Design of curriculum design system

5.1 Introduction

Previous chapter described the approach to the curriculum design system based on input, output, process, users and the features of the system. This chapter is mainly focused at the functionalities of the system and how those functionalities are designed for development. The design of the proposed solution to the problem will described in detail within this chapter using the main modules of the system.

5.2 Top Level Architecture

Based on the going through system development life cycle [8], this system has been designed to achieve main objectives of the system. Figure 5.1 illustrates the system architecture of the proposed curriculum design system which contains two main parts. Those are user interaction module and the MAS module. In MAS module there are four major parts Request Agent, Resource Agents, Ontology and the Message Space. The other entire diagrams related to the system design are attached with Appendix A.
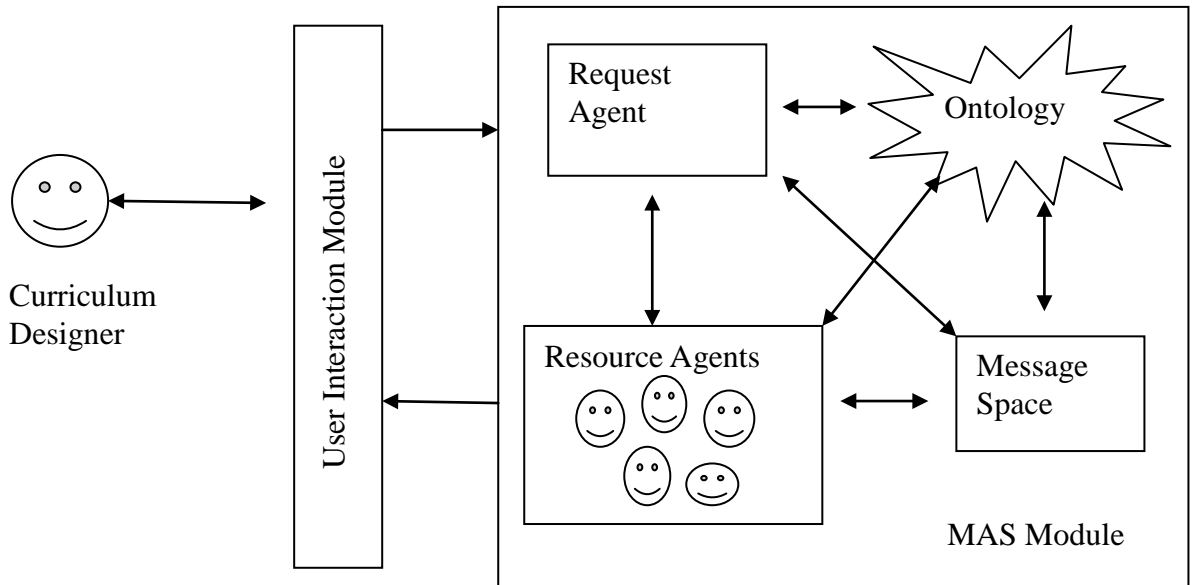
Figure 5.1: System Architecture for Autonomous Curriculum Design System

5.2 User Interaction Module

User Interaction Module (UIM) is the major module which used to interact with the curriculum designers. Curriculum designers will input the curriculum details through the UIM and receive the results return by MAS module through UIM.

5.3 MAS Module

Today Multi Agent System is applied to many real world problems. It has ability to make decisions through the negotiation. MAS' module is the core of the curriculum design system. It is based on the multi agent system. When the input is received through the user interaction module MAS module create the well balanced curriculum. To create the well balanced curriculum this module consist Request Agent, Resource Agents, Message Space and the curriculum Ontology.

5.3.1 Request Agent

Request agent connect with User interaction Module and when receive the input data through the User Interaction Module and the display them in the massage space. Also when the resource agents do a particular task it will display in the message space and request agent show the result through the user interaction module.

5.3.2 Resource Agents

Credit Agent, Prerequisites Agent, Level Agent, Module Agent, Designer Agent are work as resource agents. Those agents receive request through the message space and work on behalf of request to produce the well balanced curriculum.

5.3.2.1 Credit Agent

Credit agent works on credit balancing. When credit agent receive request from the request agent this agent will start checking number of credits per particular module, number of lab hours per credits, number of lecture hours per credit with the use of knowledge available in the ontology. According to all those details and by communicating with other agents this agent will do the credit balancing.

5.3.2.2 Pre-Requisites Agent

This agent wills seek the prerequisites for a particular module and if required propose prerequisites for that module. For that this agent checks the content of a particular module. According to the content and the level this agent will propose prerequisites modules . Also this agent will search the equivalent modules in other curriculums.

5.3.2.3 Level Agent

In the real world curriculum design process each module were assigning to a level to fulfill the level requirement. Normally there are numbers of modules which need to offer in a particular level according to the credit requirement, total number of hours

available for that particular level and etc. Level agent will work on those level requirements.

5.3.2.4 Module Agent

Curriculums are consists modules. Each module has its own contents. The content related to each module is representing as learning outcomes or course outlines in a curriculum. Module agent will work on those modules details of the curriculum. When the request comes check the content with the available curriculums and give comments accordingly. When users enter content of a particular module through the system request agent display the input details in the message space. Then module agent will take the module name and its content and decide the keywords of that particular module. If there are same module in different curriculums compare the keywords of that module and inform about the distinction between those modules.

5.3.2.5 Design Agent

Design agent is responsible for entire designing process of the curriculum. This agent will check all the details related to the format of the curriculum. For example check whether objectives of a module have been written in a correct format. This agent will check the reference models of curriculum and finalized the curriculum.

5.3.3 Curriculum Ontology

Sharing common understanding of the structure of information among agents is one of the goals in developing curriculum ontology. Domain Knowledge required to design curriculum is also stored in the ontology. Curriculum ontology consist three major parts: Curriculum knowledge base, schema and Remarks as shown in Figure 5.2.
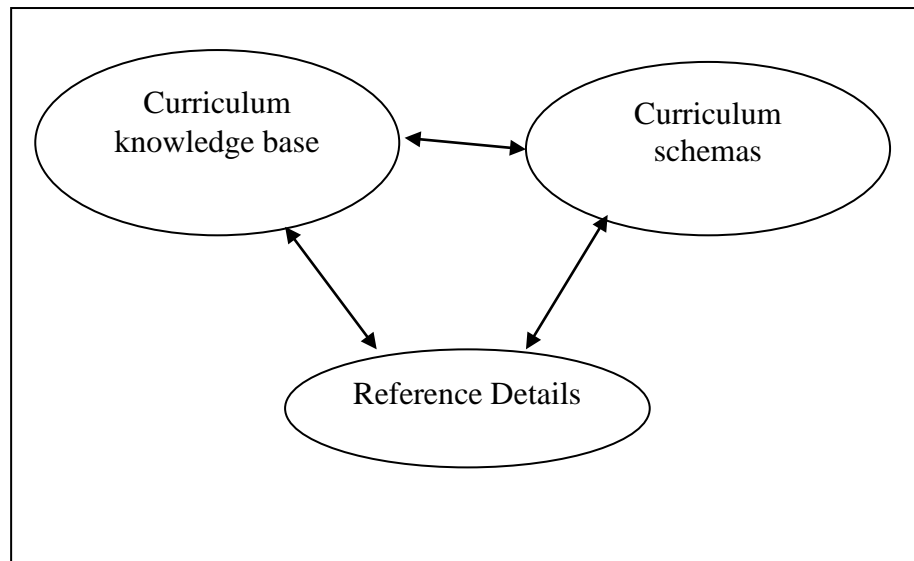
Figure 5.2: Curriculum Ontology

Curriculum schema consists of class structures related to the curriculum designing. This will refer by agents as content ontology. Curriculum knowledge base includes available curriculums of the faculty of information technology, rules related to curriculum design and some queries and etc. Reference details of the ontology will keep the some extra information regarding the curriculum development. Agent retrieve all the knowledge required for designing curriculum through this ontology.

5.3.4 Message Space

Message space also works as agent. The communication among agents is happen through this agent. All the agents are display their messages in message space. According to the display messages each agents do their specific task.

5.5 Summary

In this chapter we discussed about the design module of the curriculum design system. The major module was the MAS module which produced curriculums with the support of curriculum ontology. Next challenge is to implement the curriculum design system.