A Course Guidance System based on Learner Characteristic Analysis: Case study of Chiangmai Rajabhat University

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Abstract: This study was conducted to study about Course guidance System. The main objective of the research is to develop a guiding system to match student's capability and course characteristic. Currently, we focus on Computer science, Information technology and Web programming and security. We apply ontology concept to define learner profile, and course profile which belong to subject profile in detail. Learner profile assessment and Course profile assessment are introduced to decide the characteristic of user and subject. We apply mapping module to map the characteristic between course and student profile. Finally the summarized recommended results are reported to student.

Keywords: Education Recommender System, Computer Curriculum Recommender System, Learner Characteristic Analysis ,Nearest Neighbor algorithm.

1. Introduction

Understanding the strength of individual student and managing the suitable ways for them are important tasks in Education Guidance. In general, universities provide information such as curriculum, cost, learning environment, the entrance examination range score to assist students for planning their future study with suitable course. A lot of students have selected the unsuitable course because they do not understand the nature of those selected subject. Most students used personal criteria to select course, such as feeling, preference, dream, parents or friends suggestion, accumulative GPA, popular job and so on. Nowadays, computer related field becomes popular among Thai students. There are a lot of computer related course, such as computer engineering, computer science, information technology, management information system, IT for business, and so on. Our assumption problem is “how to advice students to enter the appropriate computer related course?”

Chiang Mai Rajabhat University is a university aiming to develop a skill based students. Students in this university are not top rank students. Most of them do not know about their strengths. There are three computer's curriculum in IT, computer science, and web programming. Based on the statistics of three computer’s curriculum on past four years (2008-2011), the dropout rate by regulatory measures over than 30%. Thus, the dropout rate of students by three courses are Computer science 41%, Information Technology 44% and Web programming and security 32%, respectively [4]. After we interviewed the students, most of them informed that they applied to study computer as the end user who use application program such as MS-Office, Adobe Photoshop, entertainment program such as music, video or games. They do not know that it is necessary to understand programming language as a fundamental study. In this paper, we try to develop course guidance system. At Section 2, we explains the related work. In Section 3, we illustrates the overview of system. Section 4 describes the conclusion and future work.

2. Related work

An Education purpose of recommendation system is mostly developed to make a decision and support an operations in different parts of the educational system. There are several related work on recommendation system. Nguyen Thai-Nghe and groups,[3] developed a recommended system for predicting student performance based on Collaborative Filtering and Matrix Factorization techniques and compare to the traditional regression methods that are logistic/linear regression methods. Benjaporn Lerdsakooljinda and Nattavee Utakrit.[2] developed the educational recommender system for high school students as a guide to study in higher education/ academic degree. The case study of Bangalore Mysore District, Karnataka and Delhi State of India are introduced here. They used content-based filtering technique and nearest neighbor algorithm to recommend result which has similarity value with liking and interesting of user. Our work attempts to find the most appropriate technique to map between curriculum and student profile, and recommend based on the student's skill more than the interest.

3. A Course Guidance System based on Learner Characteristic Analysis Framework

3.1 The overall system architecture

We design a course guidance system as shown in Figure 1. It consists of four modules; learner profile assessment module, course assessment module, mapping module and recommendation module. A Learner profile ontology and course profile ontology are designed for conceptual understanding of learner and course. Mapping module is applied to matching between learner profile and each subject in each course to analyze the capability of students with the interested course. Finally, the reports are shown to the students.

3.2 Assessment module

A) Profile assessment module. This module is assigned to collect learner profile data by three processes as shown in Figure 2.

B) Course assessment module. This module is designed to collect course information and to get the characteristic of each subject in the course as shown in Figure 3. In this initial step, this paper concentrated on Computer science , Information technology and Web programming and security course. After we investigate all subjects in three courses, we found that there are 102 subjects in total. After we investigated in detail, the common subject among three courses are 16. The common between CS and IT is 11 subjects;, CS and Web is 13 subjects, and IT and Web is 8 subjects. The special subject, in each course (CS, It and Web) are 6, 9 and 4 respectively.

3.3 Mapping Module

This module is assigned to measure the similarity between student profile and course profile. The process on mapping is shown in Figure 4. We calculate the accuracy based on two strategies, (1) The non-weight strategy uses the percentage of matched subject per total subject. (2) The weighted strategies uses the community of subject as a criteria for weighting the course specific, currently, we set the weight for 3-common, 2-common and non-common are 1/3, 1/2 and 1, respectively. After we normalize the weight, we get the ratio among 3-common, 2-common and non-common are 2/11, 3/11 and 6/11

3.4 Recommendation Module

This module is assigned to present result of recommendation system .The result consists of Name, characteristic, chosen courses and % of accuracy as shown in Table 1.

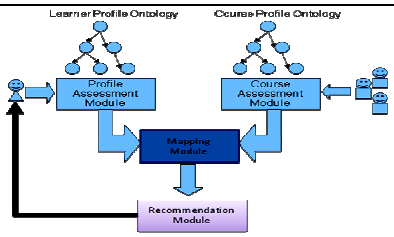

Figure 1: Overview of course guidance system.

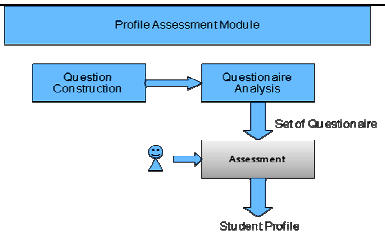

Figure 2: Process of Profile Assessment Module.

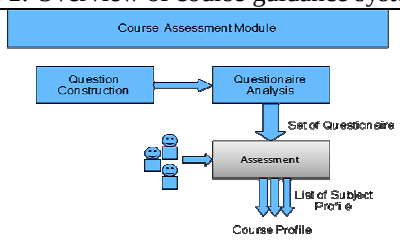

Figure 3: Process of Course Assessment Module.

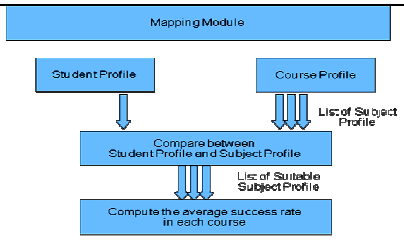

Figure 4: Process of Profile Assessment Module.

Table 1: Recommendation Result

Name	Anantra Maitree.		
Characteristic and Skill	Self-confidence, Individual, Freedom, Honest, Self-discipline, Observant, Serious, Responsibility, Carefully and Diligence, Logical Thinking, Step-by-step Thinking, Connectedness		
Expected course	**CS**		
% of accuracy	**CS**	**IT**	**Web**
Without weight	**93.48**	**81.82**	**85.37**
With weight	**88.64**	**70.31**	**55.36**
Recommendation	Based on your result, we found that the most appropriate course is _CS_. After we consider the information in detail, we found that **Anantra Maitree** tends to do the special subject well on 1 .		

4. Conclusion and Future work

In this paper, we present the concept of course guidance System. This concept consists of four modules as profile assessment module, course assessment module, mapping module and recommendation module. In the future work of this study, we plan to extend the work as follows: (1) we plan to develop a course guidance system and test in the real education environment with some selected school near university, and (2) we plan to conduct an assessment of satisfaction with the developed system.

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