This paper considers a system for massive course generation. The output of this system is a course arranged in a hierarchical structure of chapters and pages. Each page consists of multimedia components such as text, sound, music, image, video, animation, and graphics. The system has a hypermedia capability that is built on top of open Internet standards such as HTML. This enables the generated hypermedia courses to be broadcast on the Web and be navigated using any web browser. Students can evaluate their study and get a quantitative measure score for their study. Furthermore, the system is equipped with an automatic system for final exams generation. Finally, six courses of the senior year in the biomedical engineering department, Faculty of Engineering, Cairo University, were implemented using this generation system.

INTRODUCTION

In this paper, a course generation system has been developed. This system requires as input a prepared script of the course and its organization. This script is built as a hierarchical structure of chapters that includes pages. On each page, the instructor(s) should describe its contents in terms of multimedia components, such as text, sound, music, image, video, animation and graphics or even VRML (Virtual Reality Modeling Language) (Vince, 1998). The system has a hypermedia capability: It is built on top of open Internet standards such as HTML. This enables the generated hypermedia courses to be broadcast on the Web. The HTML enables the placing of the other multimedia components within the courses. The
developed system interacts with the course instructor(s) through an easy interface. It provides the instructor with more than twenty different formats of HTML pages. Moreover, new formats may be designed and implemented if needed. Each chapter is followed by a set of questions. Once a student registers in the course, he can browse through the course using any web browser. Then he can evaluate his study by getting to the questions, answering them, and getting his score. This property will enable the student with a quantitative measure for his understanding of the course material. The questions can be updated and modified automatically every time. Moreover, different levels of help may be provided to the student to give him hints to solve the problem. If the student gets help, the score of the question will be decreased according to the level of help he has got. Six courses of the senior year in the biomedical engineering department, Faculty of Engineering, Cairo University, were implemented using this generation system.

In this paper, a system for automatic random generation of exams is provided. The system starts with a bank of questions. Each question is linked to a subject and a level of difficulty. Once it exists, the instructor can specify the number of questions in the exam and the subject of the questions, together with their level of difficulty. To facilitate the correction, each set of exams is generated with a model answer. The types of questions considered are multiple choice and true/false. Using this system, the students are divided into groups. Each group will have a different exam with the same degree of difficulty. So we can optimize the use of the same place by dividing the huge number of students into smaller groups, each having its own exam. Moreover, this system can be applied to perform remote testing on the Web. Each student in the lab will be able to answer a different exam with the same difficulty level at the same time. These exams are corrected automatically and the results are provided to the students. The system is interactive and easy to use.

**SYSTEM DESCRIPTION**

The proposed system is a systematic way for the generation of different courses with simple and easy steps for the instructors that requires no special or previous skills. The steps for the course generation are to fill some simple forms that contain all the information required for the course generation. This information is then stored in tables in a database. Finally, the instructor issues the command to convert all information into HTML (Raggett, 1997; Lemay, 1995) pages, and the course will be available.

The produced HTML pages contain four basic components: paragraphs, images, sounds, and/or videos. A variety of pages can be obtained with different font, different colors, the use of tables in the pages, images, and their locations with respect to paragraphs, etc. A library of page styles is included to suffice the
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