Overview

- assign a relevance score r to a new item based on specific user
    - decide how relevant an unknown item I_{new} is to user U_0
- $r = f(U, I, U_0, I_{new})$
    - set of users U
    - set of items I
- unlike [[Information Retrieval]] recommendation is proactive
    - no explicite query
    - results often based on implicitly collected data

Recommender System Types/Paradigms

- [[Collaborative Filtering]]
    - based on user interactions with items in a system
    - interactions such as
        * user ratings
        * clicks
        * purchase
- content based
    - based on description of users and items in terms of content
    - e.g. new fantasy novel for fantasy fan based on
        * metadata
            ◆ keywords
            ◆ genre
        * content analysis
    - similarity between user interest and content-wise description of items
- knowledge based
    - based on explicitly modelled constraints on items
    - simillar to basic filtering
    - e.g. all all-inclusive hotels in Egypt with beach access within a certain price range...
- hybrid of different recommendation paradigms

Sparsity of user-item matrix if explicit interactions (e.g., ratings) are taken into account
- ➢ Use implicit measures of interest/preference (clicking, buying, …)
- ➢ Spreading activation

Cold-start problem: What to do with new users or items?
- ➢ Use metadata, content analysis, explicitly stated preferences, „test" user with high-variance selection of items

Scale
- ➢ Offline pre-computation; limited size of neighbourhood, thresholds for keeping neighbourhoods small

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Discussion 1: Relevance of an item I_{NEW} for a user U_0

Depending on context of recommender system, **relevance** can mean different things; and hence implementations differ.

Relevance can mean whether a

- User will like an item
- User needs this item (e.g., in educational domain – what does learner need to know? – learning materials and explanations)
- User will click on an item
- User will buy the item

Relevance relates to goals for a socio-technical system that are OUTSIDE the technical system!

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Discussion 2 – Relation to Information Retrieval

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        ┌──────────────────┐   ┌──────────┐   ┌──────────────┐   ┌────────────────┐
        │ Formulation of a │   │          │   │ Analyses of  │   │   Feedback and │
        │ the need for     │──▶│  Search  │──▶│ the results  │──▶│  refinement of │
        │ information      │   │          │   │              │   │   the query    │
        └──────────────────┘   └──────────┘   └──────────────┘   └────────────────┘
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We don't have, in this sense a query

… but we still want to identify in (SEARCH) a set of items

… RELEVANT items

- … and expect to get some feedback & iteration