I. INTRODUCTION

The development of news on online services has provided users with many choices. One popular news agency service can provide a much greater volume or amount of communication than a user can digest. Information overflow resulting from the ability of the user to discover news is hindered when there are several news items because more recent news has been uploaded [1],[2]. The relationship between the time users require to search and read news recommended by the system is inversely proportional. Consequently, individuals encounter difficulty locating desired news content within a specific timeframe. Therefore, it is imperative to develop a recommender system that can assist readers in discovering and choosing news articles. A recommender system is a purpose-built system that helps users in achieving their objectives by providing suggestions for information that may prove beneficial. These suggestions may include reading materials or product recommenders [3], which can aid users in making more informed decisions and achieving their desired outcomes. The recommender system employs various algorithms to filter data and suggest the most pertinent information [4].

By analysing user interest preferences, recommender systems have become extremely useful for various domains, including movies [5], restaurants [6], and tourism [7]. The recommender system algorithm aims to provide recommenders based on user preferences and to assist users in locating the items they desire. Consequently, many businesses implement recommender systems to enhance the viewing experience, health-based adjustments, and decision-making efficiency [8].

An example of implementing a recommender system in applications such as the Netflix movie streaming service that analyses user data, preferences, ratings given by other users and user viewing history. Netflix can recommend content according to user interests and preferences [9]. This can help find exciting movies, increasing the fun and satisfaction of watching. Similarly, the news recommender system suggests articles to readers so that readers may locate information using data gathered from reading histories or based on the similarity of reading histories between one reader and another. This allows readers to access information more quickly. Readers may obtain information more quickly and easily thanks to a recommender system, which also helps them save time.

Asghar et al. [10] proposed using collaborative filtering with content-based filtering techniques for personalised news recommender, a customised news recommender framework called Hybrid Customized News Recommender (HYPNER), which includes both collaborative filtering and content-based filtering approaches. The name of this framework comes from its hybrid nature. The framework improves the accuracy of news recommenders by overcoming the difficulties of scalability caused by massive news corpora, enriching the user's profile, reflecting the precise attributes and characteristics

of news items, and proposing a vast collection of news items. Experiments for validation indicated that HYPNER obtained an 81.56% increase in F1-score and a 5.33% improvement in diversity compared to an existing recommender system.

Combining cosine similarity and Autoencoder (DAE) in the proposed by A. Manikantan [11] on Hybrid Recommender System for Video Games offers a powerful approach to enhance the recommender process. The system measures the similarity between game characteristics by utilising cosine similarity, allowing for effective content-based filtering. On the other hand, the Autoencoder (DAE) plays a crucial role in capturing implicit data representations of users' purchasing habits, enabling personalised recommender through collaborative filtering. By integrating these two techniques, the system leverages the strengths of both approaches, resulting in a more accurate and comprehensive game recommender for users.

Recommender system that utilises the bidirectional-encoder-representations-from-transformers (BERT) technique to model user behaviour sequences. This method was proposed by C. Channarong et al. [12]. by considering the target user's historical data, a content-based filtering (CBF) approach. The HybridBERT4Rec model leverages BERT for content-based filtering (CBF) and collaborative filtering (CF) to predict rating scores. In the context of recommender systems, Collaborative Filtering (CF) involves identifying users who share similar preferences with the target user. In contrast, Content-Based Filtering (CBF) entails extracting features from the target user's interactions with purchased items. The system utilises BERT with the ratings of other users who evaluated the target item as a secondary input to extract the attributes of the target item, thereby producing a profile of the target item. The system utilises both profiles to predict a rating score upon acquiring them. The model has undergone experimentation with three distinct datasets, and the findings indicate that it exhibits greater accuracy compared to alternative methodologies.

Based on the previous work, this study developed a recommender system that combines collaborative and content-based filtering techniques to offer precise and varied news recommender. Content-based filtering involves recommending articles by considering their intrinsic characteristics, whereas collaborative filtering involves examining user actions and preferences. The system integrates the suggestions derived from both methodologies by employing a rating system that assigns weights to each. Evaluation metrics, such as recall@5 and recall@10, are utilised to evaluate the efficacy of a plan by quantifying the ratio of recommended pertinent news articles. The paper is organised into distinct sections, each serving a specific purpose. The initial section provides an overview of the research topic, while the subsequent section delves into the relevant literature. The third section outlines the system architecture, and the fourth section presents the findings of the system test evaluation. Finally, the fifth section offers concluding remarks.