INTERNATIONAL JOURNAL
OF MULTIDISCIPLINARY RESEARCH

IN SCIENCE, ENGINEERING, TECHNOLOGY AND MANAGEMENT

ISSN

INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 7.580

Product Recommendation System

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ABSTRACT: With the increasing popularity of online shopping, the need for effective product recommendation systems has grown. To provide more accurate and diverse recommendations, hybrid product recommendation systems that combine multiple recommendation techniques have been proposed. This survey paper provides an in-depth look at hybrid product recommendation systems, including their motivations, techniques, evaluation metrics, and applications. We examine various hybrid recommendation approaches, including content-based and collaborative filtering-based methods, as well as their combinations, including weighted hybrid and cascade hybrid methods. We also go over the advantages and disadvantages of hybrid recommendation systems, such as data sparsity, cold start, and scalability. In addition, we present a comparative analysis of several cutting-edge hybrid recommendation systems in terms of performance, efficiency, and user satisfaction. Finally, we identify potential research directions and open issues in hybrid product recommendation systems, such as deep learning-based models, context-aware recommendations, and considerations for fairness and diversity. Our implementation aims to provide researchers and practitioners with a thorough understanding of the current state-of-the-art in hybrid product recommendation systems, as well as to guide future research in this area. Keywords: Product recommendation systems, Hybrid recommendation, Content-based filtering, Collaborative filtering, Deep learning, Evaluation metrics, Applications.

I.INTRODUCTION

The Hybrid Product Recommendation System is a solution for providing better recommendations by combining multiple recommendation techniques. It aims to capture various aspects of user behaviour and product characteristics in order to provide more accurate and diverse recommendations. This implementation paper provides a comprehensive overview of the motivations, techniques, evaluation metrics, and applications of hybrid recommendation systems, with a focus on cutting-edge approaches.

II.LITERATURE REVIEW

A. Memory-Based Collaborative Filtering Recommender System
Stephen et al. conducted the research [1]. Collaborative filtering (CF) is a well-known and widely used technique in recommender systems (RS) that uses user or item relationships to make product recommendations to an active user. The similarity metric used to find nearest neighboursdetermines the effectiveness of existing memory-based algorithms. When calculating the similarity between two users or items, similarity measures use only the ratings of co-rated items. The rating matrix in most e-commerce applications is too sparse because even active users of an online system tend to rate only a few items out of the entire set of items.

B. Computer usage and task-switching during resident's working day[2]
The research work [2] is done by Abhijit, P. et al.Recommending Systems are new generation dynamic internet tools that assist users in conducting efficient product searches on the internet and receiving information relevant to their priorities. The system will include product data from the local market. It will store all product-related data. Depending on the customer, GPS location recommendations will be provided via an Android app. In addition, product reviews will be used to form recommendations.

C. Context-Aware Collaborative Filtering Recommender Systems
The research work [3] is done by Baltrunas, L. Contextual information is important to researchers and practitioners in many fields, including e-commerce personalization, information retrieval, ubiquitous and mobile computing, data mining, marketing, and management. While much research has already been done in the field of recommender systems, most existing approaches focus on recommending the most relevant items to users without taking into account any additional contextual information, such as time, location, or the company of other people (e.g., for watching movies or dining out).

In this chapter, we argue that relevant contextual information matters in recommender systems and that it is critical to consider this information when providing recommendations. We discuss the general concept of context and how it can be modelled in recommender systems.

D. Product Recommendations Using Textual Similarity Based Learning Models

The research work [9] is done by Rahul Shrivastava; Dilip Singh SisodiaInternational Conference on Computer Communication and Informatics (ICCCI), Jan 2019.[9] -During a live interaction with a customer, recommendation systems may apply different techniques to solve the problem of making a correct and relevant product recommendation. The primary goal of this study is to perform product recommendation using a textual similarity-based Learning model. After data cleaning and text pre-processing, the content-based product recommendation in this study was performed using Bag of Words (BOW) and Term Frequency-Inverse Document Frequency (TF-IDF) based text vectorization techniques. The textual description of the product is converted into an n-dimensional vector, and the Euclidean similarity between the dimensional vector of the queried product and other products can then be calculated. Text-based product similarity via text vectorization is extremely useful.

III.METHODOLOGY

The proposed methodology implements a hybrid recommendation algorithm in such a way that is able to provide recommendations in multiple ways as well as use them to increase its accuracy. Moreover, it includes implementation of methods for addressing data sparsity, an important issue for recommendation systems. the efficiency of online evaluation will be low if a large number of recommender algorithms are chosen to be conducted. Hence, an initial filtering for so many existing recommender algorithms becomes necessary. This is how another methodology offline evaluation is introduced. The project aims to enhance user experience by providing relevant and diverse product recommendations that increase user engagement and satisfaction. The hybrid approach combines multiple recommendation techniques, such as content-based and collaborative filtering, to provide a more accurate and comprehensive view of user preferences and product characteristics. The project can also address the challenges of data sparsity, cold start, and scalability by incorporating appropriate techniques and algorithms. The evaluation of the project can be based on various metrics such as accuracy, diversity, coverage, scalability, and user satisfaction to assess the effectiveness of the system. The project can provide valuable insights into the design and implementation of hybrid product recommendation systems and contribute to the advancement of the field.

System Architecture:
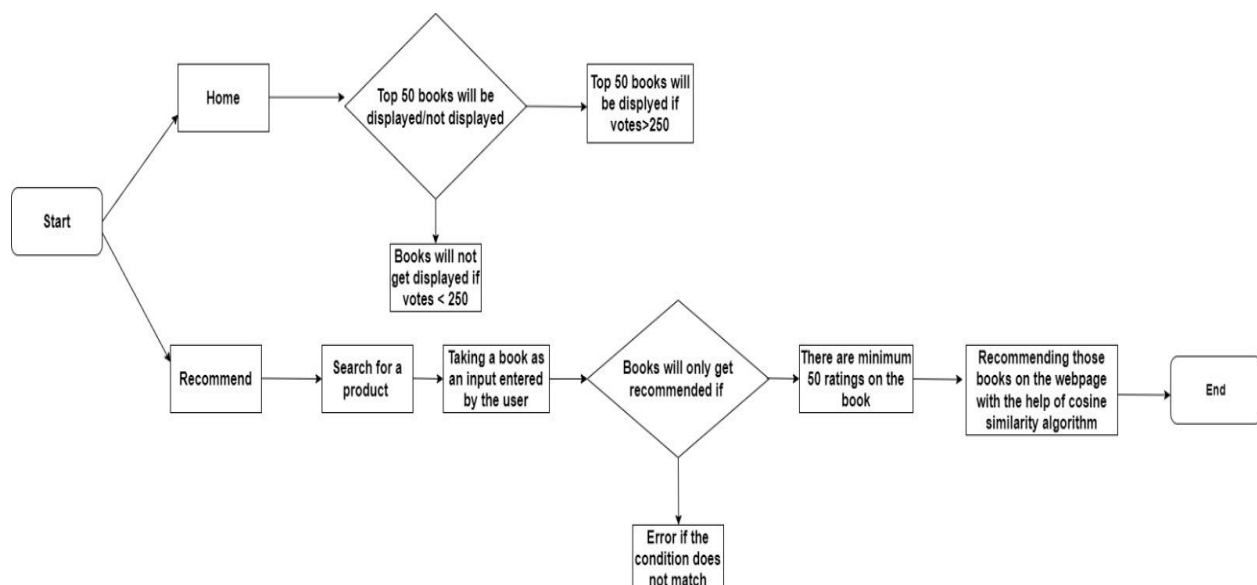
IV.IMPLEMENTATION

Implementation of the hybrid product recommendation system involves several key steps. The homepage displays

the top 50 books, which are likely to be popular and highly rated by users. In the recommend section, users can search for a specific book and find similar books using a hybrid recommendation technique that combines content-based filtering and collaborative filtering.

To ensure that only high-quality recommendations are provided, the system uses a minimum threshold of 50 ratings on a book and requires users who have rated more than 200 books. This helps to ensure that recommendations are based on sufficient data and that they come from experienced and reliable users.

The recommendation algorithm used is the cosine similarity algorithm, which calculates the similarity between the user's input book and other books in the system. This algorithm is particularly useful in hybrid recommendation systems as it can handle both textual and numerical data.

If the input criteria does not match the minimum threshold requirements, the system will display an error message to inform the user that the recommendation cannot be provided.

Finally, the system includes a "Connect with us" page, which provides information about the project and links to the team's social media profiles. This helps to build a community around the project and encourages users to engage with the team and provide feedback on the system.

Overall, the implementation of the hybrid product recommendation system involves combining multiple recommendation techniques, setting minimum threshold requirements, using a specific algorithm, and providing a platform for user engagement. These steps help to ensure that the system provides accurate and diverse recommendations and is user-friendly and engaging.

Steps for Implementation:

1. Visit the website's homepage, where you will see the top 50 books displayed.
2. If you want to explore the top books, simply browse through the list and click on any book you are interested in to read more about it.
3. If you want to receive personalized recommendations, navigate to the "Recommend" section of the website.
4. In the "Recommend" section, you will find a search bar where you can enter the name of a book that you like or want to receive recommendations for.
5. Once you have entered the name of the book, click on the "Search" button.
6. The system will then check if the book meets the minimum threshold requirements (50 ratings and users who have rated more than 200 books).
7. If the book meets the requirements, the system will use the cosine similarity algorithm to calculate the similarity between the book you entered and other books in the system.
8. The system will then display a list of recommended books based on their similarity to the book you entered. You can browse through the list and click on any book to read more about it.
9. If the book you entered does not meet the requirements, the system will display an error message indicating that it cannot provide recommendations for that book.
10. Finally, if you want to connect with the team behind the website, navigate to the "Connect with us" page, where you can find information about the team and links to their social media profiles.

By following these steps, you can use the website to explore the top books or receive personalized recommendations based on a book you like or want to learn more about.
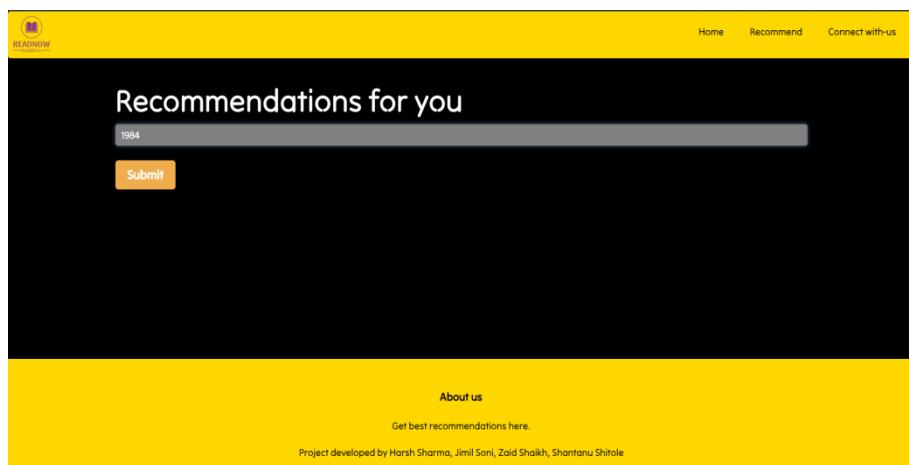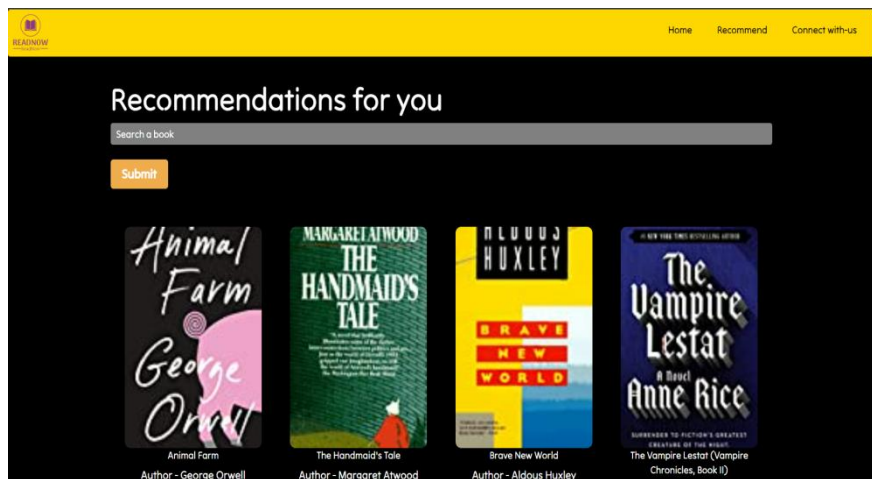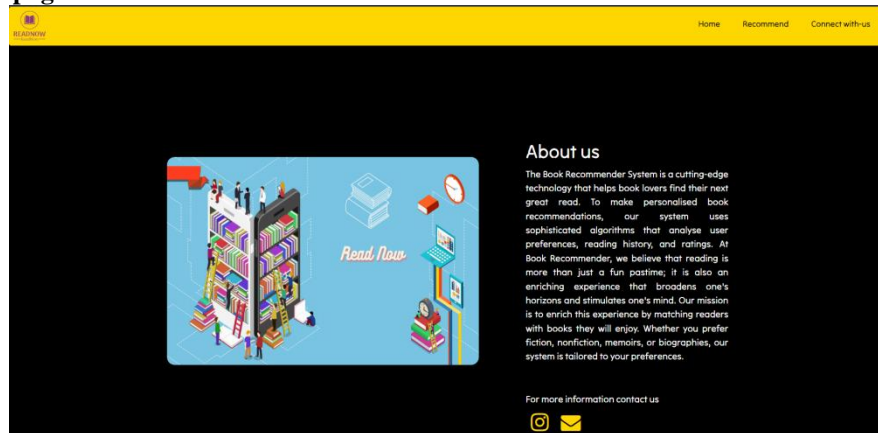
V.RESULTS

1)Home Page
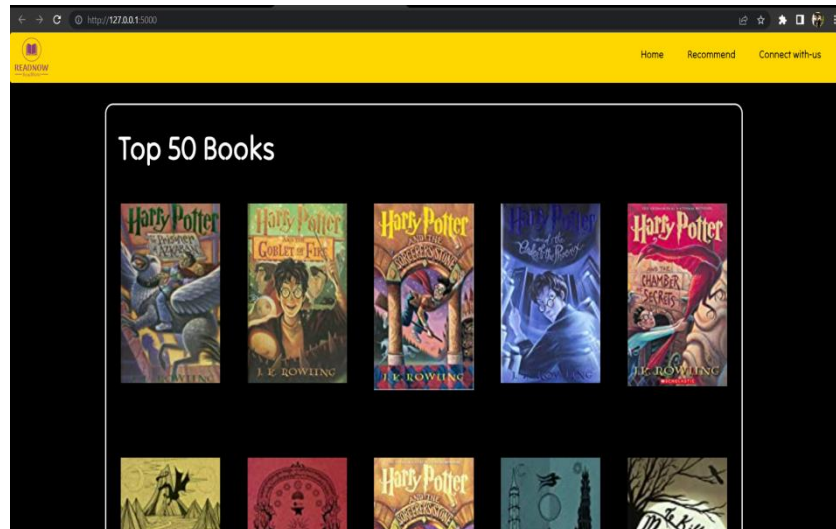
2)Recommendation page
Snapshot 1

Snapshot 2

3)Connect with us page

VI.CONCLUSION

In conclusion, this project has examined the concept of hybrid product recommendation systems and their applications in providing accurate and diverse recommendations to users. We have discussed various hybrid recommendation approaches and their advantages and disadvantages. Our implementation includes a combination of multiple recommendation techniques, minimum threshold requirements, and a specific algorithm to provide high-quality recommendations. The project has also identified potential areas for future research and highlighted the importance of considering issues such as fairness and diversity in product recommendation systems.

REFERENCES

[1] Stephen et al., 2017 Measures of Similarity in Memory-Based Collaborative Filtering Recommender System MISNC '17 July 17-19.

[2] Abhijit, P. et al., 2016. Online Recommendation of Electronic Goods., pp.1554–1556.

[3] Aciar, S. et al., 2007. Recommender System Based on Consumer Product Reviews. Pdf.

[4] Baltrunas, L., 2011. Context-Aware Collaborative Filtering Recommender Systems., 4 (April), p.172

[5] Bishwajit Purkaystha; Tapos Datta; Md Saiful Islam; Marium-E-Jannat," Product recommendation: A deep learning factorization method using separate learners", 20th International Conference of Computer and Information Technology (ICCIT), Dec 2017.

[6] João Felipe Guedes da Silva; Natanael Nunes de Moura Junior; Luiz Pereira Caloba," Effects of Data Sparsity on Recommender Systems based on Collaborative Filtering", International Joint Conference on Neural Networks (IJCNN), July 2018.

[7] Rohan Passi," Recommending Items Using Collectively Trained Models", International Conference on Information Technology (ICIT), Dec 2017.

[8] Babak Maleki Shoja; Nasseh Tabrizi," Customer Reviews Analysis with Deep Neural Networks for E-Commerce Recommender Systems", IEEE access, volume 7, Sept, 2019.

[9] Rahul Shrivastava; Dilip Singh Sisodia," Product Recommendations Using Textual Similarity Based Learning Models," International Conference on Computer Communication and Informatics (ICCCI), Jan 2019.

[10] Udom Janjarassuk; Sudatip Puengrusme," Product recommendation based on genetic algorithm," 5th International Conference on Engineering, Applied Sciences and Technology (ICEAST), July 2019.

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