-based distance education. In this second section, we will briefly explain the basics of EduPalace, in order for the audience to understand easily where the reported FAQ system fits and how it works for online education.

EduPalace is an integrated system for today's distance education. It provides portals to all parties involved in course authoring and delivery for online education. These parties include the president of a university as super user (indeed, the major difference between president and the ordinaries is that the president has more power to make decision on more things), school directors, professors or subject matter experts, editors, instructors, tutors, administrators, and students, of course. In each portal, the user is provided with specialized tools for him or her to do their jobs. Figure.1 shows a portal for instructors in EduPalace, whose responsibility is to deliver courses online through some modules dedicated to its sole purpose.

In addition to specialized modules in each portal, there are also common modules available to all parties. These modules include whiteboard, forum, peer-to-peer messaging, planner, notebook, bookmark, address book, goodies, and profile management, as can be seen from Figure 1. As an overview, we will not discuss any further about any of these common modules here.

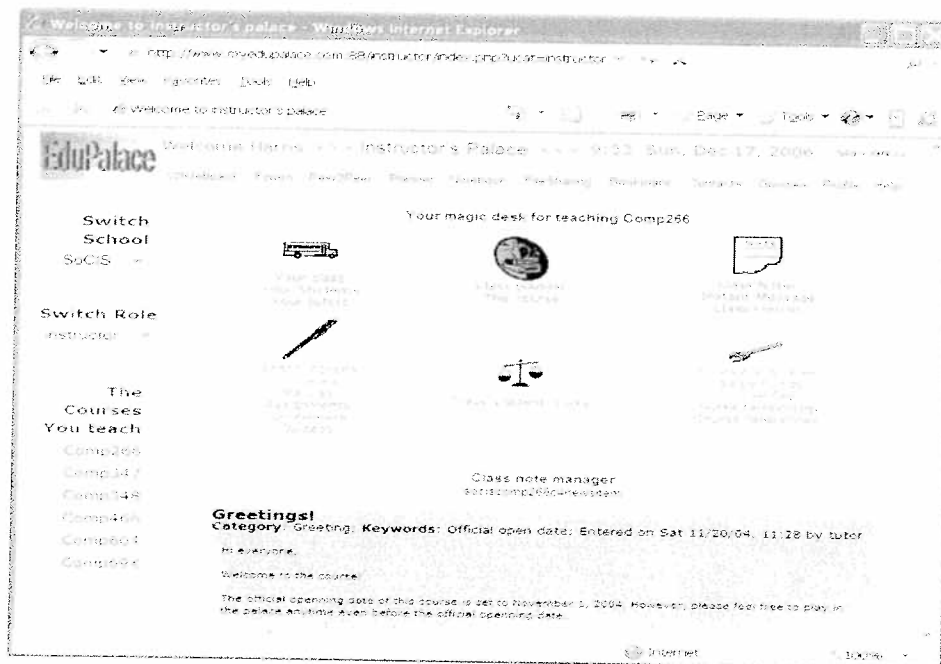


Figure 1: a portal for instructors in EduPalace

3. The structure of the intelligent FAQ system

The system consists of a question-answer knowledge base, an automatic question-answer generating agent, an intelligent management agent, and an assistant for manually managing the question-answer knowledge base.

3.1 Question-answer knowledge base

The question-answer knowledge base contains questions and their answers as well as other information needed in maintaining the knowledge base. This information includes some keywords, categories, subjects, courses and even units an particular FAQ item is associated with, and the authorship of the item.

3.2 Automatic question-answer generating agent

The automatic Q-A generating agent is built to work with the whiteboard, forum and p2p messaging systems to capture FAQ items from communication between instructor and students with the three communication channels. It is triggered when a question is answered by the instructor on the whiteboard, forum or p2p messaging systems. It first identifies the question and answer, and then formats them, try its best to figure out whether the same entry is already in the knowledge base.

3.3 Intelligent agent for autonomous maintenance

This piece of software is designed to autonomously check the consistency and redundancy of the Q-A knowledge base. It also tries to classify questions according to their content (keywords at the moment), and the ways the questions are asked.

3.4 Assistant for instructors to manually manage the question-answer knowledge base

With this assistant, instructors can browse and search for specific items, can add one item or some (5 or 10, but the user can leave certain entries empty) at the same time. The items can also be re-ordered such as moving a specific question to the beginning of an FAQ

4. Ways of building up your list

As experience shows, one big obstacle in making and managing course FAQs is that we often don't have a complete list of questions ready to build at a specific time, such as the time when the course was being developed. Even though we may have a long list of questions at the time, we know that much more questions are to come from students, and they may be asked in different ways. As a result, questions in a FAQ are dynamic in nature, so are the answers.

In online course delivery with EduPalace, students communicate with instructors and their peers through online whiteboard, forum, and peer-to-peer messaging systems integrated in EduPalace. Figure.2 shows a snapshot of a forum for online course delivery.

As such, questions from students, and answers from instructors are naturally conveyed within these three communication channels. This gives us an ideal opportunity to build up FAQs for the course.

As mentioned, the autonomous question-answer generating agent is designed to capture FAQ items when instructors answer students' questions on online whiteboard, forum and peer-to-peer messaging systems. as shown in Figure.3.

Obviously, the items automatically added to the knowledge base are raw and need to be refined or checked manually by instructors or knowledgeable editors. Due to difficulties for computers to understand the real meaning of questions, redundancy is unavoidable.

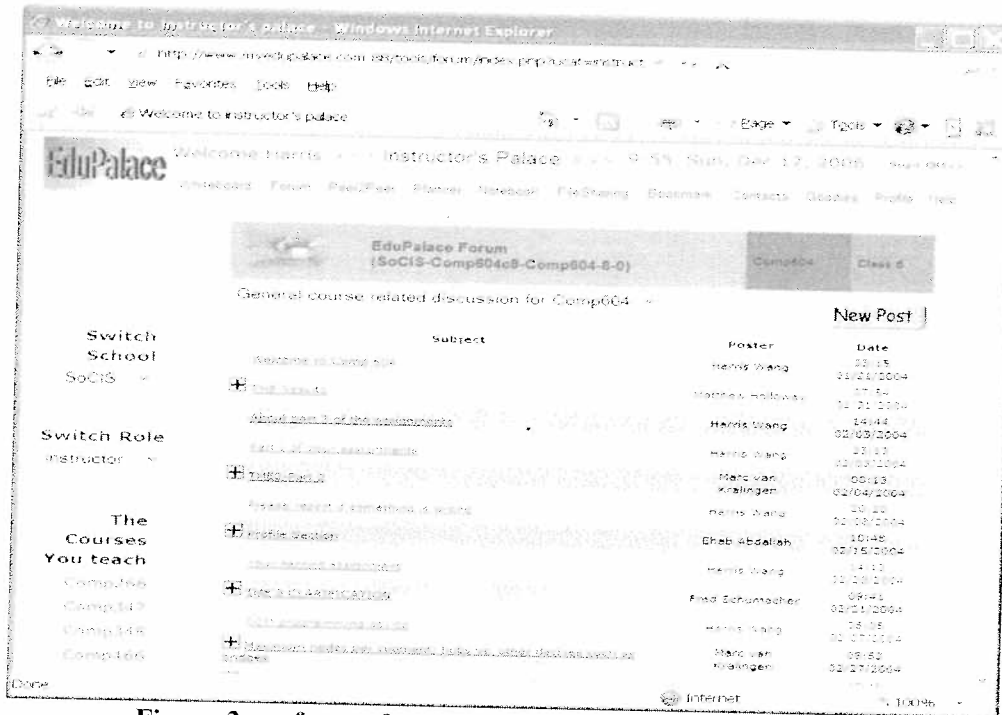


Figure 2 – a forum for online course delivery in EduPalace

In our system, the second way to add new FAQ items to the knowledge base is to use the assistant. As shown in figure.4, instructors can use the assistant to add one item or some at a time.

This may still cause redundancy in the FAQ knowledge base, unless the instructor has a thorough grasp of all the questions already in the knowledge base. That's how an autonomous maintenance agent becomes necessary.

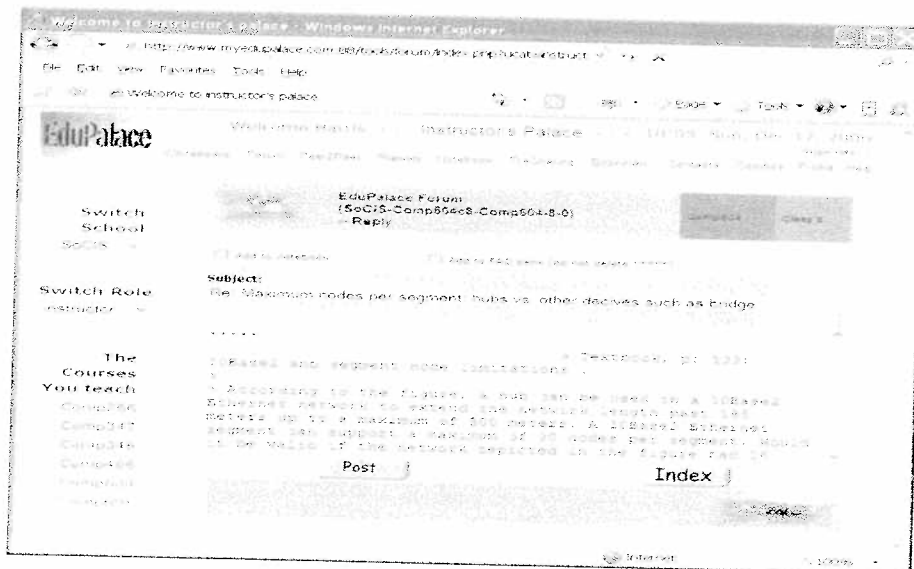


Figure 3 - How an FAQ entry can be added automatically into the course FAQ

As shown in figure.4, when an instructor replies a query from a student, he may explicitly invoke the autonomous FAQ generating agent by checking the 'add to FAQ bank' box. This will save a lot of time for the autonomous agent on figuring out whether this will be an FAQ item.

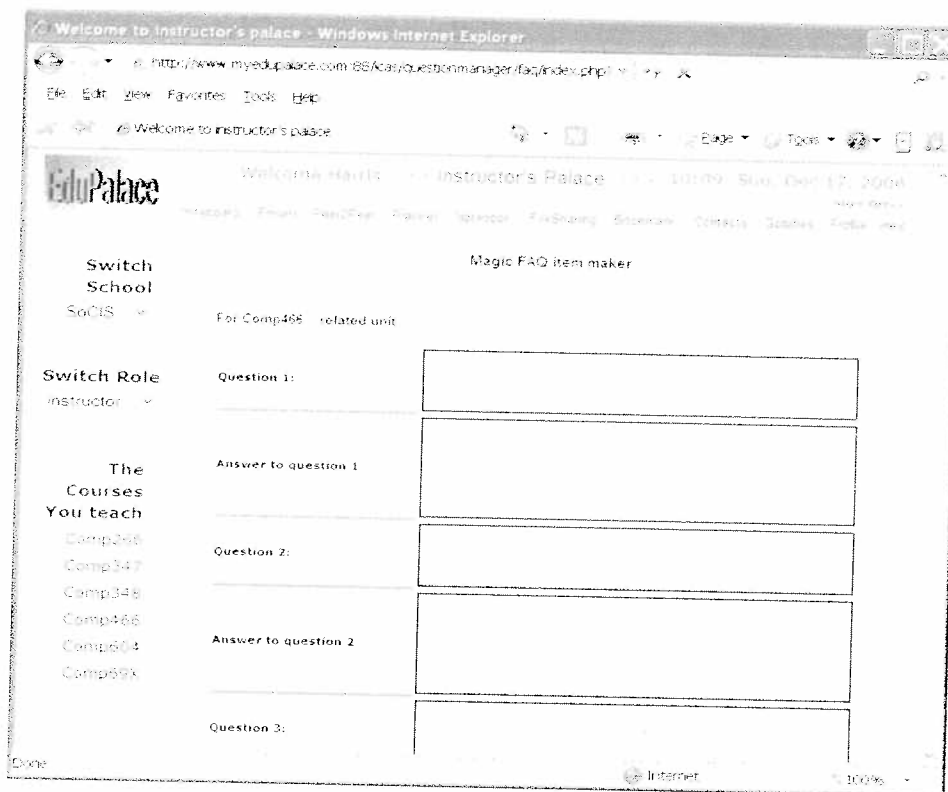


Figure 4 - FAQ entries can be added in a bunch of five or ten pairs of questions and answers

5. Assistant for FAQ knowledge base management

The FAQ management assistant is designed for instructors to browse the FAQ knowledge base, search for a particular FAQ entry in the knowledge base, and re-order the entries, as shown in Figure.5. To re-order the FAQ items, one can simply assign a number to each item and then click the re-order button. Items with no specific numbers assigned will be put at the end of the list but their relative order will not be changed. If the instructor just wants to move a specific FAQ item to the very beginning of the list, he may simply assign a negative number to that particular item.

As can be seen from Figure.5, this assistant can also be used to edit existing FAQ items. The instructor can also manually check for consistency and redundancy using this assistant.

6. Discussions

We presented in this paper an intelligent system that can be used, within EduPalace – an integrated system for online education, to automatically generate lists of frequently asked questions and answers, and to provide instructors some convenient yet powerful ways to manage FAQs for online classes.

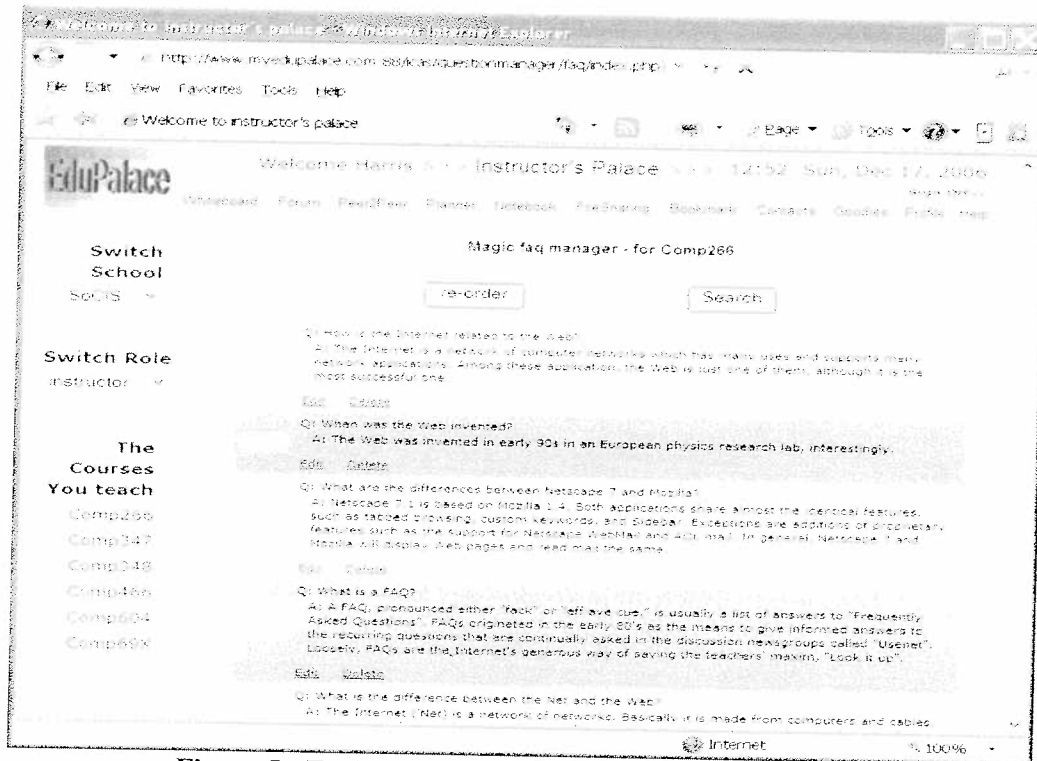


Figure 5 - FAQ entries can be re-ordered and searched

There are areas in which improvement can be made. One of these areas is consistency and existence checking, that is, to check whether the same or similar question is already in the FAQ knowledge base when a new FAQ item is captured and to be added. We know that in a class students often ask the same questions, but with certain degree of variations. Some efforts are still needed to make the system smarter enough to identify those variations. If we can achieve this, we will also be able to make the system capable of automatically answering some of the questions students asked. This is another area we are working in now.

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