

ABSTRACT

The stock market is highly dynamic, with stock prices frequently changing due to various economic factors, investor sentiment, and global events, resulting in user preferences also changing along with stock market conditions. Therefore, the stock market requires a recommendation system that can adapt to user preferences. Conventional recommendation systems have limitations in developing systems that can adapt to user preferences, this is due to the lack of integration of time-sensitive data. This study proposes the development of a stock recommendation system that can adapt to user preferences in real-time through the use of the Adaptive Collaborative Filtering method combined with the Exponential Time Decay function. The system was tested using three Collaborative Filtering methods, namely User-Based CF, SVD, and SVD++, with a dataset of 40 stocks from four sectors and 50 synthetic users. Evaluation using precision, recall, F1-score, NDCG, and MAP was carried out in scenarios without time decay, with a baseline time decay (0.1), and with the optimal decay value for each method (0.01 for User-Based CF and SVD, and 0.15 for SVD++). The test results show that Exponential Time Decay significantly improves accuracy on User-Based CF (precision +250%) and moderately on SVD (precision +43.33%), while SVD++ experiences a performance decrease due to redundancy with the built-in temporal mechanism. The use of optimal decay results in improved performance compared to the baseline on User-Based CF and SVD, but does not provide significant improvements on SVD++. This study proves that Exponential Time Decay is effective for recommendation methods that do not have a built-in temporal mechanism, with the decay value adjusted to achieve optimal performance.

Keywords: Adaptive Collaborative Filtering, Exponential time decay, Stock, Real-time, Recommender System