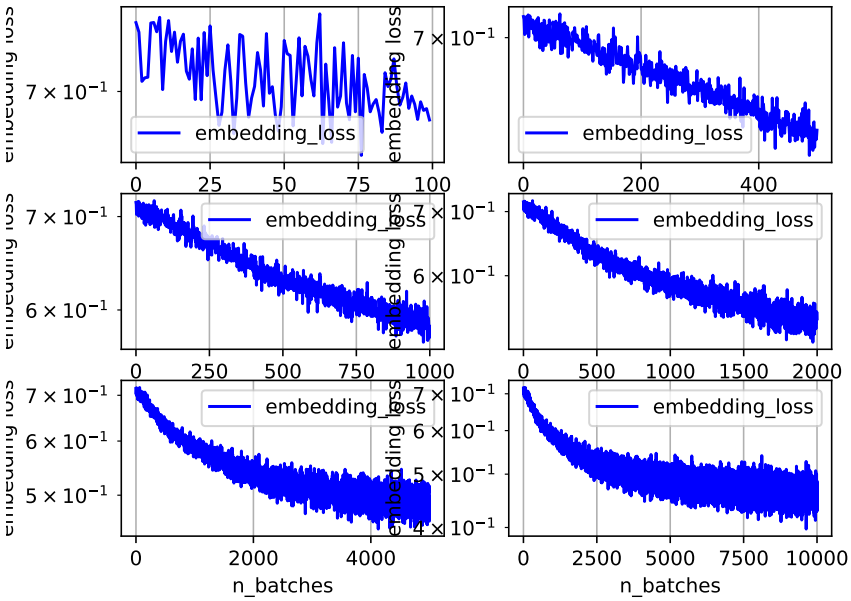


Figure 1: ml100k embedding loss with fixed alpha = 1.0

Table 1: Results obtained on ML-100K. Settings with fixed $\alpha$, increasing $\alpha$ and decreasing $\alpha$

| | MAP@1 | MAP@5 | MAP@10 |
|---|---|---|---|
| $\alpha = 1.0$, $\beta = 0.1$ | 0.888 | 0.865 | 0.842 |
| Increase $\alpha$ | 0.819 | 0.804 | 0.775 |
| Decrease $\alpha$ | 0.8375 | 0.822 | 0.794 |

Table 2: Results of all state-of-the-art approaches for implicit feedback when prediction is done only on offers shown to users. The best result is in bold, and a $^{\downarrow}$ indicates a result that is statistically significantly worst than the best, according to a Wilcoxon rank sum test with $p < .01$.

| | ML-100K | | ML-1M | | Netflix | | Kasandr | |
|---|---|---|---|---|---|---|---|---|
| | MAP@1 | MAP@10 | MAP@1 | MAP@10 | MAP@1 | MAP@10 | MAP@1 | MAP@10 |
| BPR-MF | 0.613$^{\downarrow}$ | 0.608$^{\downarrow}$ | **0.788** | **0.748** | 0.909$^{\downarrow}$ | 0.842$^{\downarrow}$ | 0.857$^{\downarrow}$ | 0.857$^{\downarrow}$ |
| LightFM | 0.772$^{\downarrow}$ | 0.770$^{\downarrow}$ | 0.832$^{\downarrow}$ | 0.795$^{\downarrow}$ | 0.800$^{\downarrow}$ | 0.793$^{\downarrow}$ | 0.937$^{\downarrow}$ | 0.936$^{\downarrow}$ |
| CoFactor | 0.718$^{\downarrow}$ | 0.716$^{\downarrow}$ | 0.783$^{\downarrow}$ | 0.741$^{\downarrow}$ | 0.693$^{\downarrow}$ | 0.705$^{\downarrow}$ | 0.925$^{\downarrow}$ | 0.918$^{\downarrow}$ |
| RecNet$_c$ | 0.894$^{\downarrow}$ | 0.848$^{\downarrow}$ | 0.877$^{\downarrow}$ | 0.835 | 0.877 | 0.846 | 0.958$^{\downarrow}$ | 0.963$^{\downarrow}$ |
| RecNet$_p$ | 0.881$^{\downarrow}$ | 0.846$^{\downarrow}$ | 0.876$^{\downarrow}$ | **0.839** | 0.874 | 0.842 | 0.915$^{\downarrow}$ | 0.923$^{\downarrow}$ |
| RecNet$_{c,p}$ | **0.888** | **0.842** | 0.884$^{\downarrow}$ | **0.839** | **0.880** | **0.849** | **0.970** | **0.973** |

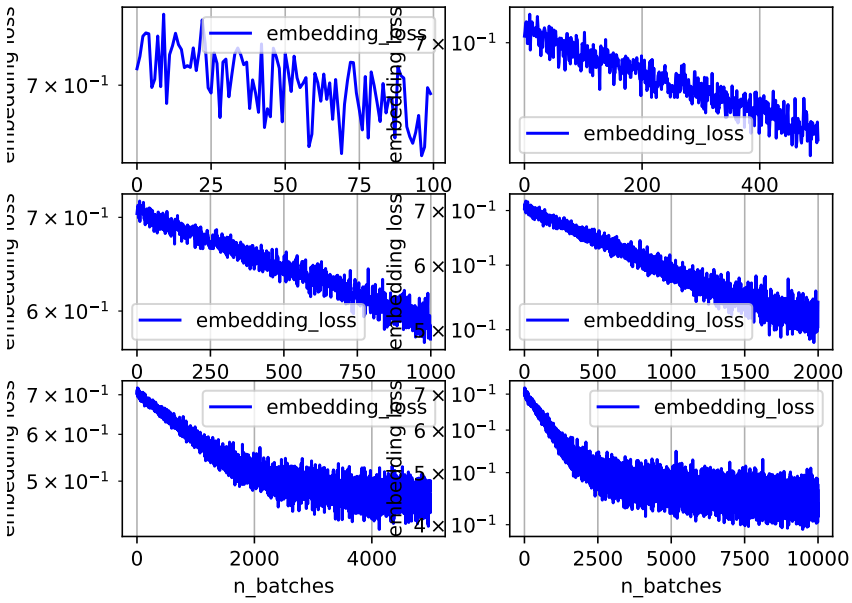


Figure 2: ml100k embedding loss with increasing alpha. embedding loss does not seem to have converged

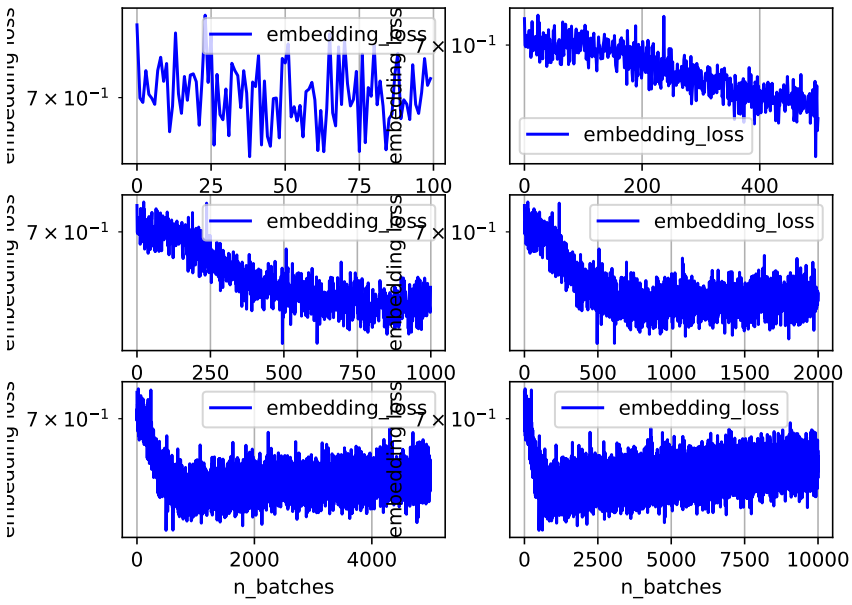


Figure 3: ml100k embedding loss with decreasing alpha.

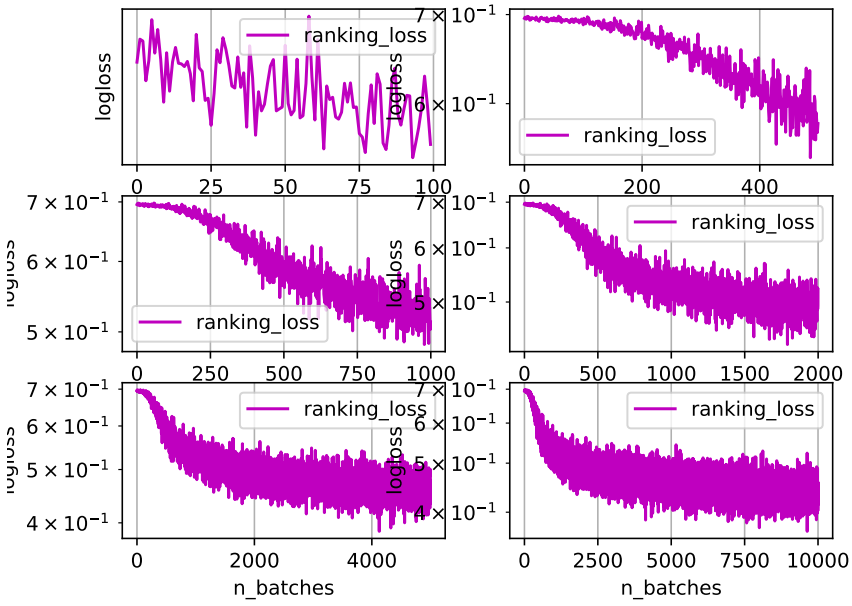


Figure 4: ml100k ranking loss with fixed alpha = 1.0

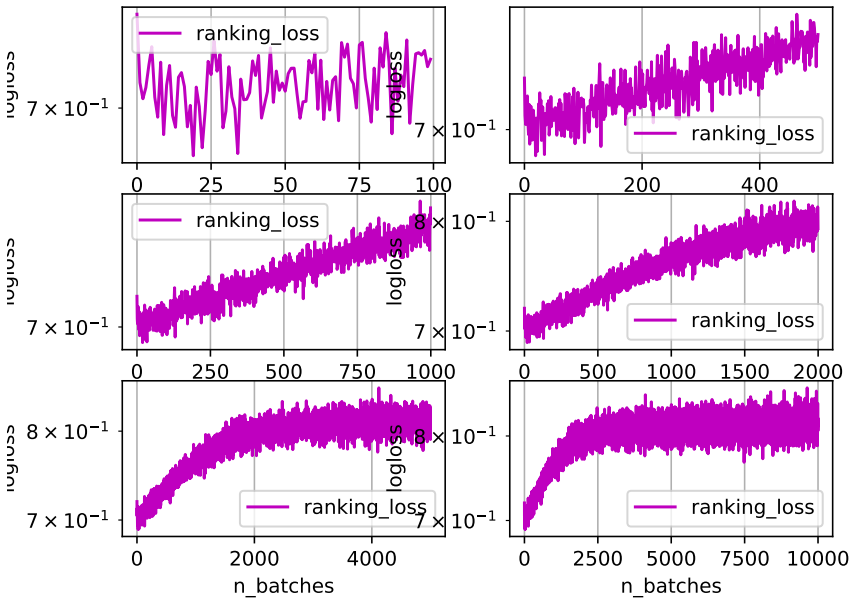


Figure 5: ml100k ranking loss with increasing alpha. ranking loss does not seem to have converged

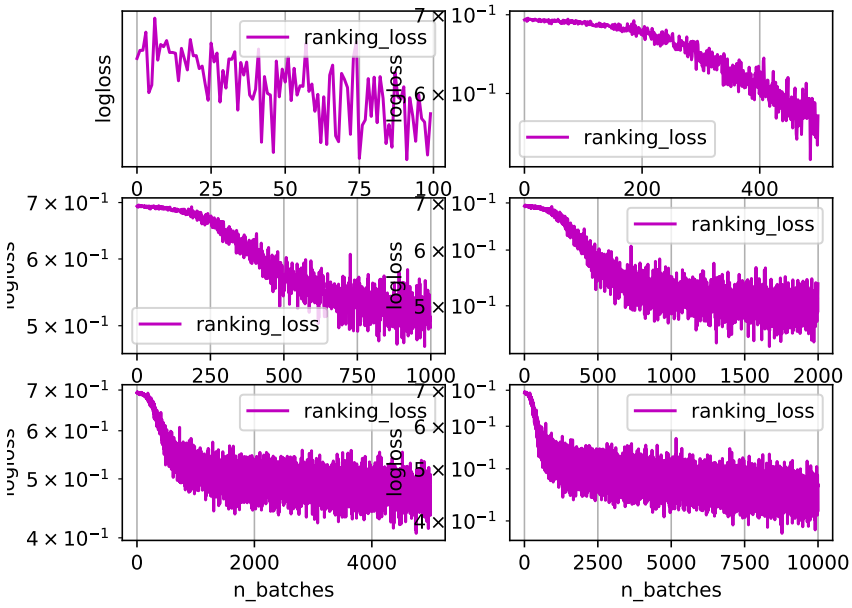


Figure 6: ml100k ranking loss with decreasing alpha.

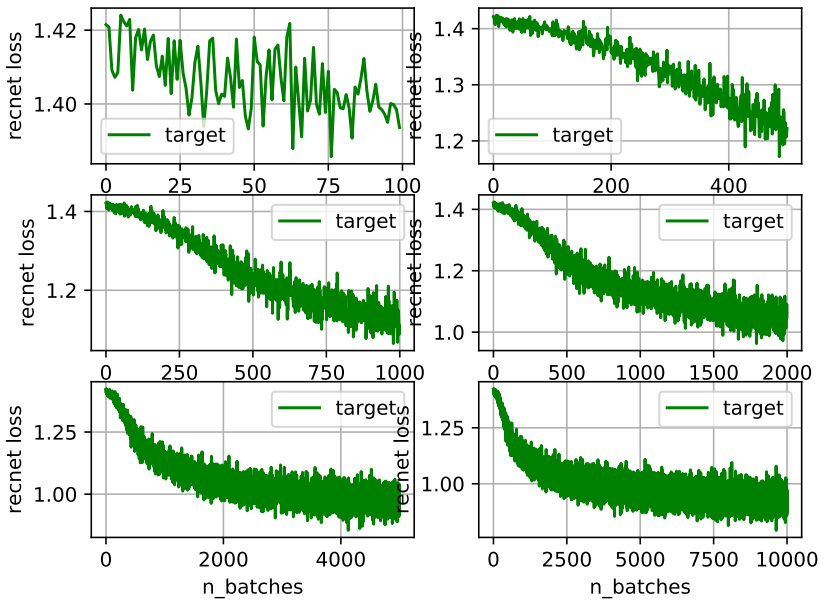


Figure 7: ml100k target loss with fixed alpha = 1.0

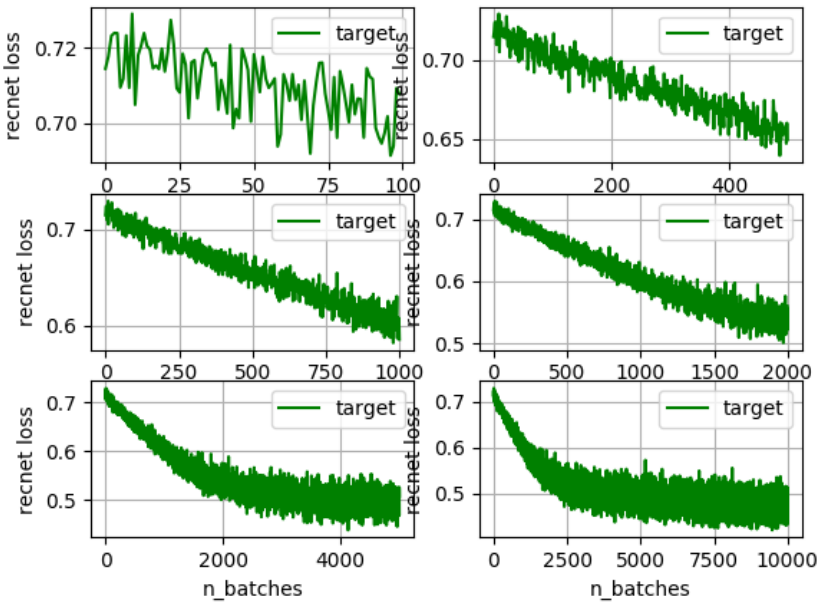


Figure 8: ml100k target loss with increasing alpha. target loss does not seem to have converged

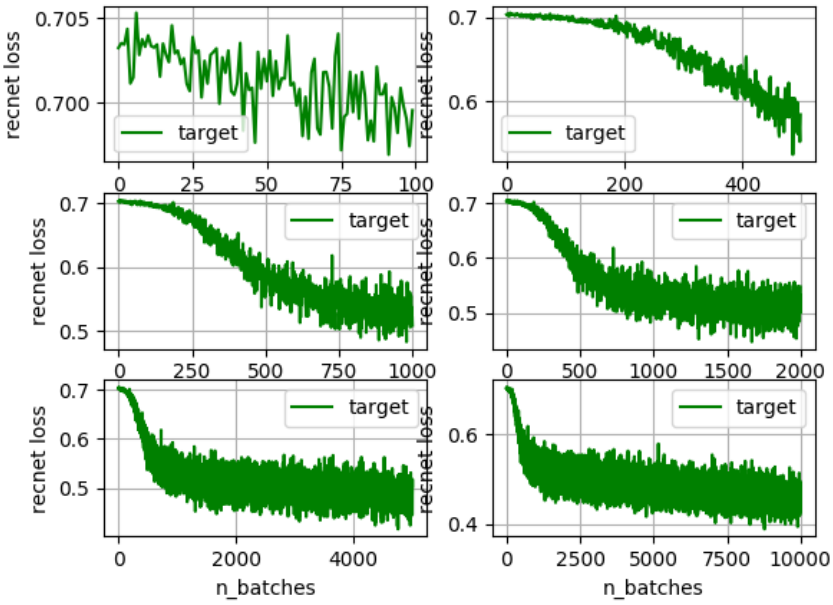


Figure 9: ml100k target loss with decreasing alpha.