

A correlative denoising autoencoder
to model social influence for top- N
recommender system

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Problems & Ideas

- Problems of learning social influence with neural network for top-N recommender system
 - The data of social network are very sparse.
 - It requires a lot of data to train a robust neural network, which is easy to fall into overfitting.
- Ideas: Learning correlations between users for neural network
 - Each node in neural network is corresponding to a particular user or item. Therefore, there exists same common characters between the nodes corresponding to same users or items.
 - Each user demonstrate similar preferences with multiple roles. Therefore, there exists some common information between user preferences with multiple roles.

Main Contributions

- **The proposed CoDAE model performs better than state-of-the-art algorithms**

| Dataset | Metrics | Pop | BPR | GBPR | SBPR | CDAE | TDAE | CoDAE | Improve |
|-------------------|---------|--------|--------|--------|--------|--------|---------------|---------------|---------|
| Ciao k=10 | MAP@10 | 0.0210 | 0.0199 | 0.0229 | 0.0219 | 0.0289 | 0.0299 | 0.0306 | 2.34% |
| | NDCG@10 | 0.0369 | 0.0357 | 0.0408 | 0.0402 | 0.0504 | 0.0521 | 0.0528 | 1.34% |
| Ciao k=20 | MAP@10 | 0.0210 | 0.0201 | 0.0234 | 0.0240 | 0.0284 | 0.0303 | 0.0311 | 2.64% |
| | NDCG@10 | 0.0369 | 0.0360 | 0.0419 | 0.0435 | 0.0500 | 0.0533 | 0.0541 | 1.50% |
| Ciao k=100 | MAP@10 | 0.0210 | 0.0232 | 0.0247 | 0.0255 | 0.0291 | 0.0320 | 0.0329 | 2.81% |
| | NDCG@10 | 0.0369 | 0.0424 | 0.0437 | 0.0456 | 0.0510 | 0.0549 | 0.0561 | 2.19% |
| Epinions k=10 | MAP@10 | 0.0080 | 0.0100 | 0.0115 | 0.0072 | 0.0143 | 0.0144 | 0.0145 | 0.69% |
| | NDCG@10 | 0.0153 | 0.0194 | 0.0218 | 0.0144 | 0.0265 | 0.0271 | 0.0272 | 0.37% |
| Epinions k=20 | MAP@10 | 0.0080 | 0.0127 | 0.0126 | 0.0090 | 0.0142 | 0.0149 | 0.0151 | 1.34% |
| | NDCG@10 | 0.0153 | 0.0237 | 0.0237 | 0.0173 | 0.0266 | 0.0277 | 0.0280 | 1.08% |
| Epinions k=100 | MAP@10 | 0.0080 | 0.0163 | 0.0082 | 0.0161 | 0.0164 | 0.0168 | 0.0171 | 1.79% |
| | NDCG@10 | 0.0153 | 0.0291 | 0.0158 | 0.0301 | 0.0304 | 0.0312 | 0.0316 | 1.28% |