ONLINE COURSE RECOMMENDATION SYSTEM USING MACHINE LEARNING

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ABSTRACT

In order to cope with the changing education system and the evolving new technologies, it is important for a student to identify his field of interest and select his best among the available wide range of courses. Many students opt the courses which are not of their interests as they will not be having much knowledge about the courses of their interests. Most of the students in our society decide their future based on what their elders say or they rely on their friends or their family and does the same course which they had done or doing. There will be no proper guidance for them on choosing their subjects or courses. This project is a part in progress of education towards better course recommendation. We use a machine learning program that asks the client questions, and recommends the better stream based on the skills and academic performance provided

INTRODUCTION

With the increase in number of students and the variety of courses that colleges offer, the structure of education system became complex. This situation has made it hard for students to find the courses they want effectively. The main idea behind the recommendation systems for students is to allow them to make decisions to select the most appropriate course for their career path. A recommendation system includes user model, the counseled model and recommendation algorithmic program. Course recommendation is to take advantage of provided information and suggestions, to help students make better decisions regarding their courses. So, with the development of Education system, it's harder for students to find the course they want, and thus recommendation systems are applied more widely.

Three main approaches for recommendation systems can be distinguished as follows:

Collaborative filtering systems recommend items to users based on their similarities to other users. In this method, the system collects and analyzes a large amount of information on user behaviours and activities and then recommends items which are already chosen by other users, which have similar attributes.

-based filtering systems recommend items to users based on item similarities. Content-based recommendation systems have profiles of items which contain item descriptions and profiles of user preferences. For example, in the case of movies; the name of the director, actors, genre of the movie and other attributes are provided on item profile. Also, a user profile is built to indicate the type of items that a user likes; the director that a user has shown interesting, the genre of movies a user prefers, actors that a user has watched frequently in movies, etc. In other words, this approach tries to recommend items that are similar to some other items that a user already have chosen or liked in the past. Hybrid recommendation systems that combine collaborative and content-based filtering have recently been demonstrated to be more effective in many cases based and

collaborative-based predictions separately and then combining them; adding content-based capabilities to a collaborative-based approach (and vice versa). As the amount of educational resources on the internet increases, it is possible to find courses from almost every knowledge domain. The percentage of higher education institutions in the United States that currently offer online courses increased from2.6% in 2012 to 11.3% in 2015. In 2015, 28% of all students took at least one online course and from those students, 83.5% were undergraduate students and 16.5% were graduate students. Although online learning is expanding in availability and popularity, the high dropout rates remain a challenging problem. With the growing number of available online courses, students can easily get overwhelmed while making decisions on which courses to take and taking courses that are not a good match to their needs may result in a dropout. Many students graduate every semester from schools and universities, who have taken a variety of courses, but often do not know if these courses are useful for their desired job. It is also hard for the students to decide which courses would be useful for a specific career goal. For instance, if a student wants to become a data scientist in the future, they should know what skills are essential and trending on the market for that job title, and acquire those skills to be a good candidate for that position. Almost none of the currently used course recommendation systems consider the user's future career goal or target job. Instead, they suggest courses from the com- munity point of view. For instance, they suggest courses based on other students' feedback [50, 73], or courses with better overall student performance based on marks [17, 19, 63, 75], or they have implemented a content-based recommendation system which considers the similarities between course materials [25, 38, 39].

2. LITERATURE SURVEY AND RELATED WORK

Many of the educational recommendation systems focus on how good students' performance or final marks are. Some of these recommendation systems are discussed in this section.

2.1 Collaborative Filtering Systems

Bobadilla proposed an equation in 2009 for memory-based collaborative e-learning recommendation system that uses the learners' grades for the weighting of the recommendations (users with better scores have a greater weight than the users with lower scores).

Thai in used a matrix factorization for predicting student performance, so users can better decide in selecting the right level of difficulty. El-Bishouty in proposed a smart online course recommendation tool which considers different students learning styles and provides teachers with recommendations to attract more students with different learning styles to get better performance.

Chen in proposed an e-learning material recommendation which considered both course difficulty and users ability to learn. They used a collaborative voting method as well as Rasch's item characterized function to define a parameter for the difficulty of each course. The ability of the user would be calculated based on user explicit feedback. Students can select course categories and materials and also search through the system using keywords of interesting course material. Courses will be recommended to students, then the system asks them to answer two questionnaires. Ray proposed a system which uses both item-based and user-based collaborative filtering on a data set of 255 students' marks in 25 subjects.

Their system could provide each student with a prediction of the grade they may get if they choose a particular course. Their system is based on other users' course marks. Users must evaluate as many courses as possible. Their

system is not able to recommend to students who have not taken any courses yet [63]. Some researchers focus on using recommendation systems in a specific field. For example, Zhang's article from 2009 [80] focuses on civil engineering professional courses and Liu's article in 2010 focuses on physical education.

Reddy in proposed a system which used learners' past courses information and a user's preference to recommend courses to them. In their system, users determine their interest areas, and then their profile will be created for them. Figure 3.1 shows interest ratings of two students for five different areas.

Field	User Preference (0-5)	
	Meghz17	Wty1009
Theory	0	5
Programming	5	4
Reading/Writing	0	0
Lab/Project	4	5
Cross Field	0	0

TABLE 1: User's ratings for different areas

The system defines a vector for each course while each vector defines ratings for the same attributes of each course. Ratings describe the areas that are going to be covered in that courses. Figure 3.2 shows an example of ratings of different areas in different courses.

Course Name	Course Attributes (0-1)				
	Theory	Programming	Reading/Writing	Lab/Project	Cross Field
The Advance Object-Oriented Technology	0.2	0.8	0.8	0.99	0.1
Practice on Programming	0.2	0.9	0.3	0.9	0.1
Algorithms	0.3	0.8	0.5	0.6	0.01
Advanced Algorithms	0.8	0.2	0.8	0.6	0.01
An Introduction to Programming in Python	0.2	0.99	0.3	0.99	0.01
Bioinformatics: Introduction and Methods	0.9	0.1	0.8	0.01	0.99

TABLE .2: Ratings of different areas in different courses

3 EXISTING SYSTEM

4Based on the above research papers, the are based recommendations solely on the marks obtained

by the student. In reality however there are many more factors that will influence the future courses a student undertakes. This is why we are looking to use numerous attributes such as grades, attendance and areas of interest as a vital factors in basing the recommendations particular to the student Imran[1] et al. proposed a learning management system that is one of the technologies to be used in personalized recommendation system. The traditional algorithms focus only on user ratings and do not consider the changes of user interest and the credibility of ratings data, which affected the quality of the system's recommendation. Hence the paper presents an improved algorithm to solve this problem. The main idea is based on the assumption that similar users have similar preferences. By computing users similarity based on the user ratings to find the neighbors who have the similar interest with the active user. Then the active user's preference for an item can be predicted by combining the neighbor's scores for the same item. Finally, top-N courses which the active user will most probably like are provided. But the similarity measurement in collaborative filtering algorithm only pays attention to the similarity score rather than the user interest.

Proposed system:

- The proposed system is for learners who want to know which course is best suited for them. It extracts reviews dynamically in order automate the data extracting process. It works on reviews which are extracted from users as a new way to tackle the problem of data insufficiency. This new way is getting reviews from E-Learning websites using web scraping technologies using python based tools so that datasets obtained are genuine in nature and are not manually fed by users to the algorithm for conducting sentiment analysis. For the purpose of doing the sentiment analysis a combined version of both support vector machine and maximum entropy is used and based on the analysis a recommendation is produced. For performing analysis of sentiments, manipulating the data is needed in a processed manner. For manipulating the dataset, a support module was developed in the early stage of the project. maintaining the attendance records of CRT classes.

5 METHODOLOGIES

MODULES

1.Load Dataset:
Load data set using pandas read_csv() method. Here we will read the excel sheet data and store into a variable.

2.Split Data Set:
Split the data set to two types. One is train data test and another one is test data set.here we will remove missing values from the dataset.

3.Train data set:
Train data set will train our data set using fit method. 80% of data from dataset we use for training the algorithm.

4.Test data set:
Test data set will test the data set using algorithm. 20% of data from dataset we use for testing the algorithm.

5.Predict data set:

Predict() method will predict the results. In this step we will predict the ranking of the google play store app.

Tensor flow

Tensor Flow is a free and open-source software library for dataflow and differentiable programming across a range of tasks. It is a symbolic math library, and is also used for machine learning applications such as neural networks. It is used for both research and production at Google.

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6 RESULTS AND DISCUSSION

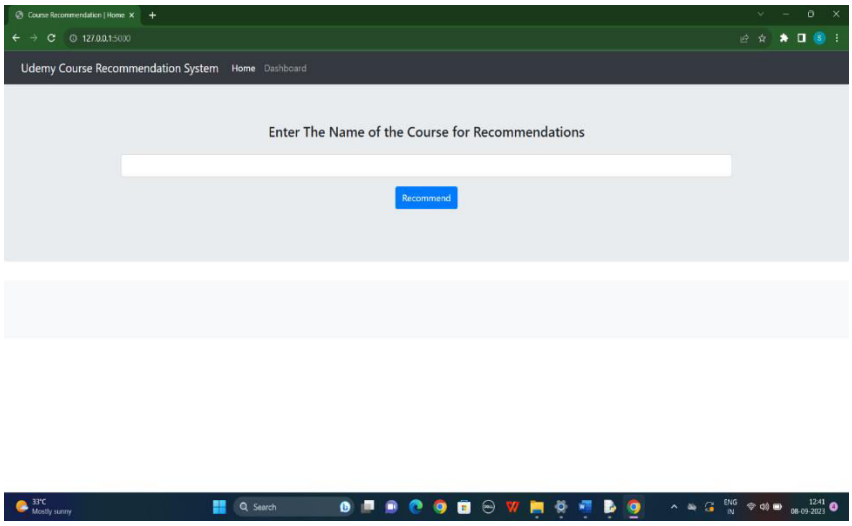

FIG1:- HOME SCREEN

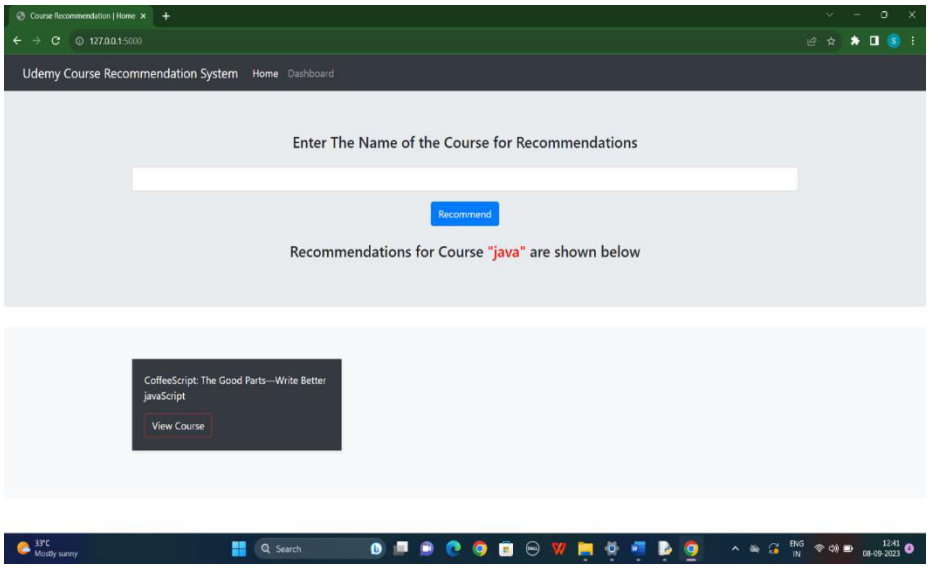

FIG 2:- COURSE RECOMMENDED SCREEN

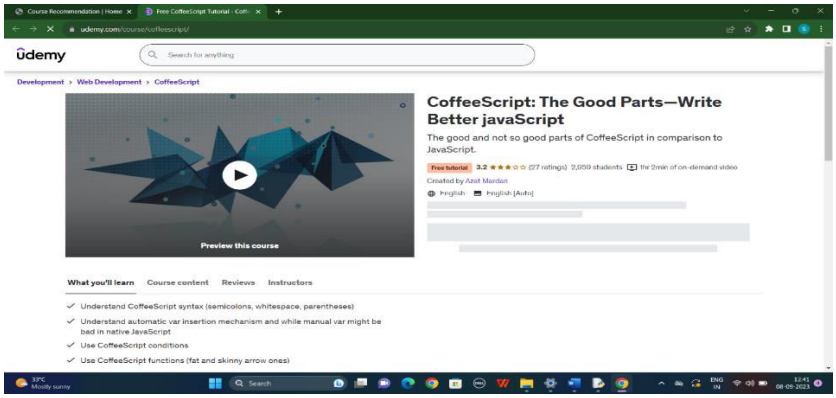

FIG 3: - RESULT SCREEN

6.CONCLUSION AND FUTURE SCOPE

Among the various metrics, cosine similarity is majorly used in various tasks of machine learning and in handling textual data because of its dynamic ability to adapt to various characteristics of data. Cosine similarity entirely operates on the cosine angle properties and it is vastly used in recommendation systems as it will help us recommend content to the user according to his most viewed content and characteristics and is also majorly used in finding the similarity between text documents as it considers the frequently occurring terms. This made cosine similarity a popular metric for evaluation in various applications.

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