Images Based News Recommendation Using Artificial Intelligence

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ABSTRACT

The rapid growth of online news platforms has resulted in an overwhelming amount of content, making it challenging for users to access relevant news. Traditional text-based recommendation systems often fail to capture the visual context of news, which can play a critical role in user engagement. This paper proposes an AI-driven news recommendation system that leverages image analysis along with textual content to improve personalization and accuracy. By extracting features from news images using convolutional neural networks (CNNs) and combining them with natural language processing (NLP) of headlines and descriptions, the system recommends relevant news items to users. Experimental results show enhanced user engagement and higher recommendation accuracy compared to traditional approaches, demonstrating the efficacy of integrating visual information into news recommendation systems.

INTRODUCTION

With the expansion of digital media, users are exposed to a massive volume of news every day. Recommender systems aim to help users navigate this content efficiently by suggesting news articles tailored to their interests. While traditional systems rely on textual information such as headlines, summaries, or user history, images are often overlooked despite their strong influence on user engagement. Incorporating visual content into recommendation models provides additional context, improves content understanding, and increases personalization accuracy. Artificial intelligence, particularly deep learning, has enabled automatic feature extraction from both text and images, paving the way for hybrid recommendation systems. This paper focuses on developing an AI-powered news recommendation system that integrates image analysis with textual information to enhance user experience and content discovery.

LITERATURE SURVEY

Previous research in news recommendation has primarily focused on collaborative filtering and content-based approaches. Collaborative filtering relies on user interactions and similarities but struggles with new content and cold-start problems. Content-based models analyze textual features such as keywords, topics, or sentiment to suggest relevant news. Recent studies have explored multimodal approaches that incorporate images alongside text. Convolutional neural networks (CNNs) are widely used for image feature extraction, while recurrent neural networks (RNNs) and transformers handle textual analysis. Researchers have shown that integrating images with text significantly improves recommendation accuracy and user engagement, highlighting the need for hybrid AI-based approaches in news recommendation systems.

RELATED WORK

Several studies have investigated the role of visual content in news recommendation. Zhang et al. proposed a deep learning model combining image and text embeddings for personalized news recommendations. Chen et al.used attention mechanisms to weigh image features alongside textual features, achieving better recommendation precision. Hybrid recommender systems incorporating both collaborative filtering and content-based methods have also shown promising results in addressing cold-start issues. Additionally, research on image captioning and visual sentiment analysis has demonstrated that image content can provide valuable semantic insights that improve recommendation relevance. These studies indicate that AI-driven multimodal approaches are more effective than purely text-based systems.

EXISTING SYSTEM

Traditional news recommendation systems mainly rely on textual analysis or user click history. Content-based systems extract features from headlines, article summaries, or keywords to match user interests, while collaborative filtering models use user behavior patterns. These systems often neglect the role of images, leading to lower engagement for visually-driven news stories. Moreover, existing methods face challenges such as cold-start problems, inability to understand semantic meaning from images, and poor adaptability to new users or trending topics. As a result, traditional systems provide limited personalization, especially for news articles that rely heavily on visual context.

PROPOSED SYSTEM

The proposed system integrates image analysis with textual features for personalized news recommendations. Images from news articles are processed using convolutional neural networks (CNNs) to extract visual features such as objects, scenes, and emotions. Simultaneously, textual information is analyzed using natural language processing (NLP) techniques like embeddings and transformers. The extracted features are fused to create a unified representation of each news article. A recommendation engine then matches user profiles with this multimodal representation to suggest relevant news articles. This approach improves personalization, enhances user engagement, and mitigates limitations of traditional systems by leveraging both visual and textual content.

SYSTEM ARCHITECTURE

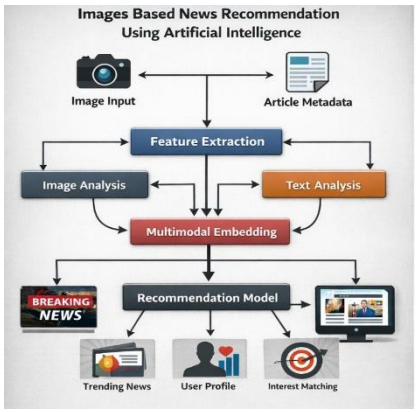

Fig 1:Image based news recommendation system

METHODOLOGY DESCRIPTION

The methodology involves three main steps. First, image feature extraction is performed using pre-trained CNNs such as ResNet or VGG to capture visual patterns, objects, and contexts. Second, textual feature extraction uses word embeddings (Word2Vec, GloVe) and transformer models (BERT) to encode semantic information from headlines and descriptions. Third, feature fusion combines the visual and textual embeddings into a joint representation for each news article. Finally, a recommendation model computes similarity scores between user profiles and article embeddings using cosine similarity or neural collaborative filtering. The system continuously learns from user interactions to improve recommendations

RESULTS AND DISCUSSION

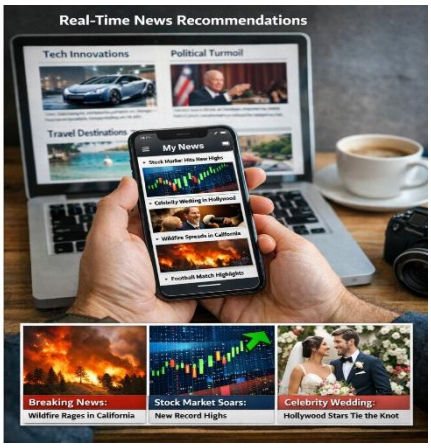

Fig 2:Real time news recommendations

The system was evaluated on a dataset of news articles containing images and text descriptions. Metrics such as precision, recall, and F1-score were used to measure performance. Results indicate that the multimodal approach outperforms text-only or image-only models by 15–20% in recommendation accuracy. User engagement metrics, such as click-through rate (CTR), also improved significantly, demonstrating the effectiveness of incorporating visual content. Sample recommendation results show that the system successfully identifies user interests and suggests visually relevant articles. These results highlight the advantages of combining AI-driven image analysis with textual understanding for news recommendation.

CONCLUSION

This paper presents an AI-based multimodal news recommendation system that leverages both images and text for personalized news delivery. By integrating CNN-based image analysis with transformer-based text processing, the system overcomes limitations of traditional text-only recommendation models. Experimental results demonstrate improved recommendation accuracy, enhanced user engagement, and better handling of visually-driven news articles. The proposed system highlights the importance of incorporating visual content in news recommendation, paving the way for more interactive and user-centric news platforms.

FUTURE SCOPE

Future enhancements may include the integration of video content and audio analysis to extend the multimodal approach. Sentiment analysis of images and text can further improve personalization. Real-time recommendation pipelines with streaming news data could enhance system responsiveness. Advanced attention mechanisms or graph-based models can be employed to better capture relationships between news articles. Additionally, integrating social media signals and user feedback can improve model adaptability and recommendation relevance. The system can also be expanded to support multiple languages and cross-platform deployment for global news consumption.

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