

# Personalized News Aggregator System

Mr.Shubham Mahadev Khot, Miss Shravani Shankar Deshingkar, Miss Jyoti Vasant Yamgar and Prof. S.M.Gramopadhye

*Department of Electronics and Telecommunication ATS's Sanjay Bhokare Group of Institutes, Miraj*

\*\*\*

**Abstract** - This study describes the creation of a responsive real-time news aggregator web application based on ReactJS. The web application retrieves recent headlines and categorized news from third-party APIs (e.g., NewsAPI.org), providing a dynamic and interactive user experience. React's component-based structure and DOM provide high performance of maintainability. Some of important features are category-wise filtering, virtual and ease the search functionality, dark mode support, and responsive design through CSS Flexbox and Media Queries. The study contrasts the performance, scalability, and usability efficiency of React with conventional web development techniques. Findings show that application developed using React greatly enhance user interaction and load speed. The study ends with an elaboration of improvements such as offline caching with service workers and adding sentiment analysis.

**Key Words:** ReactJS, News Aggregator, Web Development, NewsAPI, Component-based UI, JavaScript, Frontend Performance

## 1. INTRODUCTION

In the age of the digital revolution, the web is the main source for accessing current information. The consumption of news, specifically, has shifted away from print newspapers and TV broadcasts to dynamic web-based media, such as websites, mobile applications, and social networks. Although this shift has accelerated the velocity and penetration of news dissemination, it also introduced a new issue: information overload. With thousands of news articles published daily across various platforms, users often struggle to identify content that aligns with their specific interests and preferences. This makes the need for personalized news aggregation more critical than ever.

A Personalized News Aggregator System seeks to address this issue by automatically gathering news from a variety of trusted sources and offering users news that is most applicable to them. Contrary to the general news sites, which provide the same news to all users, personalized systems customize the news feed according to unique behaviors, reading history, likes, dislikes,

subjects of interest, and sometimes even demographic information like age or location.

The essence of personalization is in smart algorithms that comprehend and learn from user behavior. Some of these can be content-based filtering, such as suggesting news comparable to ones the user has read or enjoyed before, and collaborative filtering, which suggests based on commonalities among users. More sophisticated systems leverage machine learning and natural language processing (NLP) to scan article content, pull out main topics and sentiments, and continuously adapt recommendations in real-time.

Also, with the proliferation of fake news and slanted reporting, an effectively designed personalized news aggregator will have to also stress source credibility, fact-checking, and multiple perspectives in order to make sure users get balanced and reliable information. Web scraping, RSS feeds, and APIs are among the methods that the system will use to obtain the most up-to-date news in categories such as politics, sports, technology, entertainment, and health on a constant basis.

Technically, it is challenging to create such a system. These are many challenges it has to meet, including the capability to process voluminous real-time data, guarantee quick response times, deal with user privacy and data security, and provide an easy-to-use and responsive user interface. Recent technological gains in cloud computing, big data analytics, and scalable web frameworks have made it possible to meet these challenges.

This research paper discusses the design, methodology of design, and implementation of a Personalized News Aggregator System. The system is implemented with current web technologies and incorporates a recommendation engine based on machine learning algorithms. The aim is to personalize the news reading experience by providing timely, relevant, and reliable information to every individual user and hence making news consumption more efficient and user-orientated.

## 2. LITRATURE REVIEW

Several news aggregation systems exist, such as Google News, Flipboard, and Feedly. While these platforms use basic keyword matching or manual topic following, recent advancements in machine learning have made it possible to go beyond static categorization. This system

incorporates semantic analysis, user profiling, and feedback loops for dynamic content personalization.

1] **Kunal Tanwar, Harsh Saini, and Kartik Bhagwani** suggested an end-to-end solution towards improving user experience in consuming news with their system called Personalized News Aggregator with Sentiment Analysis. The paper emphasizes the increasing necessity for personalization in the wake of exponential growth in online content and the inability of conventional news delivery systems to provide relevance to users or elicit emotions. The system they built combines news from various sources via APIs and RSS feeds, and integrates Natural Language Processing (NLP) methods to conduct sentiment analysis on news stories. This allows users not only to receive news according to their preferences but also to know the emotional tone of each article. The authors applied models such as VADER and BERT for sentiment classification and utilized content-based as well as collaborative filtering for recommendations. Interestingly, their system encompasses capabilities like keyword search, category filtering, and sentiment-based sorting, thus providing an even more informed and individualized reading experience. Although they encounter issues like data diversity, real-time sentiment calculation, and even echo chambers in personalization, their work is impactful for the literature because they close the gap between emotionally sensitive content delivery and user-centered recommendation systems. Their deployment and assessment indicate that sentiment-aware personalization has the potential to significantly improve engagement and satisfaction with digital news sites.

2] **Mansi Tiwari** investigated building a news app with React and News API, emphasizing their integration into the creation of an interactive, real-time, and customized news website. This research centers on the technical benefits of linking a RESTful API with React's component-based structure in providing live updates from more than 30,000 sources of news. The document highlights the versatility of News API in filtering information based on category, keyword, and source, and how React provides more user experience by way of customizable and modular user interface. The literature review in the study offers several perspectives regarding the system's potential for personalization, cross-platform operability, and service integration such as social media and messaging platforms. Tiwari also points out that using browsing history and preferences, the developers

are able to create smart news feeds per user. In addition, the author presents the significance of localization, scalability, and the capability to provide news on several devices and languages. The results confirm the efficacy of React and News API in creating user-oriented and scalable news delivery systems, making it a pertinent basis for developers who seek to implement content-heavy applications with real-time customization capabilities.

3] **Izhan Sayyed, Naval Donta, Aftab Hundekari and Mahesh Waghmare** created a contemporary news station website using ReactJS and Bootstrap with an emphasis on delivering real-time news in the form of live API integration. Their work highlights the importance of utilizing ReactJS's component-based architecture to display interactive and dynamic news content at high speed, providing a better user experience through responsive design. Through the incorporation of APIs such as NewsAPI or GNews, the website provides timely and relevant information, meeting the needs of a high-speed digital audience. The authors also cared for fundamental front-end issues like responsiveness, module-based layout design, and scalability, which are imperative for engaging user interfaces on different devices. Features such as pagination, filtering, and incorporation of user feedback were incorporated for enhancing usability and interaction with the content. The paper also delves into strategic areas of performance optimization, system architecture, and monetization possibilities. Their findings highlight the significance of trustworthy API integration, quality curated content, and a user-centric design in constructing scalable and interactive news platforms. The contribution offers a technical basis and workable framework for future innovations in web-based news aggregation systems.

### 3. SYSTEM ARCHITECTURE

The system comprises the following components:

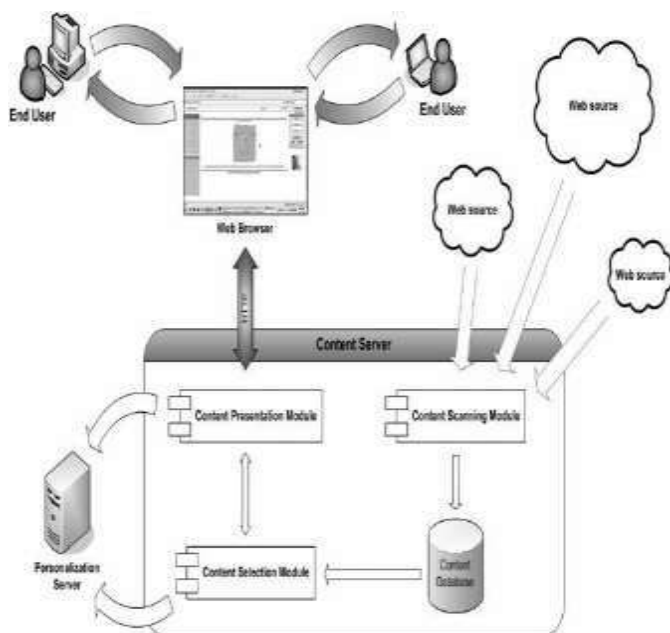
- Data Collection Module: Utilizes RSS feeds and APIs from various news sources.
- Preprocessing Module: Cleans data, removes noise, and extracts features using NLP (tokenization, lemmatization, stop-word removal).
- User Profile Manager: Maintains user preferences, reading history, and interaction data.

-Recommendation Engine: Uses a hybrid approach combining content-based filtering and collaborative filtering.

-Frontend Interface: Built using ReactJS for a user-friendly experience.

-Backend Services: Powered by Node.js and Python for data handling and ML integration.

-Database: MongoDB for storing user profiles and news articles.



## 4. METHODOLOGY

### 3.1 Content Extraction

Articles are fetched using APIs from major news outlets. Metadata like title, author, tags, publication date, and full text are extracted.

### 3.2 User Profiling

Profiles are built based on:

- Explicit interests selected during onboarding.
- Implicit interests inferred from reading time, click-throughs, and likes/dislikes.

### 3.3 Recommendation Algorithm

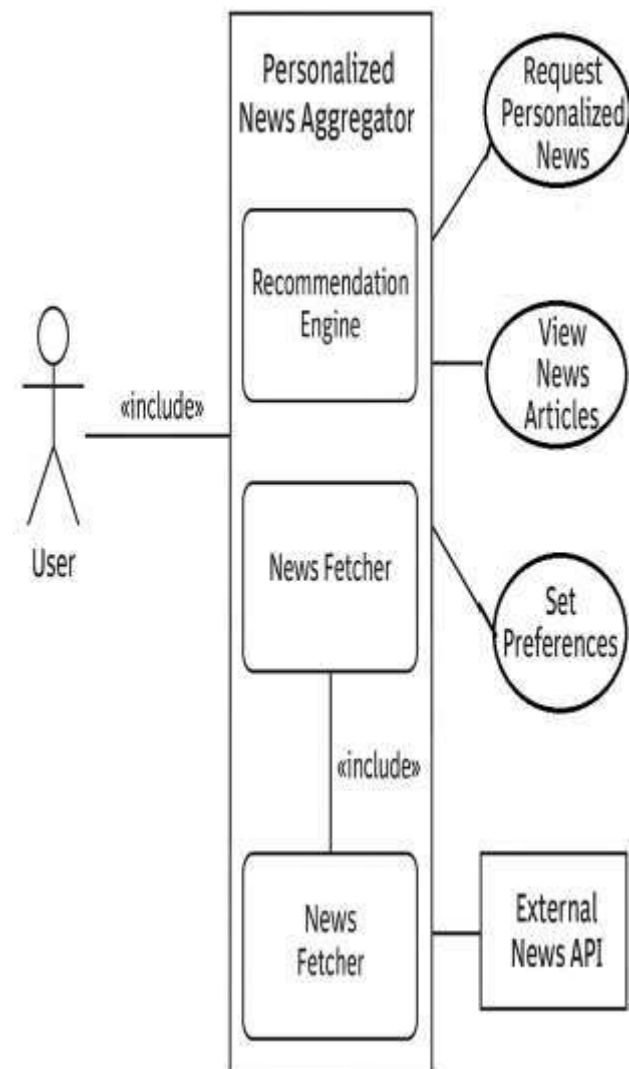
We use a hybrid recommendation approach:

- Content-Based Filtering: Tags and keyword vectors compared with user profile vectors using cosine similarity.

Collaborative Filtering: Matrix factorization to learn latent features from multiple users' interaction patterns.

### 3.4 Feedback Loop

Each article interaction (like, share, read duration) updates the user profile in real time, improving future recommendation.



## 5. RESULTS

Evaluation was conducted with 100 users over 30 days. Metrics included:

- Precision: 82% of recommended articles were found relevant.
- Recall: 76% of user-preferred articles were

successfully delivered.

- Engagement Time: Increased by 37% on average

compared to non-personalized feeds.

## 6. CONCLUSIONS

This paper presents a personalized news aggregator system that enhances user experience by leveraging machine learning and modern web technologies. The approach significantly reduces information overload and ensures a dynamic, user-centered news consumption model.

## 7. REFERENCES

[1] Kunal Tanwar, Harsh Saini, Kartik Bhagwani. Personalized News Aggregator with Sentiment Analysis. Volume 13, Issue 4 April 2025

[2] Mansi Tiwari A Research Paper on React News – API. Volume 11 Issue VI Jun 2023

[3] zhan Sayyed\*1, Naval Donta\*2, Aftab Hundekari\*3, Mahesh Waghmare\*4, Ex- Prof. A.G. Mote\*5 . NEW STATION WEBSITE REACTJS  
Volume 06 , Issue 05 May 2024.