The Effect of Feedback Granularity on Recommender Systems Performance

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Motivation

- rating schemes' influence on recommendation
- experiments with scales of different granularity
- effect of scale on willingness to provide feedback
- simpler rating scheme $\implies$ higher chance of feedback reception

Experimental setup

Two datsets LibraryThing and Movielens25M, 5-fold cross-validation.

$$norm(r_{u,i}) = (r_{u,i} - s_{min})/(s_{max} - s_{min})$$
$$\bar{r}_{u,i} = round(norm(r_{u,i}) * (\bar{s}_{max} - \bar{s}_{min}) + \bar{s}_{min}) \tag{1}$$

Where s_{max} and s_{min} are maximal and minimal values for the original rating scale and $\bar{s}_{max}$ and $\bar{s}_{min}$ are maximal and minimal values for the new rating scale.

Random reduction of train data size (100%, 95%, 90%, 80%, 70% and 50% of its original size) to facilitate lower willingness of users to provide feedback.

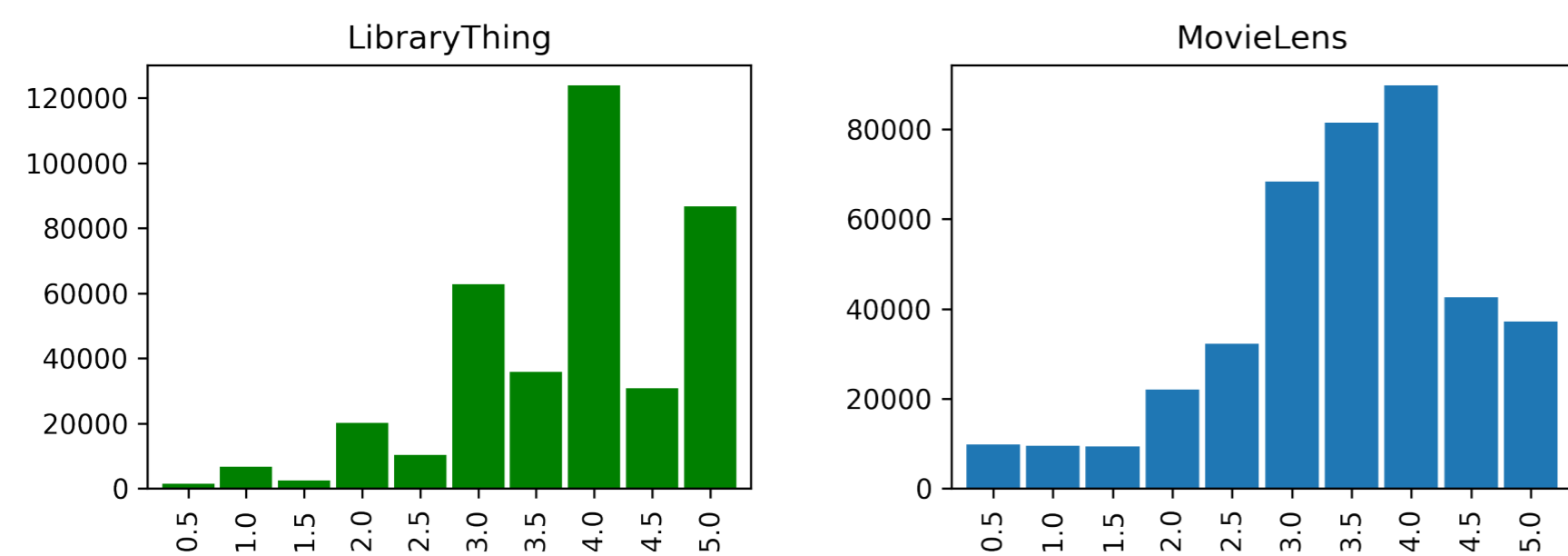## Experiment with reduction of granularity and volume of dataset
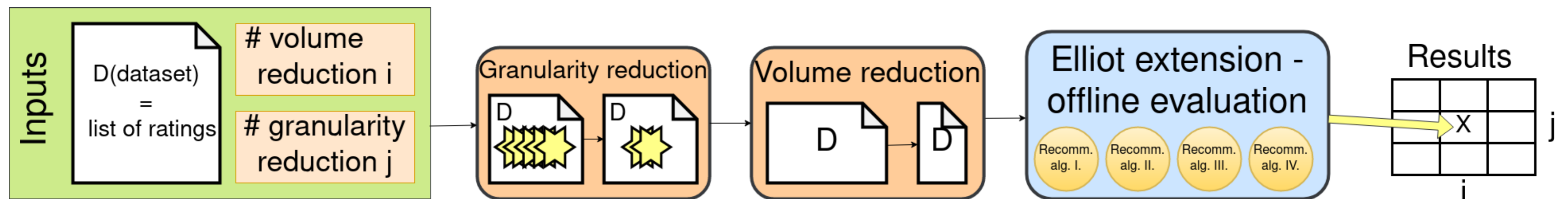
Algorithms and metrics

- UserKNN, ItemKNN, ALS, SVD++
- nDCG, Hit Rate (HR), Average percentage of long-tail items (APLT), Items Coverage (IC)

Non-uniform distribution of datasets
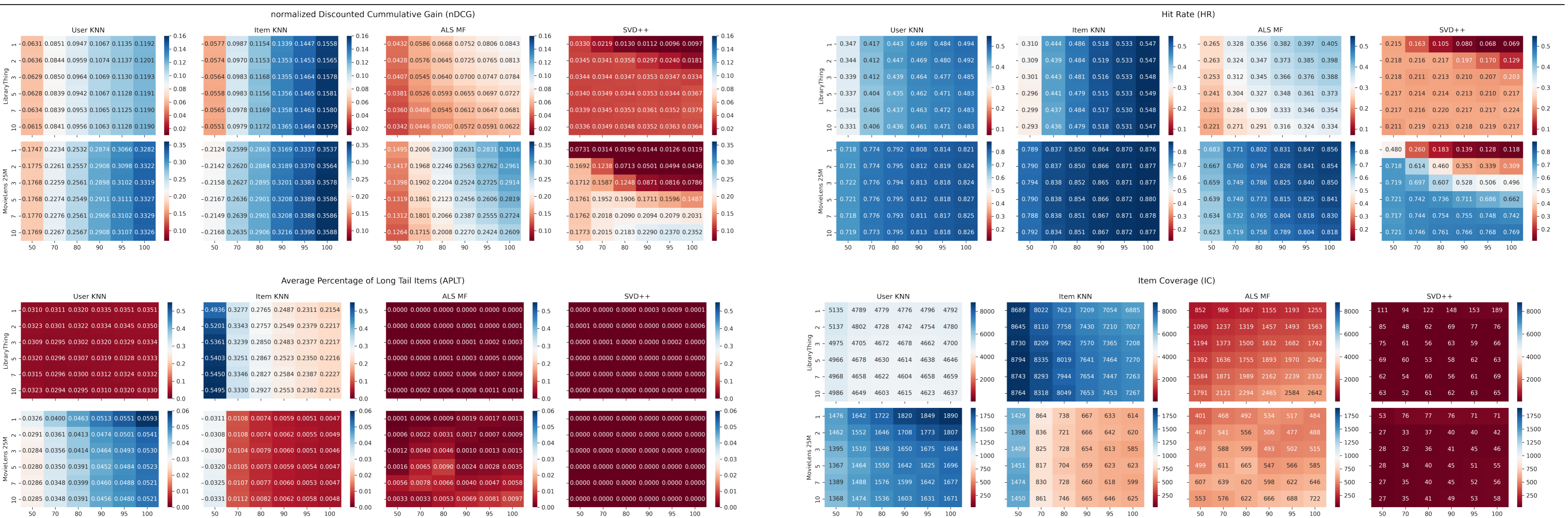

Discussion of results

The expectation was that higher feedback granularity will lead to increased values of metrics (namely nDCG). This was only partially confirmed in the evaluation. Why? We have two hypotheses.

- Both datasets have non uniform distribution of ratings with significant peaks
- Utilised RS were capable of distinguishing between *sort-of-preferred* and *completely-irrelevant* items but not between *sort-of-preferred* and *highly-preferred* ones

Results

Conclusion

Although some algorithms may slightly benefit from the finer-grained feedback, the performance increase is rather small in absolute values and it is often surpassed by even minimal decrease in feedback quantity.

Acknowledgment