JURNAL MEDIA INFORMATIKA BUDIDARMA
Volume 7, Nomor X, Bulan 2023, Page 999-999
ISSN 2614-5278 (media cetak), ISSN 2548-8368 (media online)
Available Online at https://ejurnal.stmik-budidarma.ac.id/index.php/mib
DOI 10.30865/mib.v5i1.2293

One reason why U-Autorec can outperform SVD is due to its ability to capture non-linear relationships in the data. U-Autorec is a deep learning-based method that uses a neural network to model the underlying relationships in the data. This allows it to learn complex and non-linear patterns in the data that traditional methods like SVD might miss.

Additionally, U-Autorec can also handle large amounts of sparse data more effectively than SVD. This is because the neural network in U-Autorec can learn to fill in the missing values in the data through the use of the autoencoder architecture. This makes it more suitable for recommendation systems where there is a lot of missing data or where the data is highly sparse.

In comparison, SVD is a linear method that relies on matrix factorization to model the relationships in the data. It works best when the data is dense and the relationships are linear. When dealing with sparse data or non-linear relationships, SVD can struggle to provide accurate recommendations.

In conclusion, while both U-Autorec and SVD have their strengths and weaknesses, U-Autorec tends to perform better in recommendation systems due to its ability to handle non-linear relationships and sparse data effectively.

4. CONCLUSION

This research aims to develop a music recommender system using the Collaborative Filtering (CF) paradigm with the autoencoder method, specifically U-AutoRec using music data containing implicit feedback, i.e., the frequency of music listening. We want to try to see how U-Autorec performs with such data because in its initial creation U-Autorec used explicit feedback. Then, the performance of the system is compared with the baseline matrix factorization (SVD) using the RMSE testing metric. Empirically, U-Autorec performed better than SVD with an RMSE of 1.408, which is about 0.7 less than SVD's 2.165. From this experiment, we notice that autoencoder can learn the hidden representation better than SVD in the music domain, especially on the MSD dataset. The difference of this dataset compared to Autorec's research dataset is in the difference of rating range and rating distribution. Due to time constraints, the baseline used only includes one matrix factorization method i.e., SVD. Future research can expand the baseline using other collaborative filtering methods and implement I-Autorec.

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Submitted: **dd/mm/yyyy**; Accepted: **dd/mm/yyyy**; Published: **dd/mm/yyyy**

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Available Online at https://ejurnal.stmik-budidarma.ac.id/index.php/mib
DOI 10.30865/mib.v5i1.2293

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Submitted: **dd/mm/yyyy**; Accepted: **dd/mm/yyyy**; Published: **dd/mm/yyyy**