

Analysis of Recommendation System Models

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Abstract

In my thesis, I study recommendation system models. Recommendation systems are software systems that aim to recommend certain items to users, based on their previous likes, dislikes, interactions, textual or numerical ratings, etc. Nowadays it is very important for online media and commercial sites to retain their customers, and they can easily do this by offering them more and more personalized interesting content.

The thesis includes the theoretical description and implementation of the similarity-based collaborative filtering model, the content-based recommendation model, the TopPopular model, the matrix factorization model and some attention mechanism based neural network models for solving an explicit rating prediction task.

Matrix factorization is a relatively simple method, but in practice it often achieves better results than other models. Based on this, my task was to investigate whether incorporating attention mechanism into the matrix factorization model can achieve a better performance.

The models were evaluated using Root Mean Squared Error (RMSE) values to measure their prediction accuracy. The results indicated that the 3att_res_dr model, featuring three stacked attention layers with residual connections and dropout, delivered the best performance, surpassing the original matrix factorization model. This improvement demonstrates the effectiveness of incorporating attention mechanism in recommendation systems, fulfilling the thesis's objective.