Abstract

Recommender systems have become important tools to support users in identifying relevant content in an overloaded information space. To ease the development of recommender systems, a number of recommender frameworks have been proposed that serve a wide range of application domains. Our TagRec framework is one of the few examples of an open-source framework tailored towards developing and evaluating tag-based recommender systems. To date, TagRec served the development and/or evaluation process of tag-based recommender systems in two large scale European research projects, which have been described in 17 research papers. Supported use cases:

- Social tag recommendations
- Resource recommendations
- Recommendation evaluation
- Hashtag recommendations

Features

Dataset

<table>
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<th>Dataset</th>
<th>Description</th>
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</tbody>
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Algorithm

MostPopular Frequency-based
CF Collaborative Filtering
FolkRank / APR Graph-based
FM / PITF Factorization Machines
LDA Topic modeling
MostRecent / GIRP Time-based
3Layers Human categorization theory
BLL / BLLc Human memory theory
CIRIT Tag- and time-based
SUSTAIN Human category learning
SimRank Content-based
BLLi,S,C Temporal hashtag patterns

Metric

Recall Accuracy
Precision Accuracy
F1-score Accuracy
MRR Ranking
MAP Accuracy & ranking
nDCG Accuracy & ranking
AILD Diversity
AIP Novelty
Runtime Computational costs
Memory Computational costs

Example 1: Cognitive-Inspired Tag Recommendations

Can the activation equation of the cognitive model ACT-R, which accounts for the activation processes in human memory, be exploited to effectively predict a user’s tag reuse?

\[ A_i = B_i + \sum \left( W_j \cdot S_j \right) \]

\[ A(t, u, r) = B(t, u) + \sum_{c \in T_u} \left( Y_{r,c} \cdot S(r, t) \right) \]

\[ B_i = \ln \left( \sum_{j=1}^{n} t_j \cdot d \right) \]

\[ B(t, u) = \ln \left( \sum_{j=1}^{n} \left( \text{time}_{u,ref} - \text{time}_{t,u,j} \right)^{-d} \right) \]

Example 2: Hashtag Recommendations in Twitter

Can BLLc be generalized for related use cases in the research area of tag-based recommender systems, such as hashtag recommendations in Twitter?

TagRec Framework: System Architecture

The TagRec framework as a toolkit for the development of tag-based recommender systems

Relevance

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