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# E-Learning Recommendation System

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***Abstract:*** ***A Recommendation System is a system that is used to recommend any product based on the user's rating. In the Recommendation System, we are searching for any product based on the reviews, if any product shows the best ratings, then we can select that product. Recommendation System has been used in a wide range of applications like Amazon, Netflix, Flipkart, Facebook, etc. E-Learning System is a system which helps to teach all the students in virtual way. Computers or Laptops and with Internet are used for working an E-Learning. E-Learning becomes a part of the Recommendation system. In this system, they are recommending those websites which is best to teach you, live doubt session like Coding Ninjas, Udemy, Edureka, Byjus, etc.***

***Keywords: Recommendation System, E-Learning, Collaborative-Filtering, Content-Filtering, Hybrid-Filtering, Myers-Briggs Type Indicator(MBIT), Deep Learning.***

## I. INTRODUCTION

E-Learning has completely transformed to the world which is a part of students. India is known for Academics from ages. Online teaching is the best in this world and it will helpful to understand in concepts in home, to ask the doubts, and to give some activities in schools and colleges in easy way. Multiple issues ranging from obsolete syllabus, lack of practical learning, shortage of quality educators, and others and other is uses formed the crux of the problem. However, in the past of couple of years, one could undoubtedly observe educational efficiency evolve with the support of digital means. E-Learning plays the role for bringing a high-quality education during Pandemic situation in COVID-19. It has done by providing unlimited teaching and learning opportunities.
Recommendation System have been an effective strategy to overcome information overload. Each learner has it's own ability to deal with complexities, pace of learning and integrity vast knowledge with appropriate correlation. E-Learning Recommendation System is a good tool for enhancing individualized learning. In this review, it's aim is to present the detailed study of the E-Learning.

## II. LITERATURE REVIEW

E-Learning Recommendation System will help for learners to learn in best websites platform which is best for learners with the help of reviews and ratings. Using electronic and digital means to deliver curses or even for typical face-to-face courses as enhancements or supplements to what is delivered in classrooms. Typically web-based learning environments, such as Virtual-U and Web, include course content delivery tools, synchronous and asynchronous conferencing systems, polling and quiz modules, virtual workspace for sharing resources. There are three recommendation approaches – Collaborative Filtering, Content-Based Filtering and Hybrid Filtering.

### *A. Collaborative Filtering*

Collaborative Filtering is a method which is used for recommender systems. It is designed to purchase any product based on user's behavior. To plot and calculate these similarities, collaborative filtering uses a matrix-formula. An advantage of collaborative filtering is that it does not need to analyze or understand the content. This method is applicable for E-Learning.

### *B. Content Filtering*

It is another type of Recommendation System that works on the principle of similar content. If the user is watching a movie, then the other user will watch the other movie with same genre or similar producer. E-Learning has been used in this type of system.

### *C. Hybrid Filtering*

Hybrid Recommendation System works as a combination of Collaborative-Filtering and Content-Filtering System.
In this type of recommendation system, collaborative system has been mostly used of this and it has some advantages. Two types of Collaborative Filtering are used in this system. Neighborhood based and Model-Based. It uses the ratings in this system to see the learners to choose the platforms. And it uses the prediction model for ratings. The most popular method of this system is Matrix Factorization method. Other components like Principla Component Analysis(PCA), Singular Value Decomposition(SVD), Regularized Matrix Factorization(RMF) and Latent Dirichlet Allocation is also used in this system.

 

## III. PROPOSED METHODOLOGY

A website has been created for E-learning to collect student data and conducted a small personality test. After submitting the test, the user will come to know about both it personality type and also user's learning style will be mentioned.

To identify student personality, we are using the Myers-Briggs Type Indicator(MBIT). It has four types:

*1)* Extroversion(E) or Introversion(I)
*2)* Sensing(S) or Intuition(N)
*3)* Thinking(T) or Feeling(F)
*4)* Judging(J) or Perceiving(P)

The functionality of the E-Learning system is shown below:

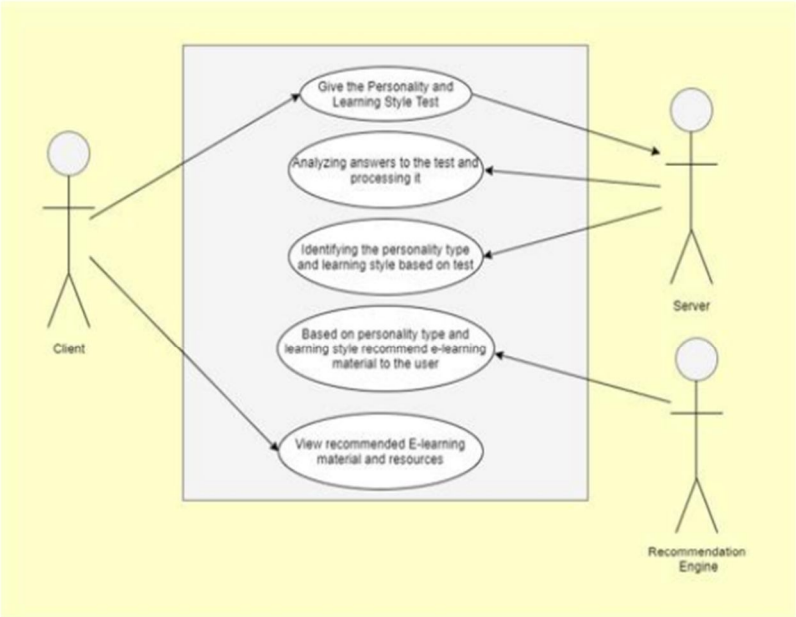


Fig 2. Use Case Diagram

We have used the Use Case Diagram to show the relation between the client and server, Recommendation Engine. So client will give the Personality and Learning the style test to the server, the server will analyze the answer to the test and processing it with the help of MBIT. Now the server will use this MBIT method to identify the personality type and learning the style based on test and the recommendation engine will check and recommend the e-learning materials based on personality type and learning style to the user. After completing the process, the client will view the recommendations of e-learning material and resources on it.
The MBIT test highlights the unique nature of each student's preferences. Apart from the sixteen personality types, each type of person has one unique choice used with great confidence. It provides the personality and reveals goals and motivates it in longer life. The Books, the sample question papers, etc. has been done and recommended with the help of MBIT method.

### *A. Technology Used*

#### *1) Front End*

*a)* HTML5
*b)* CSS3
*c)* JavaScript
*d)* Bootstrap5

*2) Back End*
*a)* Mongo DB
*b)* Node JS
*c)* Express JS

*B. Advantages of E-Learning Recommendation System*
*1)* User can learn easily from anywhere and anytime.
*2)* User paced learning is possible.
*3)* Courses, learning materials can be created, upgraded, and revised easily.
*4)* Learning access to user is fast.

*C. Disadvantage Of E-Learning Recommendation System*
*1)* Lack social interaction.
*2)* Inaccessible to others.
*3)* Cheating is unavoidable.
*4)* Focuses more on theory.
*5)* Time management is required.

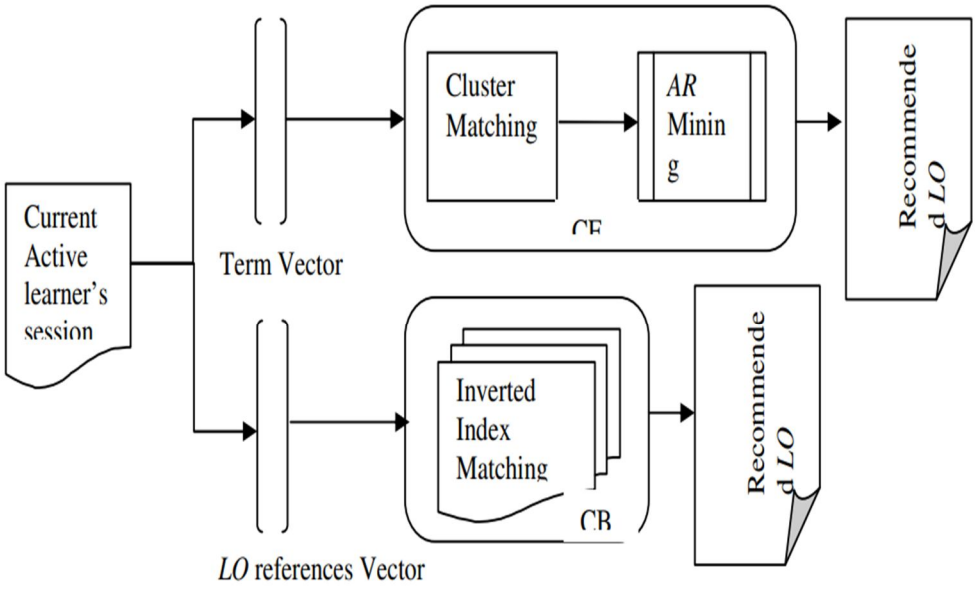


Figure 3: Recommendation process

## IV. RECOMMENDATION PROCESS

The recommendation process is shown above. The current learner's has been done both Collaborative Filtering(CF) and Content-Based Filtering(CB). It will be processed by using term vector which comes in Collaborative Filtering, and LO references vector which comes in Content-Based filtering. So, for viewing the user's behavior, Collaborative Filtering is used which contains Cluster Machine, and AR Mining and then it will recommend the resources, and for similar resources, Content-Based Filtering is used which contains Inverted Index Machine and it will recommend the resources. Matching based Clustering algorithm is sued to match those cluster which are nearest, the large amount of information is clustered into meaningful sentences. The AR Mining solves the problem of innovation and to reduce the hazardous condition for human being. Inverted Index Matching is an index data structure storing a mapping from content, such as words or numbers, to it's locations in a document or a set of documents. It is like a HashMap data structure that directs you from a word to a document matching.

 

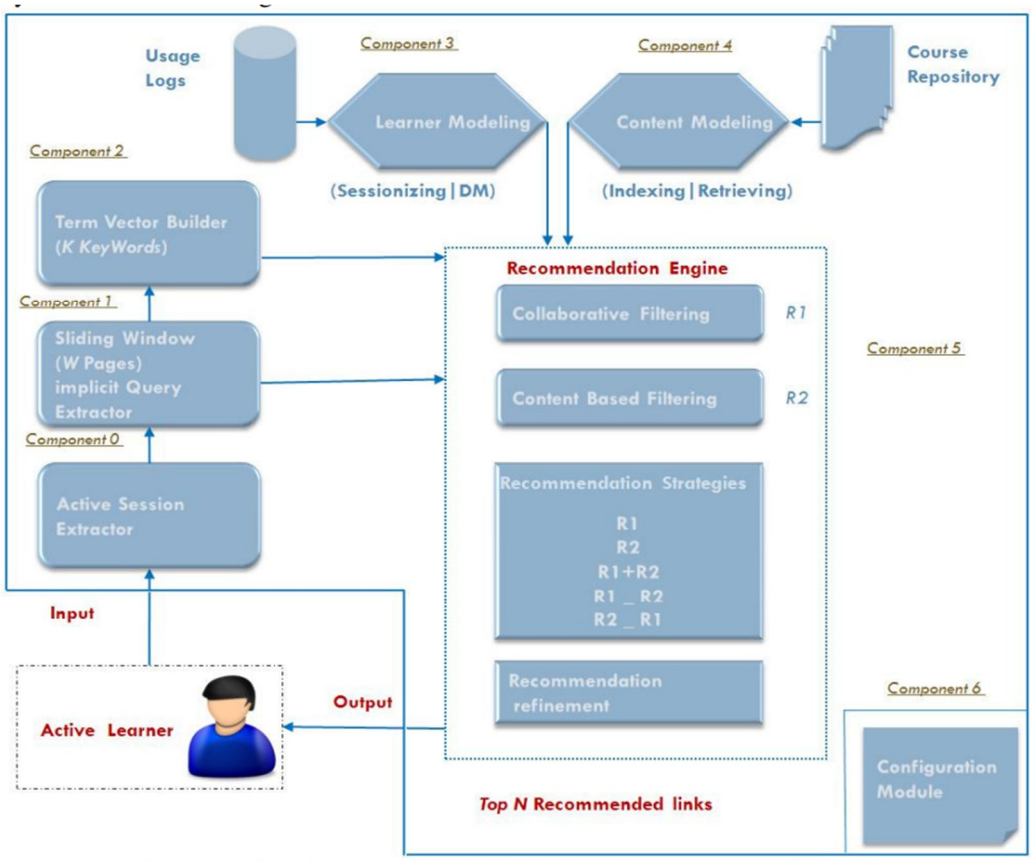


**Figure 4** : Architecture of the hybrid e-learning recommender system

## V. FUTURE SCOPE

This system will help all the students to learn everything using Internet and even in Pandemic situations also. Lot of work in recommender system has been proposed since the mid-1990. Deep Learning has been used because it provides heterogeneous data handled easily, it provides more accurate representation of users and items and it directs feature extraction from the contents. Recommendation System help users on individual level for getting correct required content and information.

## VI. CONCLUSION

Thus we have studied the concept of E-Learning Recommendation System. It is a system which is used to recommend the E-learning websites. All the three E-Learning Recommendation System have been used i.e. Content, Collaborative and Hybrid Filtering. The Myers-Briggs Type Indicator(MBIT) is used for creating an E-Learning websites and some front-end and back-end development has been used.

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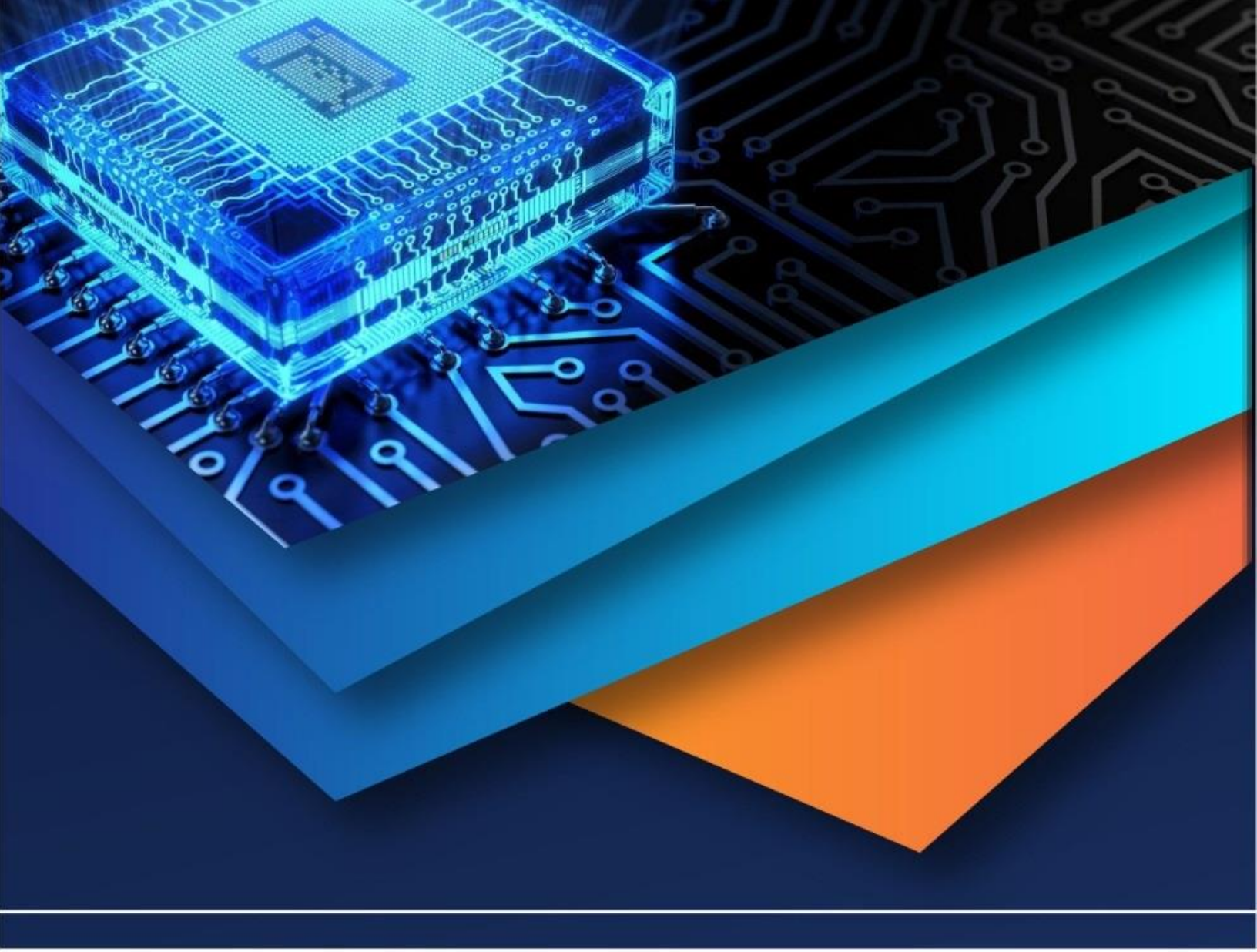

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