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Recommender systems

Compsci.760

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Overview

- Background
- Definition
- Ways its used
- Problems
- Maintenance
- The future

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Background

- CBR used to find and recommend products for e-commerce systems
- Similar people like similar things
- -> "recommender systems"

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What is it?

- Recommender systems are a technological proxy for a social process.
- Recommender systems are a way of suggesting like or similar items and ideas to a users specific way of thinking.
- Recommender systems try to automate aspects of a completely different information discovery model where people try to find other people with similar tastes and then ask them to suggest new things.

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Example



Customer A

- Buys Metalica CD
- Buys Megadeth CD



Customer B

- Does search on Metalica
- Recommender system suggests Megadeth from data collected from customer A

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Motivation for Recommender Systems

- Automates quotes like:
 - "I like this book; you might like it"
 - "I saw this movie, you'll love it"
 - "Don't go see that movie!"

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Further Motivation

- Many of the top e-commerce sites use recommender systems to improve sales
- Users may find new books, music, or movies that were previously unknown to them
- Also can find the opposite e.g.: movies or music that will definitely not be enjoyed

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Where is it used?

- Massive e-commerce sites use this tool to suggest other items a consumer may want to purchase
 - www.amazon.com
- Web personalization

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Ways its used

- Survey's filled out by past users for the benefit of new users
- Search-style algorithms
- Genre matching
- Past purchase querying

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Recommender System Types

- Collaborative/Social-filtering system** – aggregation of consumers' preferences and recommendations to other users based on similarity in behavioral patterns
- Content-based system** – supervised machine learning used to induce a classifier to discriminate between interesting and uninteresting items for the user
- Knowledge-based system** – knowledge about users and products used to reason what meets the user's requirements, using discrimination tree, decision support tools, case-based reasoning (CBR)

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Content-based Collaborative Information Filtering

- Relevance feedback** – positive/negative prototypes.
- Feature selection** – removal of non-informative terms.
- Learning to recommend** – agent counts with 2 matrices; user vs. category matrix (for successful classification) and user's recommendation factor (1 to 5) or binary.


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Examples

Amazon.com	Books, movies, music
CDNOW.com	Music
Ebay.com (feedback forms)	Anything
Reel.com	Movies
Barnes & Noble	Books
Movielens	Movies

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Problems

- Inconclusive user feedback forms
- Finding users to take the feedback surveys
- Weak algorithms
- Poor results
- Poor data
- Lack of data
- Privacy control

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Maintenance

- Costly
- Information becomes outdated
- Information quantity (large, disk space expansion)

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The Future of Recommender Systems

- Extract implicit negative ratings through the analysis of returned items
- How to integrate community with recommendations
- Recommender systems will be used in the future to predict demand for products, enabling earlier communication back the supply chain

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Resources

- <http://www.acm.org/cacm/MAR97/resnick.html>
- <http://www.ercim.org/publication/ws-proceedings/DelNoe02/CliffordLynchAbstract.pdf>
- <http://people.cs.vt.edu/~ramakris/papers/ppp.pdf>
- <http://www.sims.berkeley.edu/~sinha/talks/UMD-Rashmi.pdf>

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Resources continued

- <http://www.cs.umn.edu/Research/GroupLens/papers/pdf/ec-99.pdf>
- <http://www.rashmisinha.com/talks/Recommenders-SIGIR.pdf>
- <http://www.grouplens.org/papers/pdf/slides-1.pdf>

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