

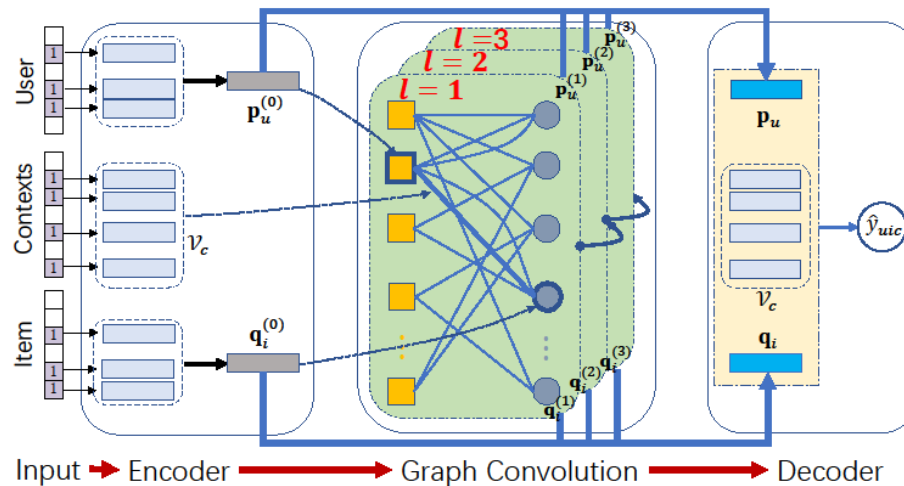
Graph Convolution Machine for Context-aware Recommender System

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Problems & Ideas

- Problems of Context-aware Recommender System
 - Data organization
 - Insufficient in capturing relationship among data instances
 - Low efficiency in online serving
- Ideas: GCN-based CARS model
 - Attributed user-item bipartite graph
 - Three components model based on graph convolution network



Main Contributions

- Overall Performance Comparison

	Yelp-NC				Yelp-OH				Amazon-book			
	HR		NDCG		HR		NDCG		HR		NDCG	
	@10	@50	@10	@50	@10	@50	@10	@50	@10	@50	@10	@50
MF	0.0384	0.1173	0.0175	0.0341	0.0429	0.1261	0.0206	0.0383	0.0402	0.1243	0.0203	0.0382
LightGCN	0.0499	0.1394	0.0241	0.0431	0.0518	0.1520	0.0249	0.0461	0.0543	0.1466	0.0274	0.0473
FM	0.0739	0.1804	0.0396	0.0624	0.1959	0.4201	0.1049	0.1538	0.0587	0.1477	0.0323	0.0514
NFM	0.0824	0.2110	0.0419	0.0695	0.2248	0.4836	0.1161	0.1725	0.0808	0.1954	0.0444	0.0692
xDeepFM	0.0851	0.2086	<u>0.0458</u>	<u>0.0723</u>	0.2296	0.4799	0.1218	0.1762	0.0886	0.2119	0.0481	0.0748
GIN	<u>0.0866</u>	<u>0.2175</u>	0.0449	0.0722	<u>0.2304</u>	<u>0.4965</u>	<u>0.1238</u>	<u>0.1818</u>	<u>0.0939</u>	<u>0.2189</u>	<u>0.0502</u>	<u>0.0774</u>
GCM	0.1046	0.2421	0.0557	0.0854	0.2648	0.5166	0.1457	0.2008	0.0968	0.2232	0.0536	0.0810
%Improv.	20.78%	11.31%	21.62%	18.12%	14.93%	4.05%	17.69%	10.45%	3.08%	1.96%	6.77%	4.65%
<i>p</i> -value	3.35e-9	4.37e-7	6.75e-10	5.91e-10	5.36e-12	9.10e-6	8.22e-9	2.45e-8	1.86e-4	3.41e-4	1.70e-3	1.05e-3

- Model inference time

Model	FM	GCM	GIN	xDeepFM	Convolutional FM
Time/s	8.51	14.93	35.45	365.82	2354.25