

# Abstract

Skincare has become a crucial aspect of today's era. Choosing the right skincare products is crucial for maintaining skin health. However, mistakes in selecting skincare products still occur frequently due to a lack of understanding of the user's skin type and the skin issues they are experiencing. Although much previous research proposed skincare recommender systems, they have not fully considered the temporal aspect, meaning how a user's skin changes over time, and personal user information. To address these issues, this study proposes the use of Neural Collaborative Filtering (NCF) as an approach to develop a more dynamic and user-centric skincare recommender system. Despite the growing importance of skincare, existing recommender systems often fail to account for the dynamic nature of skin and user-specific details. Our study aims to fill this gap by proposing a more personalized and adaptive skincare recommender system utilizing NCF. NCF combines deep neural network architecture with collaborative filtering, enabling more accurate and personalized recommendations by considering both historical user preferences and the evolving nature of individual skin, including external factors like weather or stress levels. This NCF-based system has the potential to revolutionize skincare routines by recommending products that adapt to users' changing needs. We have implemented the NCF model to generate skincare recommendations. The validation results demonstrate that our model significantly improves recommendation performance, achieving a Mean Absolute Error (MAE) of 0.4094, compared to the SVD method tested on the same dataset, which had an MAE of 2.6639.