2012 International Conference on Information and Computer Applications (ICICA 2012)
IPCSIT vol. 24 (2012) © (2012) IACSIT Press, Singapore

How Artificial Intelligent Scheduling Techniques Support Intelligent Reflective E-Portfolio

Farhang Jaryani[1], Mohd Ridzuan Bin Ahmad [1], Shamsul Sahibuddin [1] and Jamshid Jamshidi [2]

[1] Advanced Informatics School, Universiti Teknologi Malaysia

[2] Sky Zenith Network Co

jfarhang2@live.utm.my Jamshid@skyzgroup.com

Abstract. The aim of this paper is to present the role of Artificial Intelligence techniques (Scheduling Techniques) to enhance reflective e-portfolios quality. Some AI techniques such as expert system; scheduling; Data Mining can support us to enhance our reflective e-portfolios quality. These tools together will define new intelligent Reflective e-portfolio that provides intelligent and customized learning method for each student based on their backgrounds and their realities. This paper analyzes the role of AI- Scheduling Techniques to enhance learning smartness. The final vision of intelligent reflective e-portfolio is to act as an expert to consult students and support them to make Right decisions for their learning complexities.

Keywords: Reflective e-portfolio;; Artificial intelligence; Scheduling Techniques;

1. Introduction

1.1. Electronic Portfolio

Electronic portfolios traditionally have been defined as an organized collection of digital and/or analog artifacts and reflective statements that demonstrate a learner's intellectual development over time [Barrett, 2001]. Tosh defined an e-portfolio as a web-based information management system that uses electronic media and services, where learners build and maintain a digital repository of artifacts, which they can use to demonstrate competence and reflect on their learning [Tosh, 2005]. The rapidly growing use of eportfolios in higher education provides students a user-centered learning information management facility [Guo and Greer, 2005]. Many schools and universities have developed e-portfolio systems where students are encouraged to store and organize their learning materials during their formal schooling and to further carry on with augmenting that e-portfolio during lifelong learning. The main use of e-portfolios involves collection, reflection, evaluation and connection of knowledge artifacts. One defining feature of eportfolios is that the learner is the owner, while others, including teachers, can contribute information to a learner's e-portfolio or review portions of the e-portfolio from time to time. The person ultimately responsible for the content in an e-portfolio is the learner.Another characteristic is that the content in an e-portfolio can be created across different platforms using different software frameworks, and should be distributable after being packaged and annotated. Interoperability and flexible dynamic content re-organization is another key feature.[Zinan Guo,2007]

1.2. Artificial Intelligence:

Artificial intelligence (AI) is the intelligence of machines and the branch of computer science that aims to create it. Textbooks define the field as "the study and design of intelligent agents," where an intelligent agent is a system that perceives its environment and takes actions that maximize its chances of success. John McCarthy, who coined the term in 1956 defines it as "the science and engineering of making intelligent machines." There are many different types of Artificial Intelligence algorithms, including expert systems,

neural networks, fuzzy logic,Schedueling, Genetic algorithma,Data Mining ,exc The main aim of Artificial Intelligence (AI) is to study how to build artificial systems that perform tasks normally performed by human beings. This concept was born in 1956 in the Darthmounth conference. From that moment on a lot of effort has been made and many goals have been achieved but unfortunately many failures as well. Today the AI is a very important discipline and it includes a number of well-recognized and mature areas: Expert Systems, Fuzzy Logic, Genetic Algorithms, Language Processing, Logic Programming, Planning and Scheduling, Neural Networks and Robotics. Within these fields, our work focuses on AI planning and scheduling (AI P& S) and expert systems techniques.

1.3. Scheduling Techniques

A scheduler organizes activities along the time line by taking into account the resources available. Many procedures used in this area of scheduling systems come from the Operational Research (OP) and the Constraint Programming. (CP). This last discipline has been applied to the different scheduling problems with very good results, i.e. the Job Shop Scheduling Problem (JSSP) (J. Holland, 1998).

These JSSP methods can be easily generalized and applied into a learning environment. In this case, instead of machines and jobs, there are students, teachers and learning units in courses. This adaptation is made in a natural way taking into account that each learning unit can be considered as an operation that needs to be processed during a period of time, for a given student (machine) and under the supervision of an educator. The course also must have a limited duration (deadline) and an instructor can only manage a limited number of students (each teacher is a resource with a total resource capacity given by the number of students he is able to advise).In addition, it is necessary to know the initial and end time of each learning unit task considering precedence constraints among them. Also, it is mandatory to impose a course deadline (its total duration) and the resources (number of teachers) that are available. Furthermore, it is needed to establish other variables imposed by the problem conditions: number of learners, learning activities duration, course length, etc.Once all these data have been recorded, it is up to the educator or the pedagogical responsible to establish the best way to distribute the number of hours and their contents among the different units in order to assure the quality of the educative process. This business can be done automatically by applying planning and scheduling techniques. The results will be a plan, or a set of plans, if a solution exists for a given deadline. A plan can be seen as a sequence of learning activities (operator applications) with a specific duration that must be accomplished from the initial state to a state where the goals are reached, under the teacher supervision, with the resources available.Finally, it is appropriate to emphasize the possibility of compiling the information of the student interactions with the system throughout the time. This information can be used as a feedback in order to reschedule the whole course or to change the time assigned for a specific task. This way allows a better course adaptation to both: the student characteristics and the available time

2. Background of the problem

Regarding to (Jaryani 2010) , current e-portfolios have some lacks , especially in the field of smartness and intelligence. Smart e-portfolios must be able to do schedule ling for students about their future courses and future studies, currently this issue is solved with lecturers, so based on human faults many times student cannot find the best solution. Artificial Intelligence techniques would be and effective and efficient way to consult students to find out the best way about scheduling their studies.

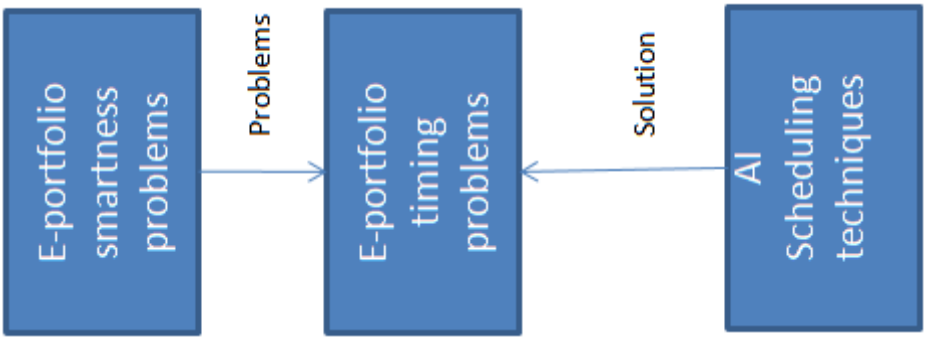
3. Proposed Method

This research aims to analyze following questions:

a) What are the main issues of using AI- Scheduling Techniques to design reflective e-portfolios?

The research has been carried out through a theoretical Framework and an empirical study. This study aims to explore and analyze AI- Scheduling Techniques effects on designing Reflective e-portfolio

frameworks. It explains the relationship between AI- Scheduling Techniques and reflective e-portfolio's needs in a theoretical Framework . The purpose of this research is Hypothesis testing, based on our extensive knowledge of AI and its effects and relationships to improve Reflective e-portfolio quality from online educational aspect. Framework of AI- Scheduling Techniques supports has been introduced to solve current e-learning scheduling problems and lacks based on AI-Expert systems advantages.



4. Advantages of AI- scheduling techniques

In recent years, Intelligent Planning and Scheduling have surpassed the effectiveness of the long dominant operations research techniques for solving a large variety of planning and scheduling problems.

This allows IP&S users to

_ tackle problems orders of magnitude larger;

_ solve problems orders of magnitude more quickly;

_ find significantly better solutions.

Through these techniques IP&S has allowed businesses and organizations to cut costs considerably while at the same time increase their ability to handle the dynamic nature and complexity of today's business environments. Furthermore, IP&S techniques provide a framework for controlling complex (autonomous) systems and agents. They are able to task individuals/systems, monitor their progress, and re-plan or re-schedule where new issues arise. At present, IP&S technologies are providing great benefits for real-world operational applications in commerce, industry, education, medicine, public transport, defense, and government. Example users of IP&S technologies are Boeing (aircraft manufacturing), British Telecom (mobile workforce scheduling), the European Space Agency (spacecraft mission planning), NASA (autonomous spacecraft operations), Electric Boat (submarine building), and military organizations. Proven benefits of IP&S technologies include 15% to 20% reduction in time needed to build an aircraft (equivalent to savings in the order of 1 million USD), 30% reduction in overtime and subcontracting, and a shortening of planning time by factors of 40 to 100. During the 1991 Gulf War, IP&S technologies speeded up the logistical build-up of the allied military Forces by several months. The savings paid for all US research and development into Artificial Intelligence over the preceding 40 years.

5. References:

[1] Barrett,H.C. (2001), "Electronic Portfolios", http://electronicportfolios.com/portfolios/encyclopediaentry.htm , accessed 9/15/2005

[2] Tosh, D., Penny Light, T., Fleming, K., Haywood, J., (2005) Engagement with Electronic Portfolios: Challenges from the Student Perspective, Canadian Journal of Learning and Technology, Vol. 31, pp 89-110, Etobicoke, Canada AMTEC

[3] Greer, J., & McCalla, G., (1994) Student Models: The Key to Individualized Knowledge-Based Instruction, NATO ASI Series F: Computer and Systems Sciences, vol. 125, Springer Verlag, Berlin Heidelberg..

[4] Guo, Z. and Greer, J., Connecting E-portfolios and Learner Models, E-Learn 2005,Vancouver, Canada, October 24-28, 2005.

[5] Zinan Guo,CONNECTING ELECTRONIC PORTFOLIOS AND LEARNER MODELS,2007 http://www.newton.dep.anl.gov/as kas ci/comp99/CS050.htm)

[6] John McCarthy,2007 WHAT IS ARTIFICIAL INTELLIGENCE,

[7] http://en.wikipedia.org

[8] Artificial intelligence and Bluetooth techniques in a multi user m-learning model, Bonifacio Castaño , Ángel Moreno ,2008

[9] http://encyclopedia2.thefreedictionary.com