

Focus Feed: A Personalized News Portal

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Abstract—In the age of digital information overload, personalized news recommendation systems are essential for enhancing user experience by tailoring news content to individual preferences and behaviors. Our project, FocusFeed, aims to manage information overload and increase user engagement by using advanced algorithms and user profiling to deliver relevant news. We utilize a hybrid model consisting of Neural Collaborative Filtering (NCF) and Content-Based Filtering (CBF) to improve recommendation efficiency. Additionally, our system provides a summary feature for each news article, offering users the option to view either the full article or a concise summary. This approach aims to improve user satisfaction and offers monetization opportunities for news providers.

Index Terms—Personalized News Recommendation, Neural Collaborative Filtering (NCF), Content-Based Filtering (CBF), Hybrid Model, Real-Time Data

I. INTRODUCTION

In today's digital world, users are overwhelmed by vast amounts of news, making it hard to find relevant content. Traditional platforms often fail to deliver personalized experiences, leading to user disengagement. FocusFeed aims to solve this by developing a personalized news recommendation system that uses a hybrid model of Neural Collaborative Filtering (NCF) and Content-Based Filtering (CBF) to deliver more accurate and relevant news. Additionally, it offers article summaries, catering to users' varying time constraints and preferences, while also providing new monetization opportunities for news providers.

A. Evolution of the Customer Care Service Industry

FocusFeed was created as a response to the problems caused by information overload in the digital news environment, where consumers frequently find it difficult to separate pertinent content from a deluge of data. FocusFeed dramatically increases user engagement by creating a personalized news recommendation system that adjusts content depending on

unique user preferences and behaviors. The platform employs a hybrid recommendation algorithm that blends Content-Based Filtering (CBF) with Neural Collaborative Filtering (NCF) to provide precise and pertinent news recommendations[3]. Users can now easily evaluate the significance of news articles thanks to the incorporation of succinct article summaries, which gives them the option to select between fast updates and in-depth reading. Another important component is FocusFeed's real-time flexibility, which allows it to continuously update recommendations based on user interactions and changing preferences. Through methods like federated learning, the platform puts user privacy first, encouraging confidence and trust among users. FocusFeed serves a wide range of users by implementing language support and guaranteeing accessibility across multiple devices. Furthermore, the incorporation of diverse content formats, such podcasts and videos, caters to a range of user interests[7]. In the end, FocusFeed strikes a compromise between long-term revenue streams and user experience improvements, establishing itself as a pioneer in cutting-edge approaches to contemporary news consumption.

B. News Recommendation without Hybrid Model (the traditional method)

A news recommendation system that employs a single strategy, such collaborative filtering or content-based filtering, concentrates on a single main way to provide tailored recommendations. Recommendations in a content-based system are generated by examining news article characteristics and comparing them to the user's explicitly specified preferences. In order to provide relevant content suggestions, the system constantly compares article attributes—such as subjects or keywords—with the user's interests.

Conversely, a collaborative filtering strategy makes recommendations for news stories that users who are similar to you have interacted with based on the user's past interactions[11]. This approach does not necessarily analyze the substance of

the articles; instead, it makes content recommendations based on patterns observed over a wider user base. Even though it can be useful in certain situations, relying solely on one model could make it more difficult for the system to properly adjust to user preferences or recognize intricate patterns in user behavior, which could eventually result in fewer varied or dynamic recommendations.

C. News Recommendation with Hybrid Model

To deliver customers customized news recommendations, the personalized news recommendation system uses a hybrid model that blends content-based filtering and neural collaborative filtering. This method combines two effective strategies: neural collaborative filtering, which uses deep learning to find patterns in user behavior and preferences by comparing them to others who share their tastes, and content-based filtering, which examines news article features and matches them with the user's specified interests. Combining these two methods allows the algorithm to offer content that is popular among users who exhibit similar activity patterns in addition to news articles based on the user's previous interactions[15]. The hybrid algorithm adjusts in real time to users' preferences as they interact with the platform, reading or favoriting particular articles, for example, so that the recommendations are more accurate and pertinent. With the help of collaborative filtering techniques and dynamic content mixing, this hybrid approach guarantees a personalized news experience that continuously adapts to the user's preferences over time.

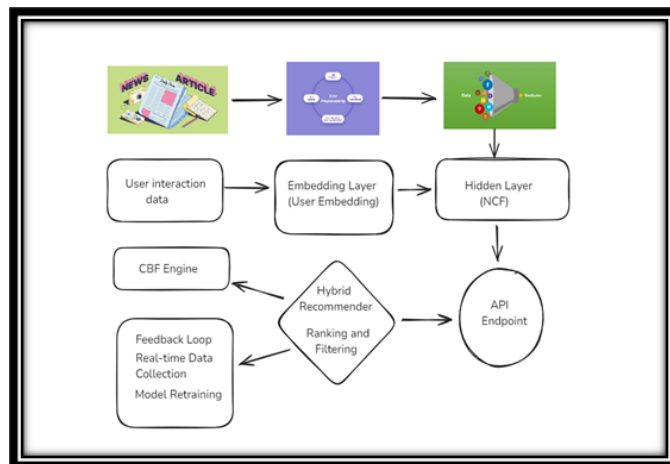


Fig. 1. System Flow.

II. ORGANIZATION OF THE PAPER

The CupMar model and its significance are progressively described in the sections that make up the CupMar study article. It begins by outlining the difficulties in providing tailored news recommendations and highlighting the shortcomings of the current approaches[8]. The related works section demonstrates the necessity of a model similar to CupMar by comparing earlier methods. Next, the fundamental architecture of the CupMar model is shown, incorporating the News

Encoder (NE) for article analysis and the User-Profile Encoder (UE) for recording user preferences over the long and short term. The functioning of these components is explained in technical detail, and then the model's superior performance over alternative systems is evaluated. The paper's conclusion summarizes CupMar's benefits and makes recommendations for future study avenues

III. RELATED WORKS

Over the previous twenty years, there have been significant breakthroughs in the field of tailored news recommendation systems. Scholars have investigated an array of methodologies, algorithms, and models to augment the pertinence and promptness of news items dispensed to users. Grouped by primary themes, this section provides a summary of some of the most important publications and advancements in the field. The techniques of collaborative filtering (CF) have been extensively used in news recommendation systems. Conventional CF methods rely on interactions between users and items, where recommendations are given according to users' shared preferences. The notion of collaborative filtering was first suggested by Resnick et al. (1994), laying the groundwork for later advances. Das et al. (2007) used CF approaches to improve the scalability of Google's news recommendation engine, however they encountered issues with data sparsity and cold-start users. Hybrid approaches that combine content-based filtering (CF) with other techniques have been presented as a way to alleviate these constraints. Content-based filtering (CBF) methods are essential in the news domain due to the dynamic and rapidly evolving nature of news content. These techniques recommend articles based on the textual similarity between the content of the articles and the user's reading history. For instance, Lops et al. (2011) provided an extensive review of content-based techniques using TF-IDF, Word2Vec, and more advanced natural language processing (NLP) models. More recently, the incorporation of deep learning methods for feature extraction from text (e.g., using CNNs and RNNs) has been explored to enhance recommendation quality. To overcome the individual limitations of CF and CBF, hybrid models have been developed. These models combine user interactions and content features to provide more personalized recommendations. Burke (2002) reviewed different types of hybrid recommendation systems, such as linear combinations and switching models. In news recommendations, Li et al. (2010) proposed a hybrid approach leveraging both the user's click behavior and the textual features of news articles to improve prediction accuracy. The use of deep learning in personalized news recommendation systems has grown significantly in recent years. Neural networks are employed to capture complex patterns in user preferences and news content. Additionally, news-specific challenges like topic modeling and trend detection have been explored using deep learning models. Approaches like Hierarchical Attention Networks (HAN) and Transformer-based architectures have demonstrated effectiveness in understanding user preferences at different levels.

TABLE I
SYSTEMATIC ANALYSIS OF DIFFERENT NEWS RECOMMENDATION SYSTEMS

Sr no	Paper Title	Methodology	Findings
1.	A survey on session-based recommender systems	Categorizes SBRS types and techniques.	Challenges in modeling session dependencies.
2.	A convolutional framework for graph learning in recommender systems 2020	Utilizes graph convolutional networks (GCNs).	Outperforms traditional recommendation techniques.
3.	Neural news recommendation with multi-head self attention	Multi-head self-attention mechanism applied.	Improved user and news representation.
4.	A survey of collaborative filtering-based recommender systems	Reviews traditional and hybrid methods.	Integration of social networks is beneficial.
5.	Deep knowledge-aware network for news recommendation	Utilizes a Deep Knowledge-Aware Network (DKN) with knowledge graphs	DKN enhances recommendation accuracy significantly.
6.	A large-scale dataset for news recommendation.	Developed as a benchmark using Microsoft News click logs.	User modeling and content understanding enhance recommendation accuracy.
7.	Deep news recommendation with contextual user profiling	Contextual user profiling; multifaceted article representation.	Improved recommendation accuracy with context.
8.	Graph learning-based recommender systems	Reviews graph learning techniques.	Graphs enhance recommendation accuracy.
9.	Graph Learning in Recommender Systems	Utilizes graph convolutional networks.	Improved recommendation accuracy achieved.

TABLE II
PARAMETER ANALYSIS

Paper Title	Operational Time	Operational Cost	Efficiency	Accuracy
[4]	Moderate	Moderate	High	High
[5]	Moderate	Low	High	Low
[6]	Moderate	Moderate	High	Low
[7]	Low	Low	High	High
[9]	Moderate	Moderate	High	Low
[10]	Moderate	Moderate	High	High

IV. RESULTS

By providing tailored news suggestions using a hybrid algorithm that combines Neural Collaborative Filtering (NCF) and Content-Based Filtering (CBF), FocusFeed successfully tackles the problem of information overload. By doing this, the user experience is much improved and news suggestions are more accurate and relevant. Article summaries provide flexibility by enabling visitors to easily get brief updates or, depending on their interests, explore whole articles. By examining user behavior and preferences and using methods like federated learning to protect privacy, the system adjusts in real-time. Maintaining a balance between privacy and personalization is essential for sustained user engagement. FocusFeed's ability to function across multiple platforms and languages increases its user base, and the addition of video, music, and other material formats enhances the whole experience. For news organizations, monetization potential through partner-

ships and targeted advertising generates additional revenue sources. FocusFeed provides a well-rounded, reliable news environment by guaranteeing content diversity and avoiding filter bubbles, establishing itself as a user-focused and long-lasting platform in the digital age.

V. CONCLUSION

FocusFeed aims to revolutionize the way users consume news by leveraging advanced AI and deep learning techniques. By combining user profiling, a hybrid recommendation model, and NLP-driven summaries, the project addresses the challenges of information overload and dynamic user preferences. The user-friendly news portal not only enhances engagement and satisfaction but also opens new avenues for monetization and growth for news providers. Through continuous optimization and user feedback, FocusFeed strives to deliver the most relevant and personalized news experience possible

VI. FUTURE SCOPE

In the future, FocusFeed will be able to incorporate real-time user feedback, which will allow it to continuously improve recommendations based on users' changing tastes. Users will be able to effortlessly obtain personalized news across several devices thanks to cross-platform integration. The accuracy of article summaries will improve with advances in AI, especially in natural language processing, and multilingual support will increase the system's global reach. Techniques that protect privacy, like federated learning, can guarantee data security without sacrificing personalization. FocusFeed might also branch out into news aggregation for specialized audiences, integrate multimedia content like podcasts and movies, and investigate sophisticated behavioral analytics to forecast user patterns. Dealing with ethical issues related to prejudice will guarantee content diversity and user confidence, while partnerships with news providers and advertisers present substantial monetization opportunities.

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