NEWSMANIA – AI INTEGRATED NEWS RECOMMENDATION SYSTEM

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Abstract: With the rapid growth of online news platforms, users often face information overload due to the availability of large volumes of news content. Most existing news systems either provide generic news feeds or rely completely on automated recommendation techniques, which may not always reflect user intent. This paper presents News-Mania, a news recommendation system that combines manual personalization and AI-based personalization to deliver relevant news.

In the proposed system, users manually select their preferred news categories, which ensures direct control over content selection. In addition, Artificial Intelligence analyzes user interaction data such as reading behavior and previously viewed articles to further refine recommendations. News articles are first fetched from online sources and stored in a database before being processed for recommendation. This hybrid approach improves recommendation accuracy, enhances user satisfaction, and reduces irrelevant content exposure.

Keywords: Artificial Intelligence, News Recommendation System, Manual Personalization, AI Personalization, User Preferences.

I. INTRODUCTION

The availability of digital news has increased significantly, resulting in users being exposed to a vast amount of information daily. While access to news is convenient, it often becomes difficult for users to find content that matches their interests. Traditional news platforms usually display the same content to all users, leading to reduced engagement. To address this issue, news recommendation systems have been introduced. However, systems based solely on automated recommendations may fail to capture the exact preferences of users. News-Mania overcomes this limitation by integrating manual personalization, where users explicitly choose their interests, along with AI-based personalization, which adapts recommendations based on user behavior. This combined approach ensures better relevance and user control.

The continuous increase in online news content has changed the way people consume information. Although news is easily available, users often find it difficult to identify articles that match their personal interests. Many news platforms provide uniform content to all users or depend only on automated systems, which may lead to irrelevant recommendations.News-Mania addresses this problem by combining user-driven selection with Artificial Intelligence. Users manually choose news categories according to their interests, while AI techniques observe reading behavior to refine future recommendations. This combined method ensures that users receive meaningful and relevant news content while maintaining control over their preferences.

1.1 Project Description

News-Mania is developed as a hybrid news recommendation system that integrates manual and AI-based personalization techniques. The system collects news articles from online sources and stores them in a database before displaying them to users. During registration, users select preferred news categories, which forms the basis of manual personalization. In addition to this, the system analyzes user interaction data, such as previously read articles, to enhance recommendations using AI logic. The final news feed is generated by combining both manual preferences and AI-based analysis, resulting in a personalized and adaptive news experience.

1.2 Motivation

The motivation for developing News-Mania originates from the increasing difficulty users face in finding relevant news content in today's digital environment. With a large volume of news being published continuously, users often

encounter repetitive, irrelevant, or overwhelming information. This reduces interest in news platforms and negatively affects the reading experience.

Many existing news systems either provide the same content to all users or rely completely on automated recommendation techniques. Generic news feeds fail to consider individual interests, while fully AI-driven systems may misinterpret user preferences or struggle when limited user data is available. In such cases, users receive recommendations that do not reflect their actual intent, leading to dissatisfaction.

News-Mania is motivated by the need to balance user control with intelligent automation. Manual personalization allows users to clearly specify their interests through category selection, ensuring that the system delivers relevant content from the beginning. At the same time, AI-based personalization observes user reading behavior to refine recommendations gradually. This dual approach helps overcome limitations such as inaccurate predictions and cold-start issues.

The system is also motivated by the importance of improving user engagement and reducing information overload. By combining manual input with AI analysis, News-Mania aims to present meaningful news content that aligns with evolving user interests. This approach supports a more personalized, flexible, and user-centered news consumption experience.

II. RELATED WORK

Several studies have been conducted in the field of news recommendation systems to address the problem of information overload. Early news platforms primarily focused on displaying the same news content to all users without considering individual preferences. This approach resulted in limited user engagement and reduced relevance of content.

Content-based recommendation systems were introduced to personalize news by analyzing article features such as keywords, topics, and categories. These systems recommend news similar to what a user has previously read. While effective to some extent, content-based methods often lack flexibility and may repeatedly suggest similar types of news, limiting content diversity. Collaborative filtering techniques recommend news based on the behavior of similar users. Although these systems improve personalization, they often suffer from cold-start problems when new users or new articles are introduced. In addition, collaborative approaches usually require large amounts of user data to perform effectively.

Recent research has explored the use of Artificial Intelligence in news recommendation systems to improve accuracy and adaptability. AI-based systems analyze user behavior patterns, reading history, and interaction data to generate personalized news feeds. However, many fully automated systems do not allow users to directly specify their interests, which may result in recommendations that do not align with user intent. Some studies highlight the importance of incorporating user control into recommendation systems. Manual personalization methods, such as category selection, allow users to explicitly define their interests. However, systems relying only on manual input may not adapt well to changing user preferences over time.

The proposed News-Mania system differs from existing approaches by combining manual personalization with AI-based personalization. By integrating user-selected preferences with behavior-based analysis, the system achieves better relevance, adaptability, and user satisfaction compared to systems using a single recommendation approach.

III. METHODOLOGY

A. System Environment

The proposed News-Mania system is implemented as a web-based personalized news recommendation platform designed to simulate real-world online news consumption. The system aggregates news articles from multiple online sources and stores them in a centralized database before presentation. Each news article is treated as a digital entity with associated attributes such as title, category, source, publication time, and content summary. The environment supports interaction between registered users and the system through secure authentication. Users interact with the platform by selecting news categories, viewing articles, and navigating personalized feeds. These interactions form the basis for both manual and AI-based personalization.

B. Personalization Architecture

Manual Personalization : Manual personalization is achieved through explicit user input. During registration or profile updates, users select preferred news categories such as politics, technology, sports, or entertainment. These selections act as primary filters to ensure that the displayed news content aligns with user interests from the initial interaction.
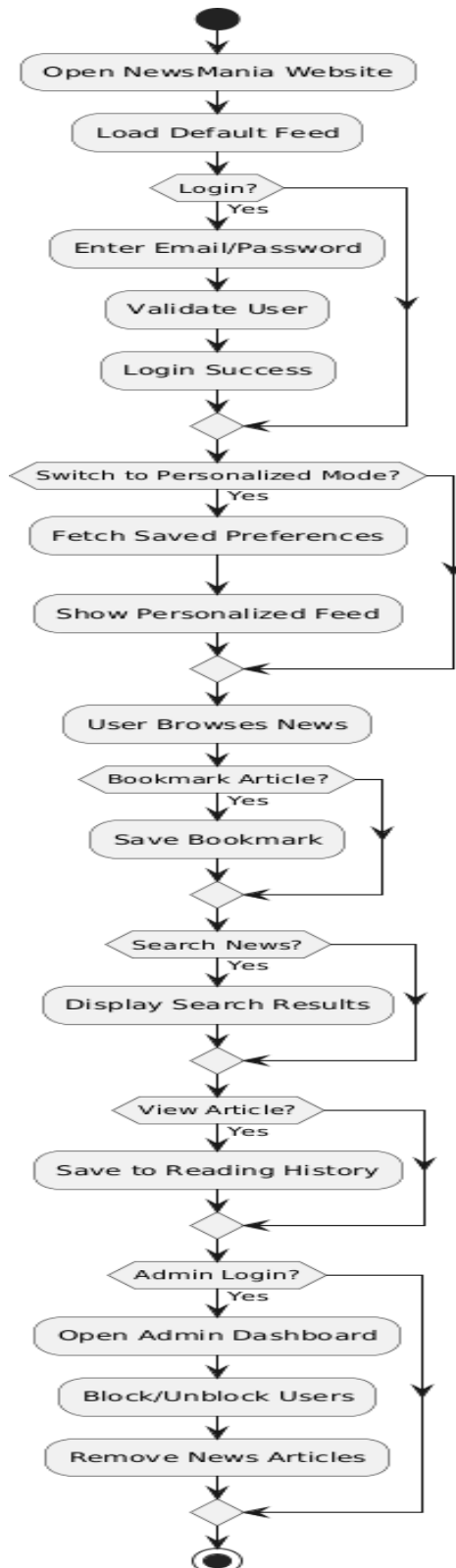

Fig. 1. Flowchart of methodology

AI Based Personalization : AI-based personalization analyzes user interaction data such as viewed articles, likes and articles shared. The system identifies interest trends based on user behavior and prioritizes news articles accordingly. This module refines recommendations over time by learning from continuous user interactions, enabling adaptive and personalized news delivery without eliminating user control.

C. News Data Collection and Storage

The system fetches news articles from online news APIs and RSS feeds at regular intervals. All fetched news data is stored in a database before being displayed to users. This storage mechanism enables efficient filtering, ranking, and retrieval of news articles. Maintaining a local database ensures consistency in recommendations and supports personalization based on both user preferences and interaction history.

D. Recommendation Process

The recommendation process follows a hybrid approach. Initially, news articles are filtered based on manually selected user categories. Subsequently, AI-based personalization ranks these filtered articles by analyzing user interaction data. The final recommendation list is generated by combining both manual preferences and AI-driven prioritization, resulting in a personalized news feed for each user.

E. Implementation Flow

1. Initialize the system environment and authenticate users through secure login
2. Allow users to register and manually select preferred news categories
3. Fetch news articles from online sources and store them in the database
4. Display news articles filtered according to user-selected categories
5. Monitor user interactions such as viewed articles, liked and shared articles
6. Apply AI-based analysis to prioritize relevant news content
7. Generate a personalized news feed by combining manual and AI-based personalization
8. Update recommendations dynamically based on ongoing user interactions
9. Record system performance data for evaluation and improvement

F. Hardware and Software Requirements
- Standard desktop or laptop system with a minimum of 8 GB RAM and stable internet connectivity
- MERN stack consisting of MongoDB for data storage, Express.js and Node.js for backend development, and React.js for frontend interface

IV. SIMULATION AND EVALUATION FRAMEWORK

This section describes the system design, evaluation methodology, and performance assessment strategy adopted for the proposed News-Mania: AI Integrated News Recommendation System. The framework evaluates the effectiveness of combining manual personalization with AI-based personalization in delivering relevant news content. The system is implemented as a web-based application using the MERN stack, with RSS feeds serving as the primary news data source. User interaction data is utilized to simulate real-world news consumption behavior and evaluate recommendation performance.

A. System Architecture and Workflow

The system architecture is designed to support continuous news aggregation, personalization, and user interaction. The major components of the system are as follows:

Web-Based Application Platform
The application provides authenticated access to registered users. Users can select preferred news categories, browse news articles, and interact with personalized feeds. The platform supports real-time updates and dynamic content rendering.

RSS and API Based News Aggregation Module

News articles are collected from multiple online sources using RSS feeds and news API's. The feeds are parsed to extract article metadata such as title, category, source, publication time, and summary. All fetched news items are stored in the database before recommendation.

Personalization and Recommendation Layer

Manual personalization filters news articles based on user-selected categories. AI-based personalization analyzes user interaction data, such as viewed articles, to rank and prioritize relevant news content. Both mechanisms operate together to generate personalized news feeds.

Database and Analytics Layer

MongoDB is used to store user profiles, category preferences, fetched news articles, and interaction logs. This data supports recommendation generation and evaluation analysis.

B. System Evaluation Setup

The evaluation framework is designed to analyze system performance under realistic news consumption scenarios. Multiple users with different interests are considered to assess personalization effectiveness.

User Configuration

Users are created with different manually selected news categories to represent diverse interests.

Data Collection Scenarios

RSS feeds from multiple news sources are continuously fetched to simulate real-time news updates. User interactions such as article views, shares and likes are recorded to evaluate AI-based personalization behavior.

C. Personalization and Recommendation Evaluation Process

The evaluation process measures how effectively the system delivers relevant news content using the hybrid personalization approach. Manual personalization ensures category-based relevance, while AI-based personalization refines article ranking based on interaction history. The generated personalized feeds are analyzed to verify consistency with user interests and behavioral patterns.

D. Results and Observations

Personalization Performance
• Manual personalization ensured immediate relevance by filtering news according to selected categories.
• AI-based personalization improved content prioritization by learning from user interaction behavior.

System Responsiveness
• RSS-based news aggregation enabled timely updates of news content.
• Personalized feeds were dynamically updated without noticeable delay.

User Experience Impact
• Users received more relevant and organized news feeds compared to generic news delivery systems.
• The hybrid personalization approach reduced irrelevant content and improved engagement.
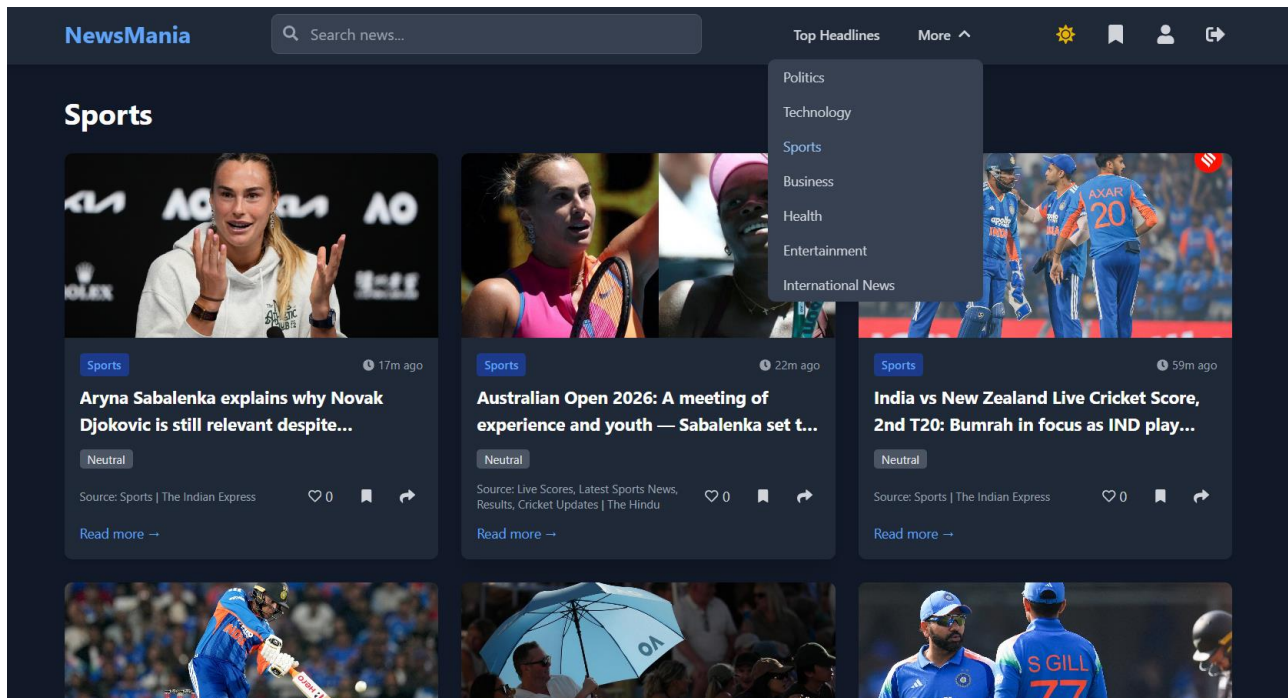
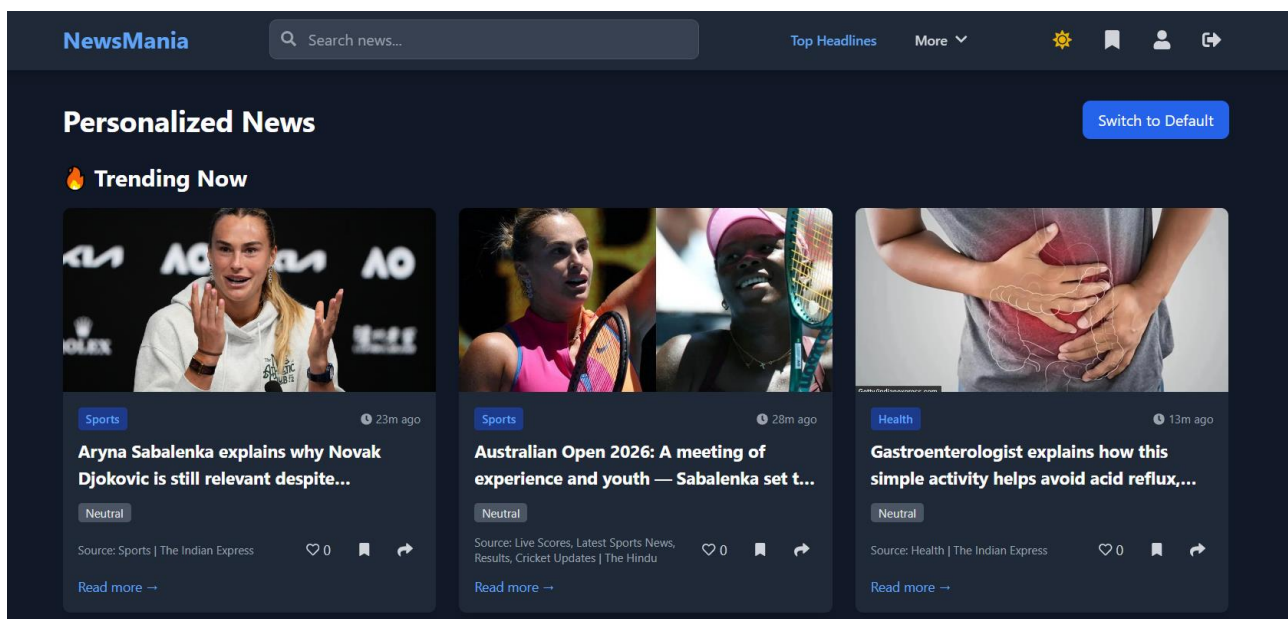Fig.2. Category wise news
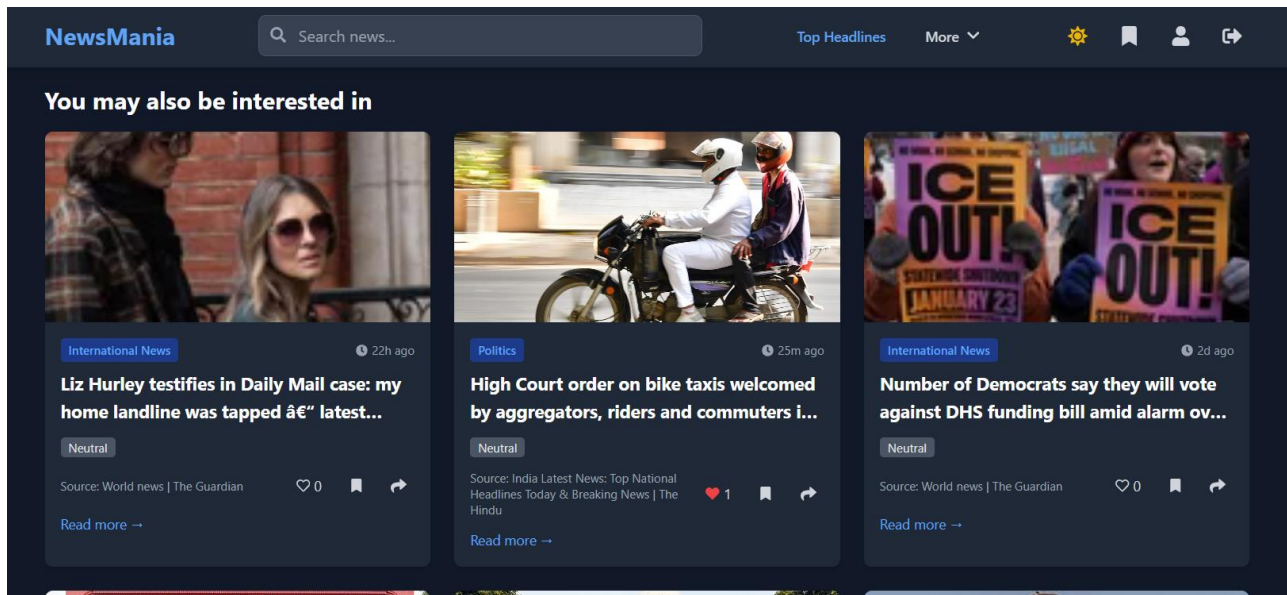

Fig.3. Manual news personalization

Fig. 4. AI Inegrated news personalization

V. RESULTS AND DISCUSSION

The results show that the use of RSS feeds and APIs together enabled reliable and continuous news aggregation from multiple sources. RSS feeds provided regularly updated structured news content, while APIs supported additional metadata retrieval and improved content consistency. Storing the fetched news data before recommendation ensured stable and repeatable evaluation of personalization performance.

Manual personalization produced immediate improvements in content relevance. Users consistently received news articles aligned with their selected categories, regardless of whether the news was obtained via RSS feeds or APIs. This demonstrated that explicit user preference selection effectively filtered irrelevant content during initial usage. AI-based personalization further enhanced the recommendation process as user interaction data increased. The system successfully prioritized news articles based on observed reading behavior, improving the ordering of recommended content over time. The AI component operated uniformly across news collected from both RSS feeds and APIs, indicating adaptability to multiple data sources. From a system performance perspective, the combined use of RSS feeds and APIs supported timely content updates without noticeable delays in feed generation. Personalized news feeds were dynamically updated as new articles were fetched and as user behavior evolved.

Overall, the results confirm that the integration of RSS feeds and APIs with hybrid personalization improves news relevance, system robustness, and user experience. The discussion highlights that combining multiple data acquisition methods with manual and AI-based personalization provides a flexible and effective solution for personalized news delivery.

VI. CONCLUSION

This paper presented News-Mania, an AI integrated news recommendation system that combines manual personalization with AI-based personalization to deliver relevant news content to users. The system utilizes both RSS feeds and news APIs to collect real-time news articles from multiple sources and stores them in a database before recommendation. This approach ensures reliable data acquisition and consistent personalization.

Manual personalization allows users to explicitly select their preferred news categories, providing immediate relevance and user control over content selection. AI-based personalization further enhances the recommendation process by analyzing user interaction data and adapting recommendations over time. The integration of these two techniques effectively reduces information overload and improves content relevance. Experimental evaluation demonstrated that the hybrid personalization approach produces more organized and meaningful news feeds compared to generic news

delivery systems. The combined use of RSS feeds and APIs supported timely updates and system robustness, while the MERN-based implementation enabled efficient data handling and user interaction.

Overall, the results confirm that integrating multiple news sources with both manual and AI-driven personalization creates a flexible, adaptive, and user-centric news recommendation system. The proposed system successfully addresses limitations of purely generic and fully automated news platforms.

VII. FUTURE WORK

The proposed News-Mania system can be further enhanced in several directions to improve personalization accuracy and user experience. Future work may focus on incorporating more advanced AI techniques to better understand evolving user interests and improve recommendation quality over time.

Multilingual news support can be introduced to provide personalized content in multiple languages, allowing the system to reach a wider audience. Additional news sources can also be integrated through extended RSS feeds and APIs to increase content diversity and coverage.

Future enhancements may include deeper analysis of user interaction patterns, such as reading duration and revisit behavior, to refine AI-based personalization. Improving scalability and performance optimization will further support a growing number of users and real-time news updates.

User feedback mechanisms can also be incorporated to allow users to directly influence recommendation accuracy. These improvements will strengthen the adaptability, efficiency, and user-centric nature of the News-Mania system.

REFERENCES

[1] X. Liu and J. Zhang, "Personalized News Recommendation Based on User Behavior Analysis," IEEE Access, vol. 10, pp. 45678–45690, 2022, doi: 10.1109/ACCESS.2022.3145678.
[2] H. Wang, Y. Chen, and L. Zhao, "Web-Based News Aggregation Systems Using Real-Time Data Streams," Proceedings of the ACM Web Conference, pp. 1123–1132, 2021, doi: 10.1145/3442381.3450098.
[3] M. Rahman and K. Hasan, "Intelligent News Filtering and Deduplication for Online Platforms," International Journal of Web Engineering and Technology, vol. 18, no. 2, pp. 145–158, 2023.
[4] P. Santos, R. Almeida, and J. Costa, "AI-Driven Summarization for Online News Platforms," IEEE Transactions on Computational Social Systems, vol. 9, no. 4, pp. 987–996, 2022, doi: 10.1109/TCSS.2022.3154321.
[5] A. Dutta and S. Roy, "Machine Learning-Based News Classification and Sentiment Detection," IEEE Access, vol. 9, pp. 65421–65433, 2021, doi: 10.1109/ACCESS.2021.3076542.
[6] R. Sharma and M. Gupta, "User-Interest Adaptive News Recommendation System Using Hybrid Filtering," International Journal of Computer Applications, vol. 176, no. 28, pp. 21–26, 2020.
[7] L. Chen and S. Wang, "Adaptive Web Content Personalization Techniques: A Review," Journal of Information and Data Management, vol. 13, no. 1, pp. 34–48, 2022.
[8] F. Iqbal and S. Ahmed, "Automated Web News Extraction and Ranking Model for Reader Engagement," Journal of Web and Information Systems, vol. 19, no. 3, pp. 201–214, 2023.
[9] K. Tan and J. Lim, "Next-Generation News Personalization Using Real-Time Behavioral Signals," IEEE Internet Computing, vol. 25, no. 6, pp. 45–53, Nov.–Dec. 2021, doi: 10.1109/MIC.2021.3098765.
[10] P. Ghosh, "Hybrid Topic Modelling for News Recommendation Platforms," International Journal of Data Science and Analytics, vol. 14, no. 2, pp. 119–129, 2022.
[11] S. Patel, "User-Centric Personalization in Web News Delivery Systems," International Journal of Computer Science Trends and Technology, vol. 9, no. 4, pp. 56–62, 2021.
[12] D. Kumar and R. Raj, "Big Data Driven Online News Ranking Algorithms," IEEE Transactions on Knowledge and Data Engineering, vol. 32, no. 11, pp. 2143–2155, Nov. 2020, doi: 10.1109/TKDE.2019.2945673.