

# Book Recommendation System using Machine learning and Collaborative Filtering

Ashlesha Bachhav<sup>1</sup>, Apeksha Ukirade<sup>2</sup>, Nilesh Patil<sup>3</sup>, Manish Saswadkar<sup>4</sup>, Prof. Nitin Shivale<sup>5</sup>

Students, Department of Computer Engineering<sup>1,2,3,4</sup>

Assistant Professor, Department of Computer Engineering<sup>5</sup>

JSPM's Bhivarabai Sawant Institute of Technology & Research, Pune, Maharashtra, India

**Abstract:** Nowadays the amount of information available on the internet has got a severe raise recently and people need some instruments to find and access appropriate information. One of such tool is called recommendation. Recommendation systems help to navigate quickly and receive the necessary information. Recommendation system are effective software technique to overcome the problem. Recommendation system can be used in various places one of them is Library. So, in this paper we are going to propose a Book Recommendation System using Collaborative filtering (CF) and Content Based Algorithm to recommend the books to the user according to their likes and information of the books ie. Ratings given by the existing users. The proposed system will give its users the ability to view and search the book, publications and genres category wise using the Support Vector Machine (SVM). SVM will list the most top-rated books based on the subject name given as input and give the ratings. It will also make sure user's privacy to be maintained.

**Keywords:** Collaborative Filtering, Content based Filtering, Cosine Similarity, Book Recommendation

## I. INTRODUCTION

Library book recommendation system is an automated system which helps to carry out the library's everyday work in a productive manner. A library is a website where the admin develops a system to store and retrieve books from the database. This library recommendation system makes use of a collaborative filtering algorithm where the admin adds the books based on categories and also recommend the top-rated (5- star rating) books to the user. Each category recommends one or more top-rated books to the user where the user can find the related books faster without wasting much time in searching the book. User can rate the book and give user's feedback of the book which he/she is recommended. Overall, our system is been developed using the collaborative filtering methodology to recommend the books to all age group category which can reduce the human effort of the user where he/she going to a public library in search of books. This system is free of cost and reliable.

## II. RELATED WORK

**Nursultan Kurmashov, Konstantin Latuta, Abay Nussipbekov et.al**

This paper proposes a quick and intuitive book recommendation system that helps readers to find appropriate book to read next. The overall architecture is presented with it's detailed description. We used a collaborative filtering method based on Pearson correlation coefficient.

**Yongen Liang, Shiming Wan et.al.**

Personalized recommendation technology is a new technology which can mine products by using user's information, and that meet user's preferences through a series of algorithms, so as to achieve better recommendation effect. in, this author designs a books recommendation system based on Apriori algorithm.

## III. PROPOSED SYSTEM

The proposed Book Recommendation system is achieved by two main approaches one is Collaborative filtering (CF) and other is Content based filtering. For similarity Cosine similarity measure is applied. In this system user first Register himself/ herself and create an account. He/ she gives all the inputs needed regarding category of the books. All

the information is saved and using the above approaches books are recommended to the user. Collaborative filtering is used to filter the books according to the user’s interest and the ratings given by the users. *Content-based filtering* is a type of recommender system that attempts to guess what a user may like based on that user's activity. User can also give the ratings to the books he read.

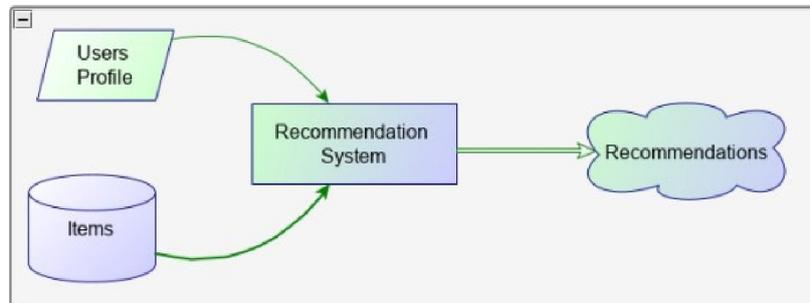


Figure 1: Block diagram of Recommendation Process

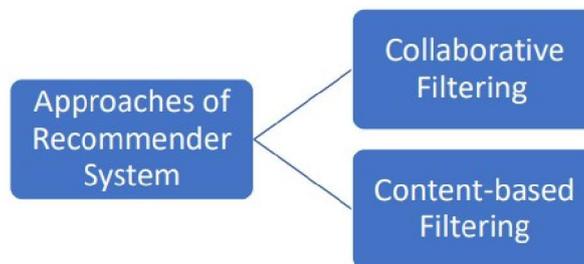


Figure 2: Approaches of Recommendation

### 3.1 System Architecture

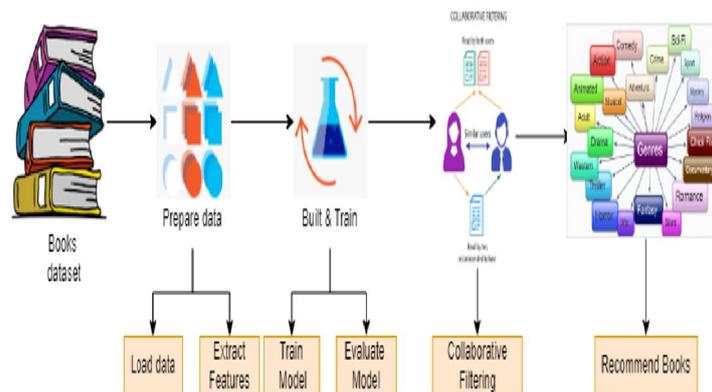


Figure 3: System Architecture

Book Recommendation System is divided into 4 modules:

1. **Dataset** - Provide dataset (By this, we mean that the collected data should be uniform and understandable for a machine that doesn't see data in the same way that people do.)
2. **Pre-processing** –A real-world data generally contains noises, missing values, and maybe in an unusable format which cannot be directly used for machine learning models. Data pre-processing is required tasks for cleaning the data and making it suitable for a machine learning model which also increases the accuracy and efficiency of a machine learning model.

3. **Training and Testing**-Training data is the data you use to train an algorithm or machine learning model to predict the outcome you design your model to predict with help of test data test your model. you can evaluate the performance and progress.
4. **Collaborative filtering**-. Collaborative filtering is a method of making statistical assumptions (filtering) about a user's interests by gathering (collaborating) expectations or interest information from other user and recommend the books.

### 3.2 Algorithms

1. **Collaborative Filtering**: Collaborative filtering (CF) is a tool used by recommenders. Collaborative filtering is a method of making statistical assumptions (filtering) about a user's interests by gathering (collaborating) expectations or interest information from other users. Collaborative filtering is the mechanism of filtering information or patterns using multiple agent methods of communication, perspectives, data sources, etc. Collaborative filtering systems usually require enormous sets of data. This approach builds the model for book recommendation based on various aspects like, opinion in the form of rating given by other users for a particular book and user's past behaviour towards the system, which includes books read by the user previously.
2. **Content-Based Filtering**: Content-based filtering uses item features to recommend other items similar to what the user likes, based on their previous actions or explicit feedback. Content-based filtering does not require other users' data during recommendations to one user.

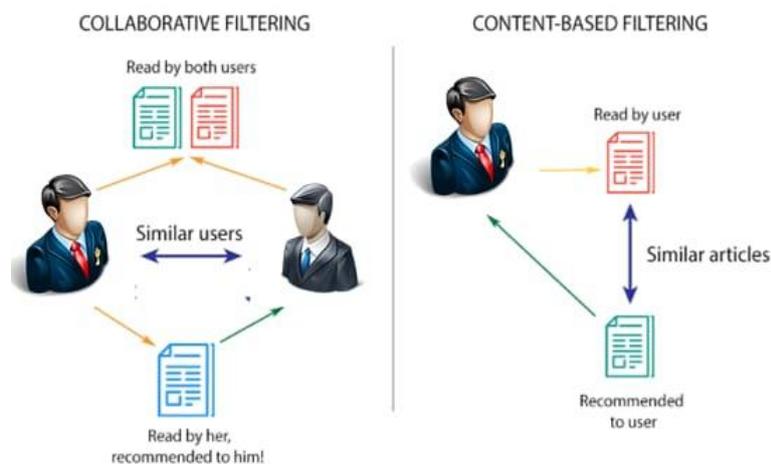
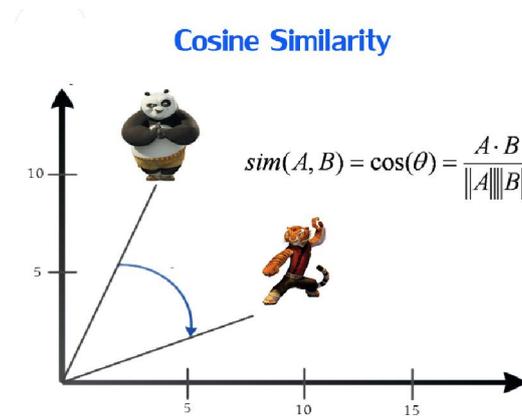


Figure 4: Algorithms

### 3.3 Similarity Techniques

- **Cosine Similarity**: It is a similarity approach used to find out similarity amongst the available documents. In other words, we can define it is used to calculate the maximum number of similar documents amongst the available documents. This approach is used to access the degree of any two documents that can be compared based on their properties. This approach is widely applicable where a huge amount of information is available and we want to find valuable information from this available information. It is also applicable in text mining areas.

$$\text{similarity} = \cos(\theta) = \frac{\mathbf{A} \cdot \mathbf{B}}{\|\mathbf{A}\| \|\mathbf{B}\|} = \frac{\sum_{i=1}^n A_i B_i}{\sqrt{\sum_{i=1}^n A_i^2} \sqrt{\sum_{i=1}^n B_i^2}}$$

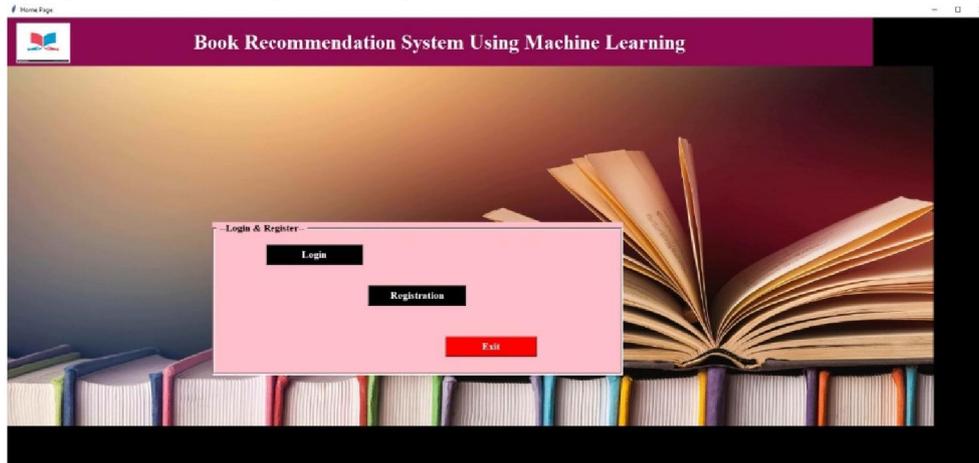


**Figure 5:** Cosine Similarity Graph Representation

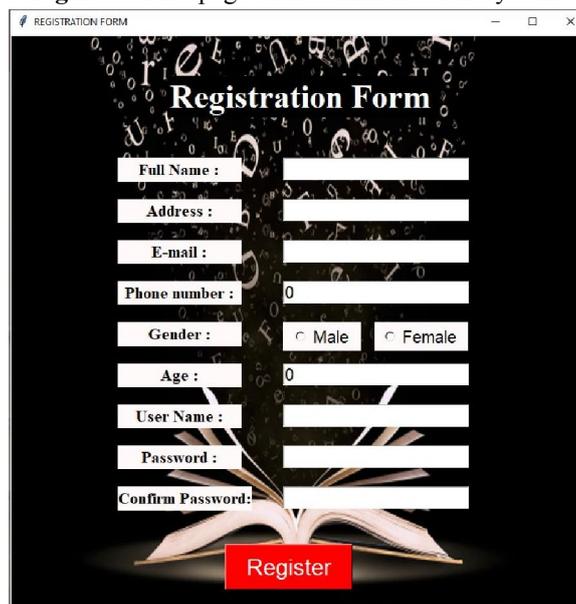
**V. FRONT PAGE GUI SNAPSHOT**

Step 1: First User needs to Register to the recommendation system.

Step 2: If already register, LOGIN using the id and password created earlier.



**Figure 6:** First page of Recommendation System



**Figure 7:** Registration Form

## VI. CONCLUSION AND FUTURE SCOPE

In our proposed system we have improvised and modified the recommendation systems. This Book Recommendation System has considered many parameters like ratings, book name, price etc. Machine learning has been improvising the recommendation systems, also it brings more possibilities to improve performance of recommendation system. Development and launching of Mobile app and refining existing services and adding more service, System security, data security and reliability are the main features which can be done in future. The API for the shopping and payment gateway can be added so that we can also buy a book at the moment.

## REFERENCES

- [1]. N. Grover, "Enabling shift in retail using data: Case of Amazon," 2019.
- [2]. Y. Lee, C. Wei, P. Hu, T. Cheng, and C. Lan, "Small Clues Tell: a Collaborative Expansion Approach for Effective Content-Based Recommendations," *Journal of Organizational Computing and Electronic Commerce*, pp. 1-18, 2020.
- [3]. T. Zhao, W. Zhang, Y. Zhang, Z. Liu, and X. Chen, "Significant spatial patterns from the GCM seasonal forecasts of global precipitation," *Hydrology and Earth System Sciences*, vol. 24, no. 1, pp. 1-16, 2020.
- [4]. A. Gazdar and L. Hidri, "A new similarity measure for collaborative filtering based recommender systems," *Knowledge-Based Systems*, vol. 188, p. 105058, 2020.
- [5]. P. Kumar, V. Kumar, and R. S. Thakur, "A new approach for rating prediction system using collaborative filtering," *Iran Journal of Computer Science*, pp. 1-7, 2018.
- [6]. R. Thukral and D. Ramesh, "Ensemble similarity based collaborative filtering feedback: A recommender system scenario," in *2018 International Conference on Advances in Computing, Communications and Informatics (ICACCI)*. IEEE, 2018, pp. 2398-2402.
- [7]. Arsan, Taner. Köksal, Efecan. Bozkuş, Zeki. 2016. "Comparison of collaborative filtering algorithms with various similarity measures for movie recommendation". Published in *International Journal Computer Science and Engineering (IJCSE)*.
- [8]. Atigadda, Shivani Reddy. 2014. "A Collaborative Filtering Recommendation Algorithm Based On User Clustering and Item Clustering". Published in *Faculty of The School of Engineering & Computing Sciences Texas A&M University-Corpus Christi Corpus Christi, TX*.
- [9]. T. Anwar and V. Uma, "Mrec-crm: Movie recommendation based on collaborative filtering and rule mining approach," in *2019 international conference on Smart Structures and Systems (ICSSS)*. IEEE, 2019.