ABSTRACT

Advances in technology have made it easier to distribute information, but have also created challenges in effectively managing and processing this information. Recommender systems are designed to help users find relevant information amidst a wealth of information by providing a recommendation. The recommender systems developed generally focus on individual recommendations, but in real conditions, recommendations for a group are often needed, for example, when we want to listen to music with friends, or we plan a vacation with family. One of the problems in group recommendation systems is the data sparsity problem, where a large number of items in the dataset are never rated by users. This sparsity is very common in recommendation datasets, such as the MovieLens and Netflix datasets, which have very high sparsity levels, often reaching over 90%. Many previous studies have used the collaborative filtering paradigm with matrix factorization to build group recommender systems. Matrix factorization is proven to be able to solve the sparsity problem, however, the matrix factorization does not completely solve this problem, especially if the data is too sparse. Therefore, we propose an approach by utilizing a sparse autoencoder to overcome this sparsity issue. Sparse autoencoder, as a deep learning technique, has the advantage of learning from more complex latent representations and handling data sparsity. We built a group recommender system with three different group sizes and aggregation approaches. The test is conducted by comparing the aggregated rating prediction results with the actual rating that has also been aggregated using the same aggregation method, then measuring the error using MAE and RMSE. The test results show that the sparse autoencoder overall outperforms matrix factorization with an average decrease in MAE and RMSE of more than 30% over all group sizes and aggregation methods.

Keywords: group recommender system, collaborative filtering, data sparsity, sparse autoencoder