

## 1. INTRODUCTION

The development of information causes information overload, where news portals publish massive amounts of news every day [1]. Information overload causes the relevance of news time to end quickly and then it is replaced with more recent news [1]. This is inversely proportional to readers who need more time to find and read the news they are interested in [1]. Therefore we need a recommendation system that can help readers to find and choose news. A recommendation system is a system designed to assist users by suggesting information that may be useful to achieve user goals, such as suggesting reading articles or choosing certain products so that they are more effective in determining the desired product. The recommendation system filters the data using different algorithms and recommends the most relevant data [2].

An example of an application that implements a recommendation system in its application service is Spotify, in this application a recommendation algorithm is used to personalize songs that each user might like. In addition, there are online commercial websites such as YouTube that recommend viewing to users based on the user's past behavior history. When there are new videos available on YouTube, those videos will be compared to the user's interests based on the user's behavioral history. If the videos is of interest to the user, the system will recommend the videos to the user [2].

The recommendation system acquires user preferences, and uses them to create several types of user models. User preferences can be analyzed through the availability of user data, information about users, and their environment [3]. Feedback provided by users can be divided into two types, namely implicit feedback and explicit feedback. Implicit feedback for example from the user's transaction history or monitoring what items the user has viewed. While explicit feedback, for example by asking users to rate an item, or asking questions at the beginning of accessing the application. Likewise with a news recommendation system that recommends news to readers so that readers can find news quickly and avoid information overload. New news and topics appear and disappear quickly, while old news is no longer interesting. Recommendation systems usually recommend news to readers based on the most popular stories obtained from ratings given by other readers, or based on the similarity of news history between one reader and another. With a recommendation system, it makes it easy for readers to access information and saves time.

The first research is a laptop recommendation system using collaborative filtering and content-based filtering by Wijaya et al. (2018) which can provide laptop recommendations based on interests and needs [4]. Collaborative filtering method in this research is done by utilizing the opinions of other buyers on an item to predict items that may be liked by certain buyers.

Meanwhile, content-based filtering utilizes item attributes and TF-IDF to provide recommendations. In this study, the measurement of similarity between one item and another uses cosine similarity based on the rating given by the user. The content-based method has a faster execution time than the collaborative filtering and mixed hybrid methods.

The second research is an exclusive pen product recommendation system using the collaborative filtering method by Putri et al. (2020). In implementing the method, the author uses TF-IDF to weight the content and customer attributes. The recommendation system generates recommendations that have similarities between content attributes and attributes owned by customers. The recommendation system has an accuracy of 96.5% which can be said to be in accordance with customer criteria [5].

Then the third research is an online news recommendation system using TF-IDF and cosine similarity by Indriani et al. (2019). This study aims to help readers who have difficulty choosing news on the Banjarmasin Radar news portal. The TF-IDF method is used to determine the number of words that appear in a document and determine the occurrence of words in the entire document. Meanwhile, cosine similarity is used to calculate the similarity value between two news stories. The news recommendation system in this study resulted in a precision value of 76% of all news [6].

The fourth research is the sentence similarity test in the title of the Deli Husada Health Institute student's final project using the cosine similarity method and TF-IDF weighting by Mawanta et al. (2021) [7]. The results of the validation in this study found that 43% of the final project titles were said to not meet and 53% were said to be fulfilled.

The fifth study is an Indian food recipe recommendation system by Chippa et al. (2022) using TF-IDF which is proposed on a mobile application to make it easier for users to find recipes using available ingredients [8]. This recommendation system is content based as it recommends recipes to people based on ingredients. TF-IDF is used to extract features and cosine similarity is used to measure the similarity between the ingredients owned by the user and the ingredients in the recipe that the system has. Based on the studies previously mentioned, we utilized TF-IDF and cosine similarity algorithm to help readers choose news stories they might be interested in. Therefore, this research is expected to be able to overcome information overload and minimize the time used by readers to select news. Our contribution in this research is that we first conduct a review of the research literature to design a recommendation system, analyze and design the system, search for datasets, then start implementing the recommendation system. after implementation, the system is tested and the results of the implementation are evaluated based on the availability of data in the dataset.