Experiments

Ablation Study

Dataset	Metric	Only $\mathcal{C}$	Only $\mathcal{S}$	Rand.	Oracle	NN	CRIS
Toys	H@10	0.385	0.352	0.361	0.652	0.401	0.460
	N@10	0.233	0.175	0.199	0.377	0.219	0.273
Clothing	H@10	0.401	0.320	0.371	0.543	0.291	0.447
	N@10	0.240	0.157	0.207	0.309	0.158	0.265
Health	H@10	0.460	0.237	0.411	0.538	0.414	0.499
	N@10	0.279	0.132	0.249	0.325	0.235	0.306
Movies	H@10	0.705	0.554	0.678	0.793	0.690	0.725
	N@10	0.458	0.299	0.446	0.518	0.433	0.469
Yelp	H@10	0.887	0.429	0.890	0.961	0.879	0.906
	N@10	0.632	0.193	0.629	0.738	0.617	0.657

- Only C is trained only the consumption-based loss L_C^P, shows similar performance of CML.
- Only S is trained only on the ISS-based loss L_S^P, shows the consistent degradation in the accuracy of recommendations.
- This result indicates that should utilize the ISSs along with the consumption-based objective, since modeling the ISS alone can't capture user's personalized preferences.
- Randomly ISSs (Rand.) hurt the model performance in all the cases as the representations of users and items will be wrongly learned by random ISSs.
- As oracle, set ISS p_i as 1 if item i appear in the test data and 0 else. It's provides the upper bound of the performance of CRIS.

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- Examine a neural transformation (fully-connect layer) to project (user, item) into a point in the space instead of the sum operation.
  - On all datasets, the neural transformation is worse than the sum-based transformation.
  - Suspect the additional parameters of the NN make the method to overfit compared to the parameter-free approach (i.e. sum).