

Introduction

1.1 Introduction

A Curriculum consists of everything that promotes learners' intellectual, personal, social and physical development. As well as lessons and extracurricular activities, it includes approaches to teaching, learning and assessment, the quality of relationship within school/institution and the values embodied in the way the school or institution operates. Therefore this process is more complex. There are many advantages of simplifying the process of curriculum design and development, and at the same time there are many approaches for this too. This chapter discusses on the need for automate the process of curriculum design and introduces one such approach for curriculum design.



1.2 Background and Motivation

The curriculum exist at three levels: what is planned for students, what is delivered to the students and what the student experience [14]. With this it should be able to maximize the possibility of thwarting students from graduating within reasonable amount of time [19]. Curriculum changes over time. In practice, however, it is not easy to keep curricular system updated and provides students with trustworthy course services that reflect and correspond to the evolution of curriculum [10]. The real curriculum design is going through the process of negotiations within a committee of expert in the field of curriculum design. They spent considerable amount of effort in designing the curriculum and it takes several days or weeks or months to complete the task in a successful manner. Therefore the potential solution for this problem would be automating the process of curriculum design. For instance, Computer Aided Curriculum Planning and Scheduling System (CACPS) [19] have been provided a better architectural approach to design curriculum and propose to use the database technology. Curriculum Management System [5] supports for planning and implementation of curriculum based on database technology. Curriculum

Management Task [7] support for curriculum proposals and review process with the use of database technology. Pharmacy Curriculum management System (PCMS) [10] is a relational database system that support for the review of pharmacy curriculum. Conventional computing aims at developing programs to do specific task without been able to improve the performance. Therefore conventional systems which stated above do not provide facility to automate the curriculum design to meet the dynamically changing requirement in a complex environment. Automated instructional design tools [5] are aided in the development of computer based instructions. CUBER: A Personalized Curriculum Builder [13] provides an ontology based solution to build the personalized curriculum. And also Integrated Multiple English Learning Ontology for personalized education (ENGOnto) [3] and Ontology-aware Course Management for Curriculum Evolution process in Higher Education (OCMCE) [6] has been developing the curriculum ontology mainly support for the history of curriculum changes. Even though these approaches give better solutions to their problems with the use of ontology, it was limited to few areas in curriculum and do not provide better solution for curriculum design. It is evident from literature use of conventional software's are not adequate to design curriculum with dynamically changing requirements in the complex environment and modern approaches were not properly address the issue in curriculum design with the negotiation among different parties.

1.3 Solution to curriculum design

There are two major modules in this approach, User Interaction module and Curriculum Design module. User interaction module support to interact with the user and Curriculum design module do necessary arrangement to design the curriculum with the use of MAS. Upon request create curriculum agent namely: credit agent, level agent and subject agent, design agent and by negotiation among those agents requested curriculum will be created with appropriate features. The knowledge required for each agent will be stored in curriculum ontology. Multi Agent System will be developed using JADE [21] and the ontology will be developed using Protégé [23]. Swing classes in Java programming language use to develop the user interaction module. All above mentioned software are licensed under open source licenses. Users

of the system would be curriculum designers in the academic institutions. The proposed solution will produce the well balanced curriculum for the given course module details.

1.4 Aim

Since the multi agent technology provide solutions based on the negotiation among different agents this project aims to provide automated system to handle the issue in designing curriculum among the negotiation within different parties with use of Multi-Agent technology.

1.5 Objectives

Objectives of this project are

- To critically study about curriculum design process
- To critically study about current software solution for curriculum design
- To study about Multi Agent technology
- To design and develop a Multi Agent system for curriculum design
- To evaluate the proposed Multi Agent solution for curriculum design
- To document the final dissertation

1.6 Resource Requirements

The system has been designed and developed to run on a standard personal computer with the following software

- JADE platform to develop Multi Agent system
- Protégé: a free and open source ontology editor and knowledge base framework to develop domain ontology
- Java programming language.

1.7 Structure of the Thesis

Chapter 1 is a brief introduction of the project. It includes an overview of the project including the background and the motivation, importance of the problem, aim and objectives of the project and also a brief discussion of suggested solution.

Chapter 2 describes related works in autonomous curriculum design systems. It gives an overview of the existing systems and of which technologies, methods they have used. Through this chapter it can be identified, that the curriculum design system had been developed in a number of different approaches and different ways.

Chapter 3 discusses the technology adopted to solve the problem and how and why those technologies are suitable for the project. This chapter mainly discusses Multi Agent Systems and Ontology.

Chapter 4 includes a discussion on the proposed approach to solve the problem. This chapter provides a vivid description on how the technology is used to solve the problem referring to users, inputs, outputs, process and technology that implements the solution.

Chapter 5 is about an analysis and design of the system; it includes top level architecture of the system. It describes features of the each component of the top level architecture.

Chapter 6 presents the implementation details of the system, with reference to the modules identified in the design presented in chapter 5.

Chapter 7 describes the evaluation methods and presents the results in tabular form.

Chapter 8 presents the conclusion and further work. The system has achieved the specified requirements and has met its objectives and these are discussed from this chapter.

1.8 Summary

This chapter presents a brief description about Autonomous Solution for Curriculum Design with the background details to implement such systems and the aim and objectives of doing this project. Also this chapter briefly describes how the thesis organizes after this chapter. Next chapter will discuss about others work related to the curriculum design.



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