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Book Recommendation System

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Abstract: As the internet grows rapidly, people need tools to find the right information quickly. One such tool is a recommendation system, often used in online stores to boost sales. This paper suggests a simple book recommendation system to help readers find their next read easily and show top 50 books We'll explain how it works and the method we used, which is collaborative filtering.

Keywords—recommendation system, collaborative filtering, book.

1.INTRODUCTION:

In today's digital age, the sheer volume of information available on the internet can make finding what you need a daunting task. This is where recommendation systems step in, aiding in swiftly locating pertinent information without the need for manual searching. Numerous websites leverage these systems to propose products to customers based on their online activity, including past browsing or purchase history. Such tailored recommendations serve to enhance the sales of online shops by providing users with personalized suggestions. In this paper, we introduce a simple and user-friendly book recommendation system. It's designed to help readers easily find their next favorite book. We'll explain how it works in detail, including the technology behind it called collaborative filtering, which uses something called the Pearson correlation coefficient.

2.RELATED WORK:

Over the past two decades, recommender systems have experienced significant growth. Research studies, such as those referenced in [1] and [2], showcase a wide range of cutting-edge methods and techniques that are commonly utilized today.

Recommendation systems employ various approaches to provide suggestions tailored to your interests. Two primary methods include collaborative filtering and content-based filtering. Content-based filtering learns about items, such as products, and suggests them based on your preferences, which it derives from your profile. Collaborative filtering, on the other hand, doesn't focus on item content; instead, it matches items with users who share similar tastes, based on their past agreements. This data is often gathered from the ratings users give to items. For instance, Amazon effectively utilizes collaborative filtering to recommend a wide range of products. Additionally, there are hybrid systems that combine both approaches for even more accurate suggestions.

In this paper, we propose a book recommendation web service that utilizes collaborative filtering to provide users with recommendations across various genres, based on the information of their preference searches. Additionally, it displays top books.

The advantage of this system lies in its speed and simplicity. Unlike most existing services that require profile history information and other data, which takes time to process and provide recommendations, our aim was to generate quick recommendations for users.

3.DATA COLLECTION:

Dataset plays an important role as it serves as input to the machine learning model and predicts the output Based on the data in the dataset. The dataset was collected from Kaggle's Goodreads books repository Its format is ".csv", which is H. Books.csv, Ratings.csv, Users.csv.
The description of datasets are as follows:

- **Books.csv:** Attributes are ISBN, Book-Title ,Book-Author ,Year-Of-Publication ,Publisher ,Image-URL,
- **Ratings.csv:** Attributes are User-ID, ISBN, Book-Rating
- **Users.csv:** Attributes are User-ID, Location, Age

4.DATA CLEANING:

Since the data comes in unstructured textual format, it needs preprocessing to standardize it and remove noise. This involves cleaning the datasets by checking for null values and deleting those rows, as well as identifying any strings in integer data types or misplaced values and correcting them. The pandas library can be used for this purpose. Once all three datasets are standardized individually, they need to be merged into one dataset based on unique columns to be fed into the algorithm.

*5.*PROPOSED *SYSTEM:*

Popularity Based Filtering
As the name suggests, a Popularity-based recommendation system operates based on trends. It essentially relies on items that are currently trending. For example, if a product is frequently purchased by new users, there is a high likelihood that it will be recommended to a newly signed-up user. We will suggest the top 50 books using popularity-based filtering.
Weighted Rating (WR)=[vR/(v+m)] +[mC/(v+m)]
where,
v is the number of votes for the Books;
m is the minimum votes required to be listed in the chart;
R is the average rating of the Books; and
C is the mean vote across the whole report.

Collaborative Filtering Technique:
The link between users and objects is the main emphasis of the collaborative filtering [CF] technique. This method suggests the best and most similar things to the item the user provided, excluding goods that the user would not enjoy based on ratings left by other users. The users who have rated both things have evaluated how comparable they are based on how similar their ratings are to each other.

5.1 User based filtering

These systems recommend products to a user that similar users have liked. For measuring the similarity between two users we can either use Pearson correlation or cosine similarity.

5.2 Item Based Collaborative Filtering :

Instead of measuring the similarity between users, the item-based CF recommends items based on their similarity with the items that the target user rated. Likewise, the similarity can be computed with Pearson Correlation or Cosine Similarity.

5.2.1 Cosine Vector Similarity:

Cosine Vector Similarity[3] is the dot product of the two data points(vectors). It measures the cosine angle between the objects i.e vectors.

$$similarity(A,B) = \frac{A \cdot B}{\|A\| \times \|B\|} = \frac{\sum_{i=1}^{n} A_i \times B_i}{\sqrt{\sum_{i=1}^{n} A_i^2} \times \sqrt{\sum_{i=1}^{n} B_i^2}} \quad (1)$$

Where, A=book1(vector1)
B=book2(vector2)
Ai=rating given to the book 'A' by a user 'i'
Bi=rating given to the book 'B' by a user 'i'

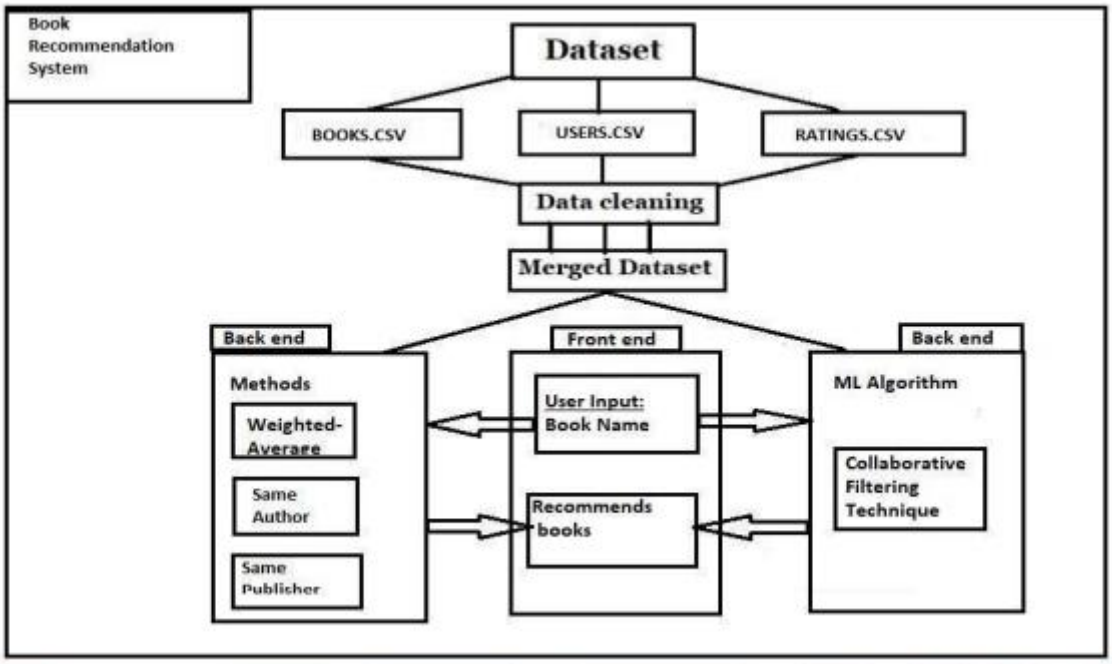
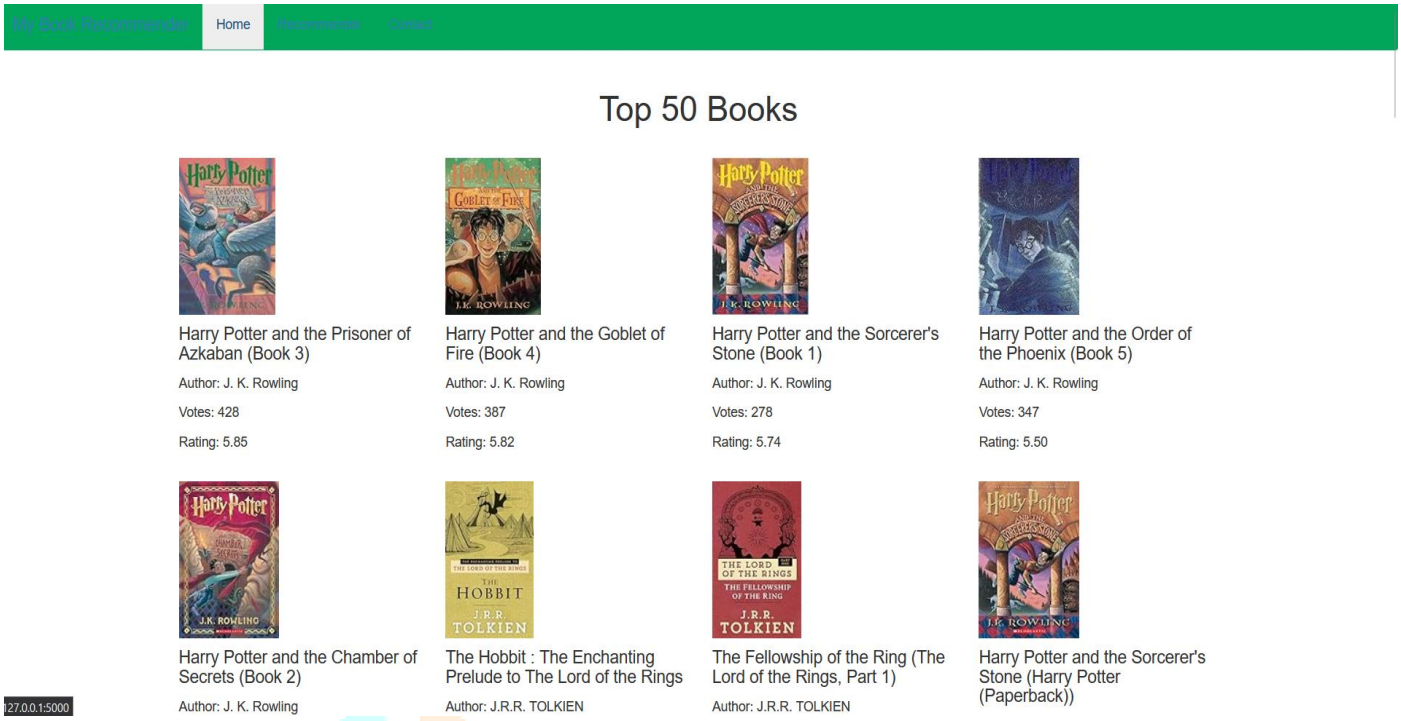


Fig.(1) : System Architecture for Book Recommendation System using Collaborative Filtering

5.3 Web-page:
On the-other hand, we have developed a software web-application using flask, a python framework for backend and Html and Css for frontend

6. Results:
An unsupervised machine learning model—a collaborative filtering technique—is trained using data from the Kaggle datasets[4], which includes 278858 user records, 242135 books, and 1149780 ratings. A real-time web application is then created. The book title "**Midnight**" is used as an example input in the following to display the recommended books for our suggested system

As shown in Fig.(2), show top 50 books and in Fig.(3) our proposed system takes the book title "Harry Potter and the Sorcerer's Stone (Harry Potter (Paperback))" as an example input to show the recommended books using CF technique as shown in Fig.(3).



Fig(2): Show Top 50 Books

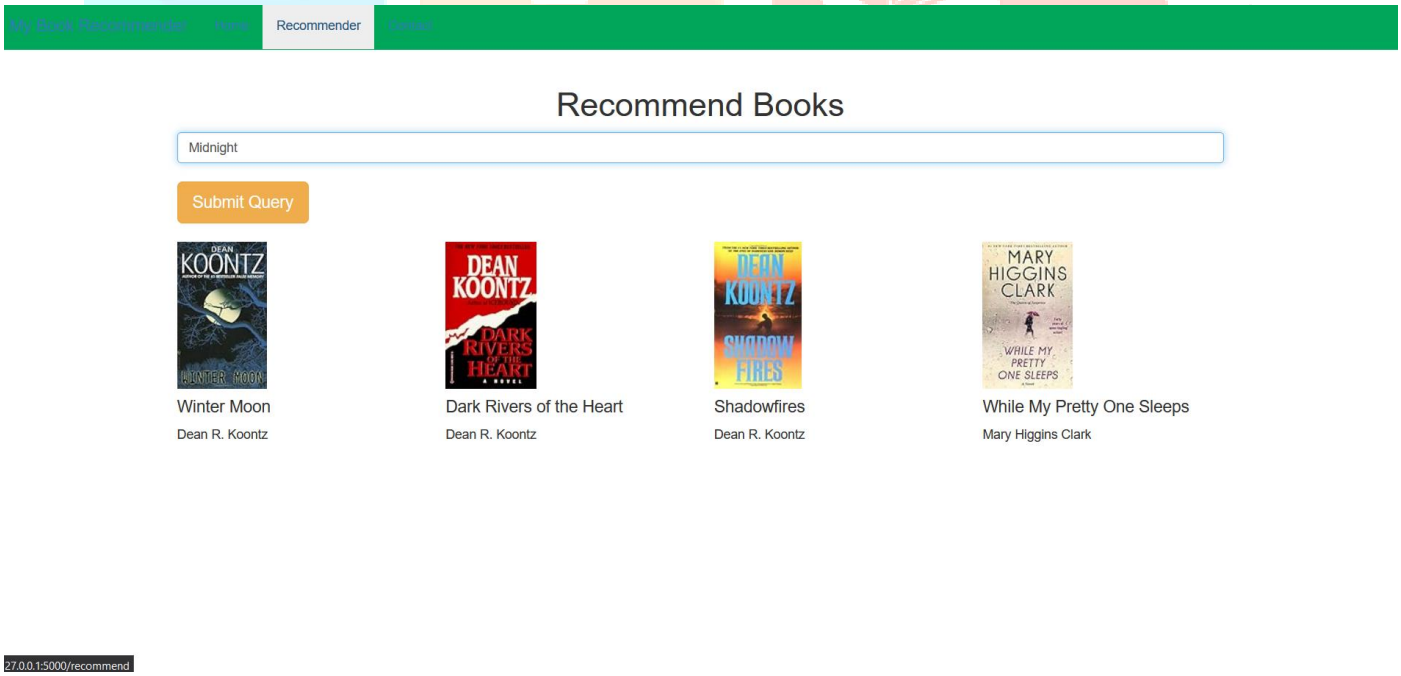


Fig.(3): Books Recommended using CF

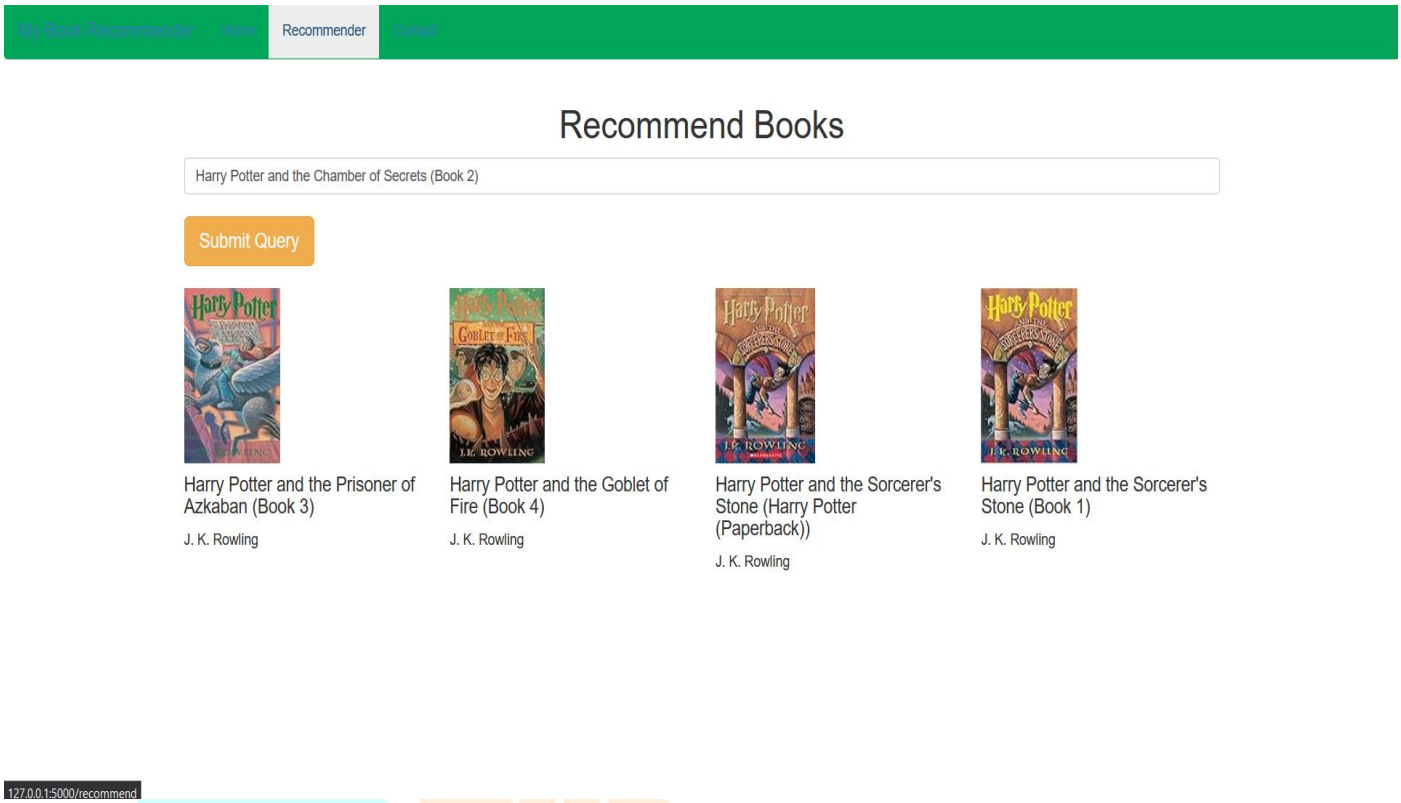


Fig.(3): Books Recommended using CF

Conclusion:

As it can be challenging for individuals to select the best books from a vast collection, this paper presents a modern solution: a book recommender system based on the item-based collaborative filtering (CF) technique, which offers relevant recommendations. Additionally, this paper demonstrates that employing popularity-based filtering to showcase the top 50 books optimal results. The CSV file provides the best outcomes when devoid of null values in the dataset. Looking ahead, collaborative filtering could be integrated with content-based filtering techniques to enhance the accuracy of recommendations further. Moreover, the proposed approach can be extended to other domains such as movies, music, and various others.

References:

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