

Career Building Recommendation System

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Abstract - Due to the pandemic, the world has shifted to online learning. E-Learning is booming and everyone is trying to get an edge over others. There are an infinite number of courses and skills to learn to make a good use of the lockdown however it might be a little overwhelming for users to choose from such a wide range of materials available on the internet. Many universities have launched a lot of courses for students to learn and make a good use of this lockdown period. To make it easier for the students to choose a right course for themselves that will align with their skills, we have come up with **CAREER BASED RECOMMENDATION SYSTEM**. It provides a roadmap for the students to pick a course that will be beneficial for them, during academics as well as in the industry. Apart from recommending courses the system also has a portal that provides updates of new technologies and the company. It is very useful for academics as well as overall career development.

Key Words: Career, Recommendation, Courses , Python , Django

1. INTRODUCTION

E-Learning has become the new normal. A few days after Covid was declared as a pandemic, the world walked on the digital path. Learning turned into online learning which also gave rise to a lot of e-learning methods. Students living in India could pursue their university programs while being miles away. Many universities like University of Michigan launched a lot of free courses which a student could learn online.

A wide variety of courses are now available online for a student to choose from, many students would feel the need of a proper guidance to make a right choice for themselves from all of the courses available. Choosing the right one would contribute a lot for the academic and overall development of the student.

To overcome this situation, we have come up with a Career Building Recommendation System. The user first logs into the system and fills a questionnaire provided, The questionnaire contains a lot of questions like Branch, specialization, year, department etc. The form also asks if the user has any experience in the technical field and if they have undertaken any courses before, based on the information provided by the user, the system then recommends a course curated according to the knowledge and the skill set of the user which can be leveraged to improve the academic performance and provide a proper guidance.

Apart from recommending courses, the system also provides information and latest news about the new technologies of emerging in the IT industry. The most important aspect in the life of an engineering student is placements. The system also gives updates about the companies hiring via the 'Trending' section.

The system is very user friendly and easy to use, even for a new user.

2. LITERATURE SUMMARY

Many algorithms and techniques can be used to help user find the right course, many such techniques include content-based filtering, collaborative filtering. Personalized, non-personalized filtering etc. The most commonly used techniques are content based filtering methods as it uses user's history, profile, feedback and other various actions. It does not take in considerations the likings and recommendations of other users.

Below is the summary of the reviews of various research papers:

Implementation of an Automated Job Recommendation System Based on Candidate Profiles (*Vinay Desai, Dheeraj Bahl, Shreekumar Vibhandik, Isra Fatma*) – Volume-2, Issue-5, May 2017

This system uses user-based and item-based collaborative filtering algorithm. It also checks other academic details of the user like past certificates, resumes, work, hiring. A very accurate recommendation is provided based on the following data

Recommendation system using association rules mining (*Weiyang Ling*) – Volume-2, Issue-5, May 2019
This recommendation system was developed by Weiyang Ling. This thesis provides a novel approach to using data mining for e-commerce. The focus of the work is to apply association rule mining to collaborative recommender systems, which recommend articles to a user on the basis of other users' ratings for these articles as well as the similarities between this user's and other users' tastes. In this work, a new algorithm for association rule mining specially tailored for use in collaborative

Automated recommendation system for course selection
(*Amer Al- Badarneh, Jamal Alsakran*)

The advantages of this system are that it makes use of collaborative recommendation system it also recommends

courses based on similarity. Although it does not recommend courses already taken up by other user

Method for building course recommendation systems(hanh-Nhan Huynh-Ly, Huu-Hoa Nguyen, Nguyen Thai-Nghe) Vol. 5, Issue 4, April 2017

The advantages of this system is that Can predict Learning results and select appropriate course but it makes no use of collaborative or content-based algorithms. Large size of dataset. Entire dataset not examined

3. EXISTING SYSTEM ARCHITECTURE

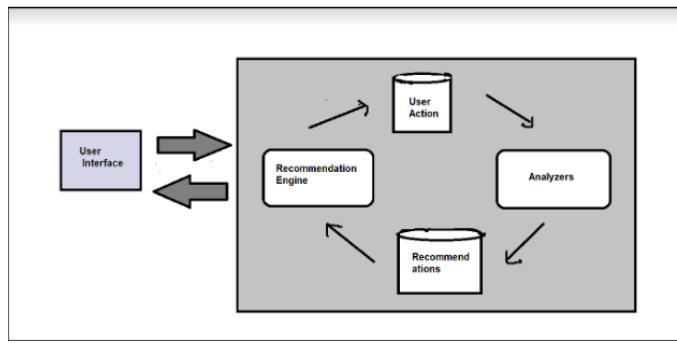


Chart -2: Existing Recommendation Diagram

The existing recommendation system is a high-level architecture of a recommender system as depicted in Figure above.

The recommendation process is performed in three steps, each of which is handled by a separate component:

User Actions

This component collects data of the user preferences and tries to generalize this data, in order to build the user profile. Usually, the strategy is the data is collected from a user interface or user actions like rating or past history and stored into a database.

Content Analyzer

When information has no structure or meaning, some kind of preprocessing step is needed to extract the relevant information. The main responsibility of an analyzer is to process the user provided data and represent the content e.g., documents, Web pages, news, product descriptions, etc. coming from information sources in a form suitable information for the next processing steps. After analyzing the information is passed on to the recommender system.

Recommendation Engine

This module exploits the user profile to suggest relevant items by matching the profile based on user history, likings and ratings etc. against that of items to be recommended. The result is a binary matrix which creates different recommendations for each user profile and outputs on to the user interface

4. PROPOSED SYSTEM ARCHITECTURE

In our proposed system, we have created a user interface i.e Way Up which can be used for recommending courses, to guide them through various aspects of the subject and make the content effective and easy to learn for the users career.

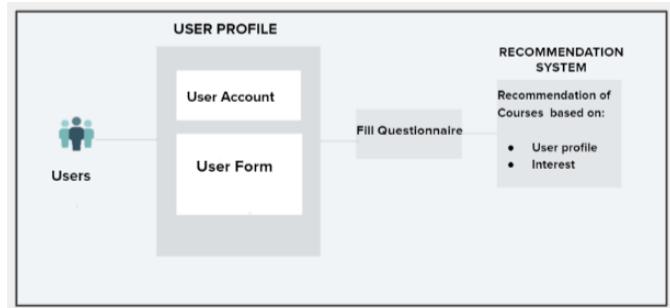


Chart -1: Block Diagram

User Profile: Login /Signup

Through the website Way Up users are able to interact using their own user accounts, where each user has to Login or sign up using their accounts to get the personalized recommendations.

This figure displays two side-by-side login forms. The left form is titled 'Log In' and the right form is titled 'Sign Up'. Both forms require the user to enter their 'Email' and 'Password'. The 'Sign Up' form also includes fields for 'Repeat Password' and 'Remember me' checkboxes, along with links for 'Forgot password?' and 'Create an account'.

Fig -1: Login and Sign-up

Questionnaire

We have provided a questionnaire form through which we would be able to learn about each users interests, their technical skills based on which we will recommend them different courses.

This figure shows a detailed questionnaire form titled 'HEY USERS !'. It asks for basic information such as 'Full Name', 'Phone', 'Email', and 'Education level'. It also includes questions about 'Technical Skills' (Beginner, Intermediate, Expert), 'User Interest' (Courses), and a section to 'Mention your prior Courses if applicable'. At the bottom, there are 'Submit' and 'Reset' buttons.

Fig -1: Questionnaire

Recommendation system

Users often face confusion and problems during their academic year or career regarding the choice of the courses, domains and career path, hence they need proper guidance for the same. Our Proposed Career recommendation system will help users to make informed course selections by selecting their choice of domain and subjects So based on user selected domains and courses we recommend different courses with learning videos and also recent trends in those areas

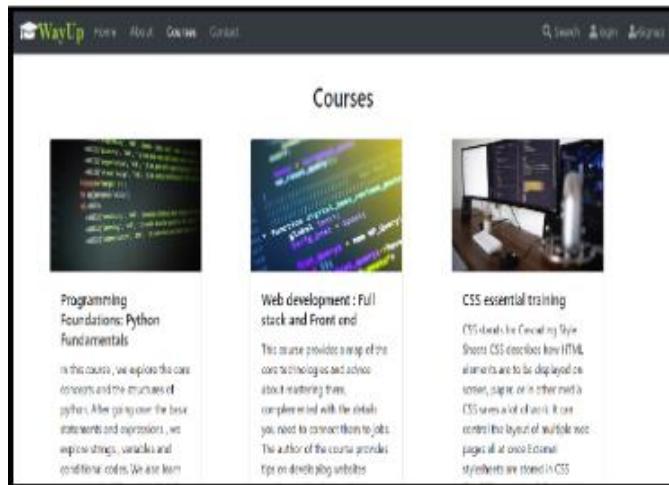


Fig -3: Courses



Fig -4 : Trending Page

5. TECHNIQUE USED

The system is made primarily using Python, Django and CSS. The Django framework handles the backend of the system efficiently. To find out accurate recommendations, the system computes the matrix between each user-selected department (d_{id}) matrix and course matrix(c_{id}) to recommend the courses based on user inputs and interests

Content Based Recommender Systems: The profile is a structured representation of user interests, adopted to recommend new interesting item.

Content based filtering methods use items features to recommend new items.

They don't rely on information about other users.

Similarity measure- its a metric that defines exactly how similar or close two items are in the embedded space.

Embeddings are - commonly used to represent input features and machine learning problems.
Techniques

- 1)dot product
- 2)cosine similarity

A. Algorithm

Step 1) User creates an account by registering on the system.

Step 2) Jump to step 3 if already a user

Step 3) Log in with the credentials provided

Step 4) A questionnaire is generated

Step 5) The user fills all the details

Step 6) Based on the data submitted by the user, a user profile is generated and the data is stored for further recommendations and computations

Step 7) System computes the matrix between each user-selected department (d_{id}) matrix and course matrix(c_{id})

Step 8) In user selected matrix each row corresponds to a user and each column represents a Department in our database. The value in row i and column j indicates the selected Department of the user.

Step 9) In Course - matrix, Each row corresponds to a Department, and each column represents a Selected Course id in our database. Based on the following computation a course is recommended to the user

Step 10) Go to step 11 if user wants information about company hiring's or latest technologies, if not, go to step 12

Step 11) Information about latest technologies and companies that are hiring are displayed on trending now page

Step 12) Finish

Department Matrix

$(i,j)=(d_{id}, s_{id})$	COMPS/IT	EXTC	MECHANICAL
user 1	1	0	0
user 2	0	1	0
user 3	0	0	1

Table 1 : matrix

Course Matrix

(i,j)=(d_id,s_id)	1	2	3	4	5
IT/ COMPS	0	0	0	1	0
EXTC	0	1	0	NULL	NULL
MECHANICAL	0	0	1	NULL	NULL

Table 2 : matrix

B. Sample Dataset

An experiment is conducted in order to identify the input/output behavior. The sample data set used in the experiment are identified as sample inputs.

The Dataset used consists of 3 departments:

- 1) IT / COMPS
- 2) EXTC
- 3) Mechanical

Each department further consists of their respective domain
Every domain in turn, contains their respective courses

Table 3: Dataset

6. CONCLUSIONS

In this project the studies of different types of recommendation systems are presented. The methods include collaborative filtering, content-based filtering, personalized and non-personalized algorithms the advantages and disadvantages described. The comparative study of various techniques mentioned above is presented in this report.

The data set used for the projects, the implementation. As a result, students are able to make an informed choice and are walked through the course which is well suited for them, this helps the students to polish their skills and perform better in academics. It also helps with placements and other competitive examinations.

Hence the career building recommendation system helps the students to make an informed career choice. The system

takes into consideration the student academic information like course, specialization and also skill sets and prior experience

The website is user friendly and hence it helps user to carry on with the process smoothly

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