Abstract:

There is a number of graduate students joining NC State University’s Computer Science Master’s program every fall. All new students have a myriad of decisions to make as newcomers, including picking courses for their very first semester. The decision process for the subsequent ones is a lot more informed compared to the first one thanks to the lack of resources readily available to the students, or simply the lack of awareness about the ones that exist. This paper highlights the most vital factors a typical new student considers when trying to decide a course. It also delves into the problems they have while trying to make a decision based on those factors, because of the inaccessibility of some of that information. The paper presents the data collected through extensive surveys and interviews and also presents literature review on a few course recommendation systems that make use of data mining techniques as well as adaptive learning to help students decide what courses they should select. Finally, a problem statement is defined for a course recommendation system that targets first semester CSC Masters students at NC State University.

Introduction:

Every fall, there is a strong number of new admissions to the graduate programs at NC State University with students from all over the world coming in to get their professional degree. Since a majority of the new admissions are international students, they have to go through an arduous process of setting up this new phase of their educational careers. Having a good start is key as some of these programs are short and require consistency in terms of academic performance. Some of the biggest reasons students fail to do well initially are mainly based around what courses they have picked. There is a good chance a new student picks up a course without having complete and comprehensive information about it, and may have to spend the semester going through a class they may have no interest in, or one that doesn’t match their intended specialization profile, or one that they may simply not enjoy because of the difficulty level, a poor balance between the workloads of multiple courses, or even because they cannot develop a liking towards the professor. This leads to immediate dissatisfaction with the course the student picked leading to potentially poor grades. We looked into these problems through our survey and came to the conclusion that students are more comfortable and confident with the resources at hand when selecting courses in the semesters following the first one. They have more information available, they have their own unique set of criteria to decide what they want to learn and the decision is made easier when they have information that would fulfil this criteria. The surveys and reviews conducted by the team revealed that certain resources are completely inaccessible to students who are new and haven’t even set foot in the university yet. They are lost when it comes to trying to find more information about courses such as their level of difficulty, popularity, or even something as simple as its content. We have compiled our observations and propose a few solutions to these issues.

Literature Review:

After looking at the issues most students face with course selection at the early stage, different academic literatures were looking into that worked towards solving this kind of a problem. A few of the proposed systems were centered around course recommendation and made use of different methodologies for their suggestions.

One of the papers was focussed on how the volume of course-related information is ever increasing and how the world of Information Technology is rapidly changing the world of academia. All of this additional information helps students shape their course and careers based on their passions and interests, and more importantly, their long term goals. A lot of the students use consultation from advisors, catalogs, and course schedules. Another crucial source of consultation is feedback from peers/students who have previously been a part of a certain course a new student is considering. One way to tackle this issue is explicit feedback provided by former participants of the course but the issue with this method is that it is difficult to get explicit course feedback from students. The system collects feedback of multiple types and rates every course on its level of relevance to the current student looking to register for said course.

The feedback system requires feedback on various aspects of a certain course such as relevance of the course to a certain specialization, and the workload. However, the entire system is heavily dependant on voluntary feedback from students. A lot of students that finish a course may not want to provide feedback on it and hence the system loses its reliability. The system is of benefit to the students but there may not be sufficient data at hand to draw conclusions with high reliability.

Another paper reviewed explains the design of a course recommendation system on the web based on students’ course selection records. The recommendation system takes in the courses the students previously picked and classifies them into certain categories. It then calculates the categories a student would like the most, and recommends courses based on this factor.

The research also mentions how students make decisions on what courses they would like to pick based on an array of different factors like class timings, popularity of professors, and the ease of scoring well in the class. The system makes use of extensive data mining theories and incorporates graph theory to come up with potential solutions.

Some of the tests run by the research team were incorrect in some phases due to factors that were not considered, but for the most part, the test results seemed to be quite accurate. Given the technique used, this system can be adapted to various levels of education too.

An additional course recommendation system was looked into which made use of item response theory to design a personalized course recommendor which provides recommendations based on course content and difficulty. The proposed system has every course item classified into a course unit that has been predefined. The system incorporates a browsing and searching mechanism from which students can retrieve more information about a course based on what course unit it belongs to. This makes looking for courses in a particular unit a lot easier.

The system provides a personalized experience after new users answer a given two questionnaires. The system makes use of perceptrons and neural networks to produce its results. The results are evaluated based on how well the returned courses satisfied the user’s requirements. The final evaluation shows results which are very reasonably well produced. The user experience evaluation done by the research states a high success rate in terms of comprehensibility of the provided courses.

Conclusion:

From the above survey results and literature review, we have concluded that different students have a variety of different parameters to consider when making decisions in terms of course selection. Most of these resources are either inaccessible for new students or they lack awareness about their existence, hence the decisions they make aren’t very well informed.

Hence, there is good scope to provide more information to the users, and recommend courses based on the factors that they consider to be more important than the rest.