Model performance report (complete dataset)

The Self-Attention Sequential Recommendation model (SASRec) (Kang and McAuley, 2018) was run on a specially preprocessed dataset (Garcia Ling *et al.*, 2022), using the parameters listed in Table 1..

Table < 1 > Default parameters for SASRec model

Parameter	**Value**	**Comments**
batch_size	128	Batch size
lr	0.0001	Learning rate
maxlen	50	Maximum sequence length
hidden_units	50	Embedding size
num_blocks	2	Number of transformer layers
num_epochs	300. 500, 1000	Number of epochs
num_heads	1	Number of attention heads
dropout_rate	0.2	Dropout rate
l2_emb	0.0	Regularization parameter

Our experiments with a complete dataset demonstrate that training the model on more data significantly improves its accuracy. However, this also substantially increases both the training time and the computational power required. The evaluation results for the model (Table 2) indicate that the highest NDCG@10 and HR scores were achieved with an embedding size of 100 and number of epochs of 1000 (Figure 1). To further explore performance, we plan to conduct an additional experiment using an embedding size of 50 while increasing the number of training epochs to either 500 or 1000. Plots of experiments with embedding sizes of 10 and 50 are provided in Appendix 1.

Table < 2 > Performance results of model experiments on a complete dataset

emb_size	**learning rate**	**# of epochs**	**test_ndcg@10**	**test_hr@10**
10	0.0001	500	0.5548	0.7997
50	0.0001	300	0.7176	0.8909
100	0.0001	1000	**0.7313**	**0.9055**

Tuning various hyperparameters, such as batch size, learning rate, dropout rate, and regularization parameter, along with modifications to the model architecture, such as adding

self-attention layers or attention heads, may further enhance the model's accuracy. These adjustments represent key directions for future experiments.

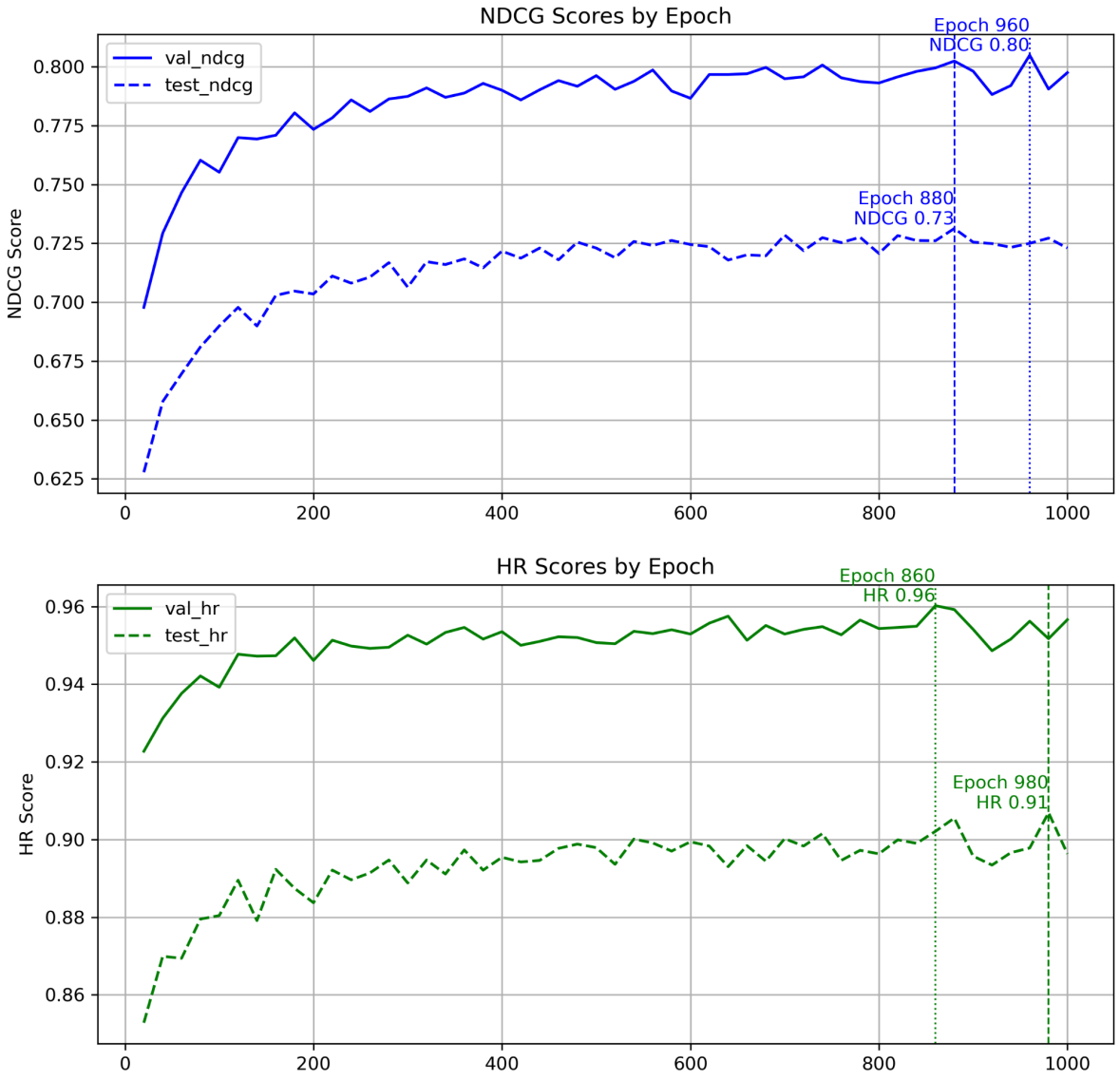

Fig < 1 > Experiment #1. embedding size=100; lr=0.0001; epochs=1000

References

Garcia Ling, C., HMGroup, E., Rim, F., inversion, Ferrando, J., Maggie, neuraloverflow, and xlsrin (2022) *H&M Personalized Fashion Recommendations* [online]. Available from: https://www.kaggle.com/competitions/h-and-m-personalized-fashion-recommendations.

Kang, W.-C. and McAuley, J. (2018) *Self-Attentive Sequential Recommendation*. In: *2018 IEEE International Conference on Data Mining (ICDM)* [online]2018 IEEE International Conference on Data Mining (ICDM). Singapore: IEEE, pp. 197–206. Available from: https://ieeexplore.ieee.org/document/8594844/ [Accessed 26 December 2024].

Appendix 1

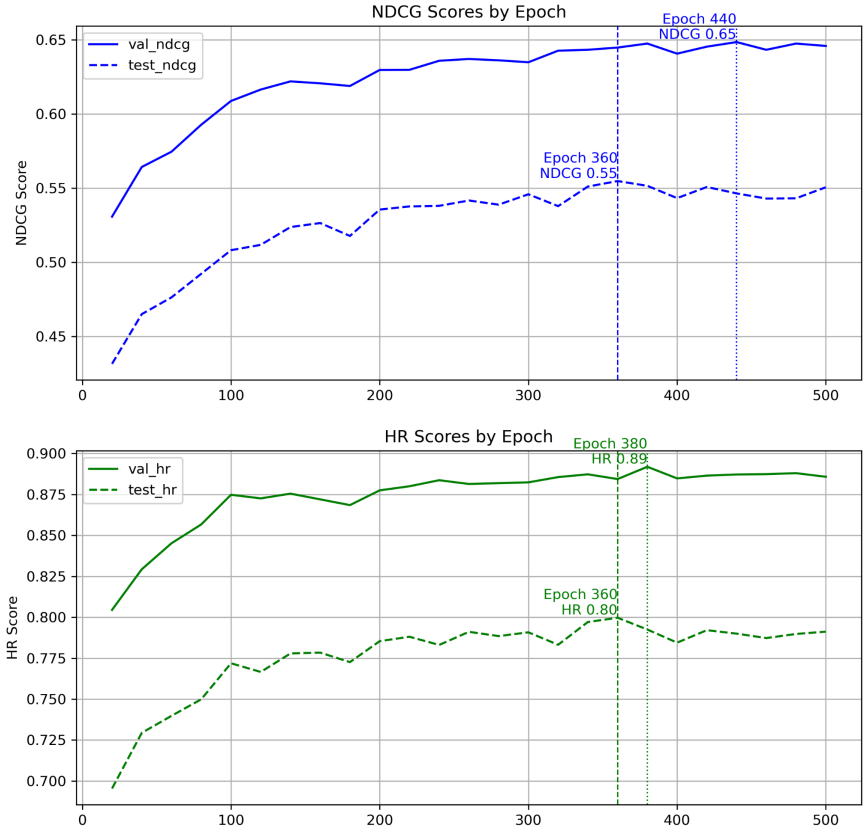

Fig < 1 > Experiment #2. embedding size=10; lr=0.001; epochs=500

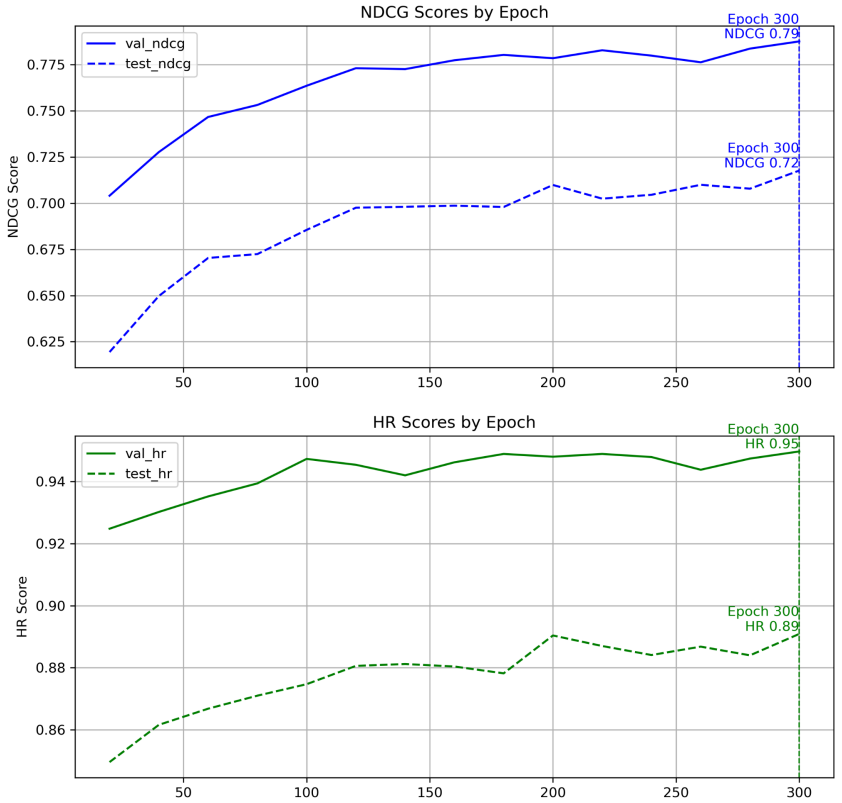

Fig < 2 > Experiment #3. embedding size=50; lr=0.001; epochs=300