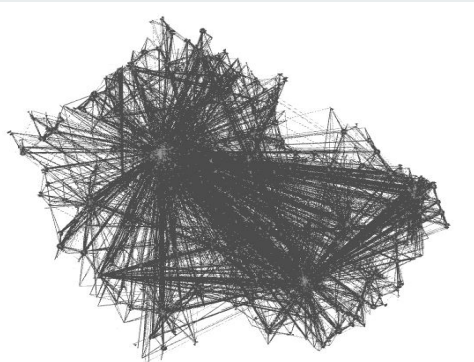




Recommender Systems



STS 351 : Minds and Machines
Research Presentation
Kimberly Prince, Chadin Youssef, Tyreek Griffith





Overview | Introduction to Recommender Systems

What and Why:

- ❑ Algorithms used to filter predictability of information based on user preferences
- ❑ Most commercially utilized application for machine learning
- ❑ Dominated by big businesses

Design approaches used:

- ❑ Content based filtering - relies on the contents of the targeted object
- ❑ Collaborative filtering - relies on users responses to the targeted object

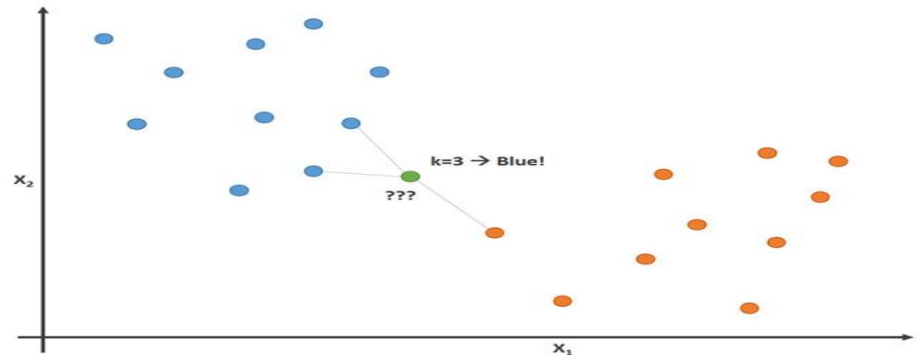
Collaborative Filtering Explored

How it works: Collect & analyze large sum of information on users' behaviors and preferences; predictive model based on what other users with similar feature set like

- Does not rely on machine analyzable content
- People who agree in the past will agree in the future and they will like similar things

Types of Collaborative Filtering Algo's:

- User-User collaborative filtering
- Item-Item collaborative filtering
(Items calculated using people's ratings)



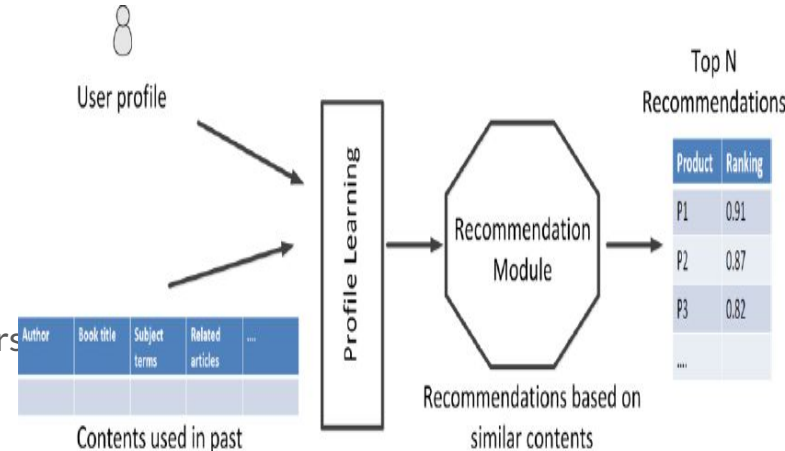
Content Filtering Explored

How it works: Based on a description of the item AND a profile of the user. Keywords are used to describe items and user profiles are built to indicate which item a user likes. Algorithms recommended items similar to items user liked in the past.

To create a user profile the system focuses on:

- Model of user preferences
- History of user interactions with recommender system

Item profile is created and system creates content based profile of users based on weighted vector of item features. The weights determine the importance of each feature to the user.





Brief | Connection to Western Philosophy

Why is there such a strong connection or attraction to user preferences or recommendations?

Agency

Qualia

Aristotle : Telos and Rational

Thus, inviting technology and devices that service these human habits, behaviors, and desires!



Goals | Recommender Systems in Work

Primary Models

- ☐ Prediction version of problem
- ☐ Ranking version of problem

Operational and Technical Goals

- ☐ Relevance
- ☐ Novelty
- ☐ Serendipity
- ☐ Increasing recommendation diversity

Research Literature | Recommender Systems

 What are popular research topics in the academic disciplines on recommender systems?

- ❑ Communication technologies (Social Systems or Networks) or Business Transactions

What are scientific magazines, public online publications, and sites saying about recommender systems?

- ❑ Harvard Business Review - Indicator of Company Leaders
- ❑ Companies Distributing Services - Webtunix Services
- ❑ Pew Research Center - ex. YouTube Users

What are some issues or controversies that come with recommender systems?

- ❑ Consumer Use and Trust | Target Example
- ❑ Data Mining



Users and Items | Large-scale Recommender Systems

Hybrid Recommender Systems

- ❑ Uses a combination of content based filters and collaborative filtering
- ❑ Is dependant on the features of the targeted object as well as the user's preferences
- ❑ Typically used in big businesses

Prediction is ranking

- ❑ Given the user and context - ranks in order of the likelihood the user is to interact with



Data Collection | How Do We Collect Data?

Core data is found through events:

- ❑ Implicit:
 - Online - page view, app interaction
 - Commerce - cart, purchase, return
 - Media - preview, watch, listen
- ❑ Explicit: Ratings, Reviews
- ❑ Intent: Search query
- ❑ Social: Likes, shares, follows

Content is attached to each event



Rec. Systems in Use | The Start Up Problem

“Cold start” - unknown data about a user or an item

New Items:

- ☐ No interaction data
- ☐ Uses baselines or item content

New Users:

- ☐ No historical interaction data
- ☐ Limited context data
- ☐ Unable to use collaborative filtering models

Must turn to Deep Learning!



Flaws in Recommender Systems

Sparsity

Scalability

Privacy Protection

Over-specialisation

“Gray sheep” Problem

Shilling Attacks



Future | Innovation and Improvements on Recommender Systems

Researchers and technologists goals for recommender systems in the future

- ❑ Dimensionality reduction techniques
- ❑ Improve privacy
- ❑ Prevention of large variances in data

Where | How do we think Recommender Systems will be implemented in the future:

- ❑ Kimberly
- ❑ Chadin
- ❑ Tyreek

Recommender Systems | Question Section

Questions **from** the Student Audience



Top Three Questions **for** the Student Audience

- ☐ Should the government monitor and be alert to user history from recommender systems?
(Reviewing popular search terms, file downloads, etc.)
- ☐ Do you think it is ethical for companies and businesses to collect and use data from recommender systems?
- ☐ Where do you think recommender systems will be in the future?

Thank You for Your Attention



Recommender Systems | Bibliography

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