I. Introduction

In the current digital era, the fashion industry is experiencing rapid development with increasingly savvy consumers and increasing demand for personalized and relevant shopping experiences. Fashion trends are dynamic and can change according to the latest trends, which are influenced by various factors such as culture, seasons, and certain social events. One of the technological developments in the fashion industry is the existence of a recommendation system that can help consumers find fashion products that suit their preferences and popular trends.

There are various paradigms in recommendation systems. One is Collaborative Filtering, which utilizes information from multiple users to make personalized and relevant recommendations. In the fashion sector, each individual's preferences and lifestyle are different, so the Collaborative Filtering approach allows the system to provide recommendations according to user preferences based on their behavior toward similar fashion products.

Taking the time factor into recommendation system is a step to increase the relevance of recommendations. The influence of time, such as seasons, has quite an influence on fashion products, such as clothing collections in summer are different from clothing collections in winter. In the fashion sector, by calculate time factors such as seasonal changes, the system can provide recommendations that are more relevant and appropriate to current circumstances.

Minghao Yin et al. [1] conducted research on the point of Interest (POI) recommendations that consider time using the Collaborative Filtering method combined with the fuzzy clustering algorithm. The study was carried out by comparing two approaches, such as UTE and CTF, and resulted in the Collaborative Filtering fuzzy clustering method being more effective in providing recommendations.

Zhijun Zhang et al. [2] developed a recommendation system algorithm using Collaborative Filtering, which integrates time factors and ranking predictions on the Netflix, MovieLens, and Epinion datasets. The algorithm developed is TPMF-CF, which is a combination of probability matrix factorization with user-based Collaborative Filtering. This research compares the TPMF-CF algorithm with other algorithms such as PMF, MPMF, User-CF, and TLCA. It produces the TPMF-CF algorithm, which is superior in predicting rankings, especially for middle rankings, and calculate the time factor.

The development of Collaborative Filtering, which calculate the time factor, has also been carried out by Weijin Jiang et al. [3]. This research uses the Collaborative Filtering method, which is enhanced by introducing a fuzzy matrix using the MovieLens dataset. The research results show that this model has a lower Mean Absolute Error (MAE) and Root Mean Square Error (RMSE) compared to other methods for a certain number of nearest neighbors.

Zhijing Tang et al. [4] developed a recommendation algorithm using Collaborative Filtering, consider user confidence and time context. The algorithm developed uses a similarity calculation method that considers user beliefs and time context. Testing was carried out using the MovieLens dataset, which has 100,000 film ratings from 943 users for 1,682 films. Each user provides ratings on at least 20 films. The dataset used has a sparsity level of 92.1139%. The results of this research show that the proposed algorithm is effective in dealing with sparsity and is able to provide more personalized and relevant recommendations.

Weiguo Zhang et al. [5] developed Collaborative Filtering by calculate changes in user interests over time and user similarity to increase recommendation accuracy. The dataset used is MovieLens, where data is assessed using a scale of 0 to 5 points. The data is split into training data and test data with a ratio of 80% and 20%. The research results show that the approach developed in this research can increase the accuracy of recommendations in a Collaborative Filtering recommendation system.

Until now, a number of studies have developed a collaborative filtering approach that considers the time factor to increase the accuracy and relevance of recommendations. However, this

approach still has some drawbacks. The use of collaborative filtering, which calculate time, tends to be limited to specific domains such as e-commerce, and its application in fashion products has yet to be explored in depth. The fashion industry is heavily influenced by time such as seasonal trends, fashion cycles, and dynamically changing consumer preferences. Fashion products have characteristics that follow seasonal trend patterns where certain clothes are only relevant at certain times. For example, warm clothes are suitable for use in winter and less comfortable when used in summer. The lack of Collaborative Filtering applications that consider time creates obstacles such as the inability of the recommendation system to provide clothing options that are by the current season and current trends which can cause user dissatisfaction. For example, users who are looking for clothes for winter may be recommended summer clothes where winter clothes are generally warm clothes with thick and long materials while summer clothes tend to be thin and have shorter fabric cuts. This is because the recommendation system does not consider time in its recommendation process. Therefore, the author proposes a recommender system using a Time-Based Collaborative Filtering approach for fashion products. This system will calculate time and seasonal factors. By calculate time and seasonal factors in the fashion product recommendation process, it is expected that the proposed system can provide more relevant and up-to-date fashion recommendations that are tailored to seasonal patterns to users.