1-1: Introduction to Recommender Systems

Today's Learning Objectives

- Understand what a recommender system is
- Some history and background
- NOT: course details (next lecture)

A Bit of History

- Ants, Cavemen, and Early Recommender Systems
  - The emergence of critics
- Information Retrieval and Filtering
- Manual Collaborative Filtering
- Automated Collaborative Filtering
- The Commercial Era

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Information Retrieval

- Static content base
  - Invest time in indexing content
- Dynamic information need
  - Queries presented in “real time”
- Common approach: TFIDF
  - Rank documents by term overlap
  - Rank terms by frequency

Information Filtering

- Reverse assumptions from IR
  - Static information need
  - Dynamic content base
- Invest effort in modeling user need
  - Hand-created “profile”
  - Machine learned profile
  - Feedback/updates
- Pass new content through filters

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Collaborative Filtering

- Premise
  - Information needs more complex than keywords or topics: quality and taste
- Small Community: Manual
  - Tapestry – database of content & comments
  - Active CF – easy mechanisms for forwarding content to relevant readers

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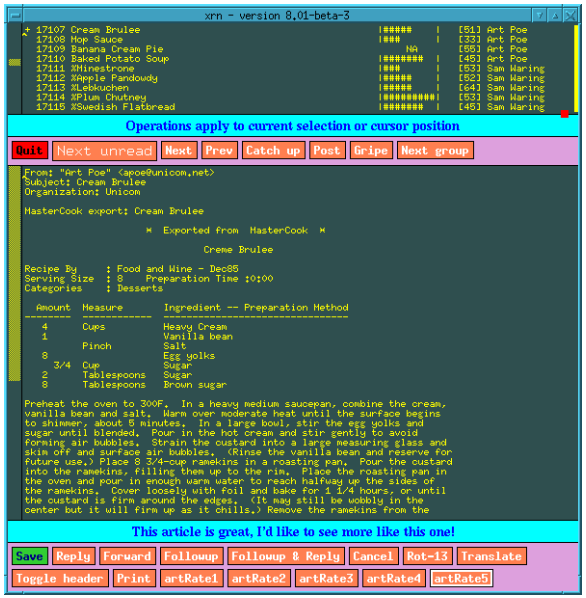
Automated CF

- The GroupLens Project (CSCW '94)
  - ACF for Usenet News
    - users rate items
    - users are correlated with other users
    - personal predictions for unrated items
  - Nearest-Neighbor Approach
    - find people with history of agreement
    - assume stable tastes



Does it Work?

- Yes: The numbers don't lie!
  - Usenet trial: rating/prediction correlation
    - rec.humor: 0.62 (personalized) vs. 0.49 (avg.)
    - comp.os.linux.system: 0.55 (pers.) vs. 0.41 (avg.)
    - rec.food.recipes: 0.33 (pers.) vs. 0.05 (avg.)
  - Significantly more accurate than predicting average or modal rating.
  - Higher accuracy when partitioned by newsgroup

It Works Meaningfully Well!

- Relationship with User Behavior
  - Twice as likely to read 4/5 than 1/2/3
- Users *Like* GroupLens
  - Some users stayed 12 months after the trial!

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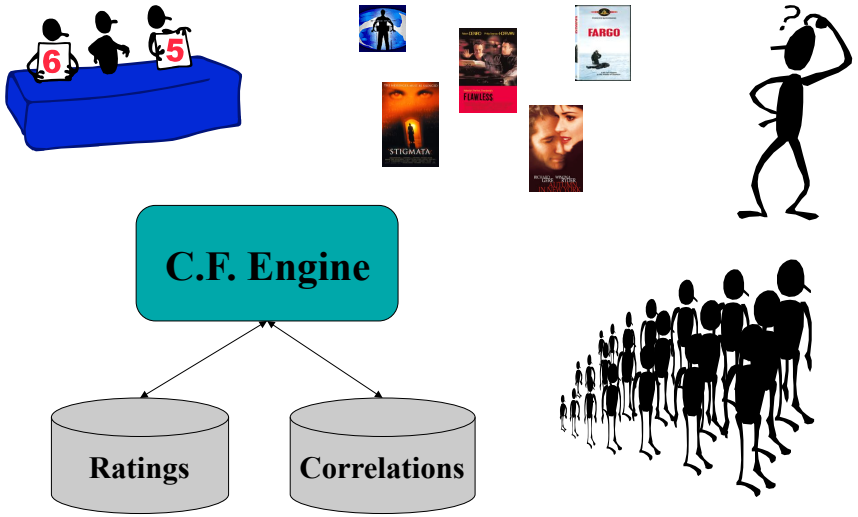
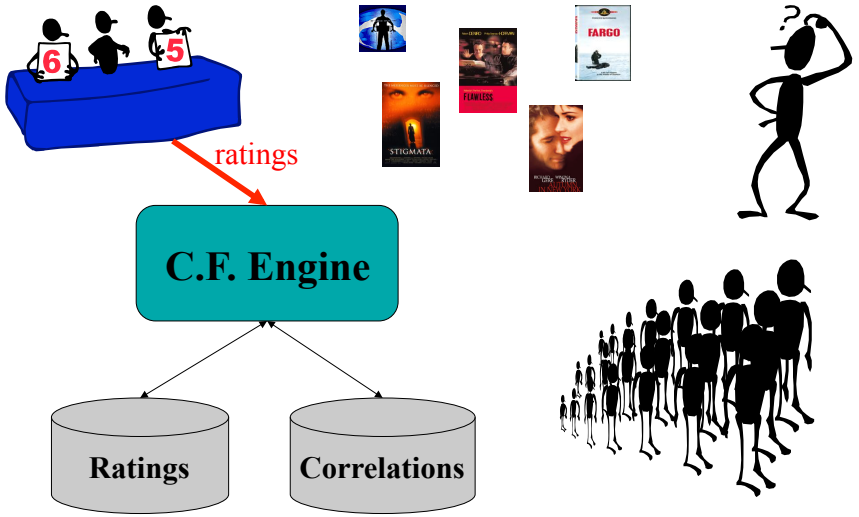
Am

A TOUR OF MOVIELENS
(CLASSIC COLLABORATIVE FILTERING)

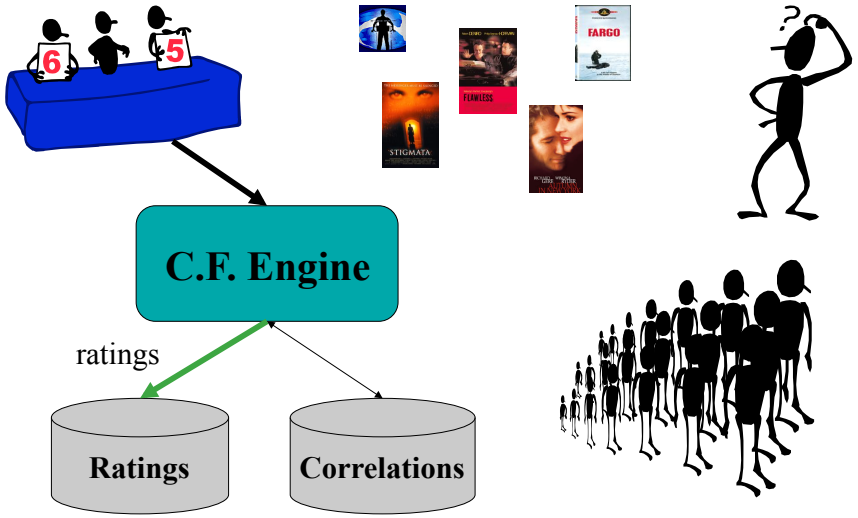
K-Nearest Neighbor User-User



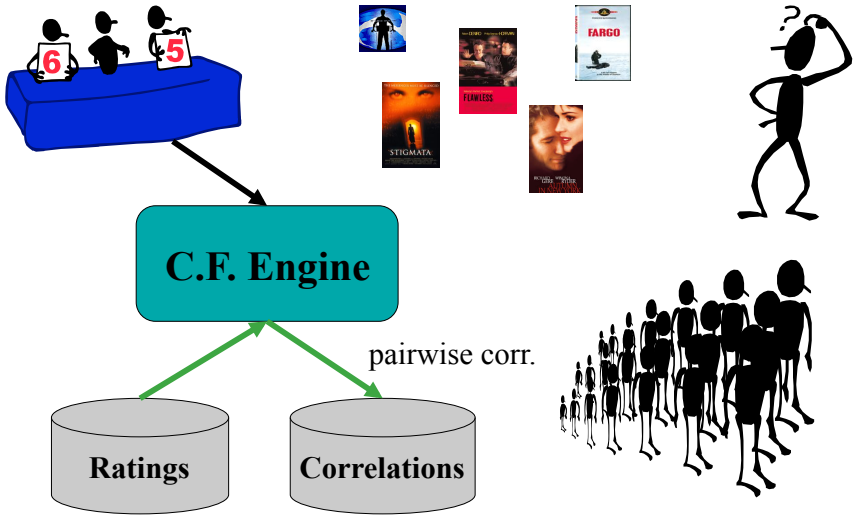
CF Classic: Submit Ratings



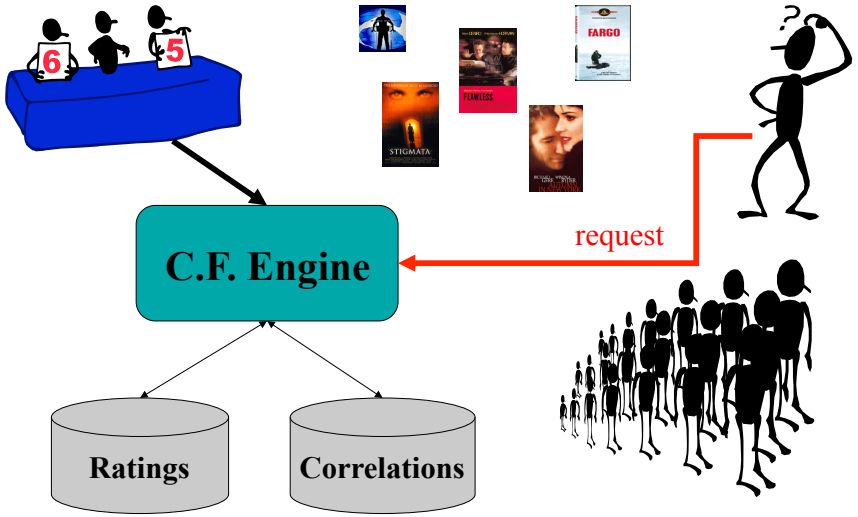
CF Classic: Store Ratings



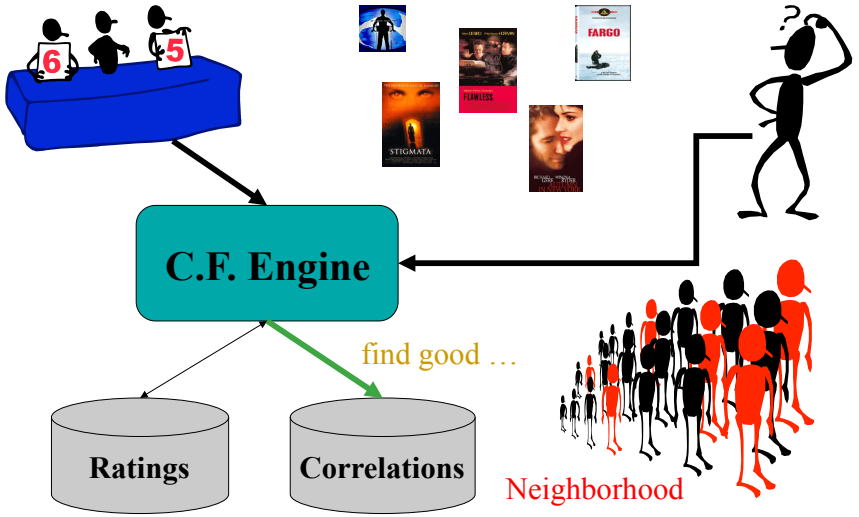
CF Classic: Compute Correlations



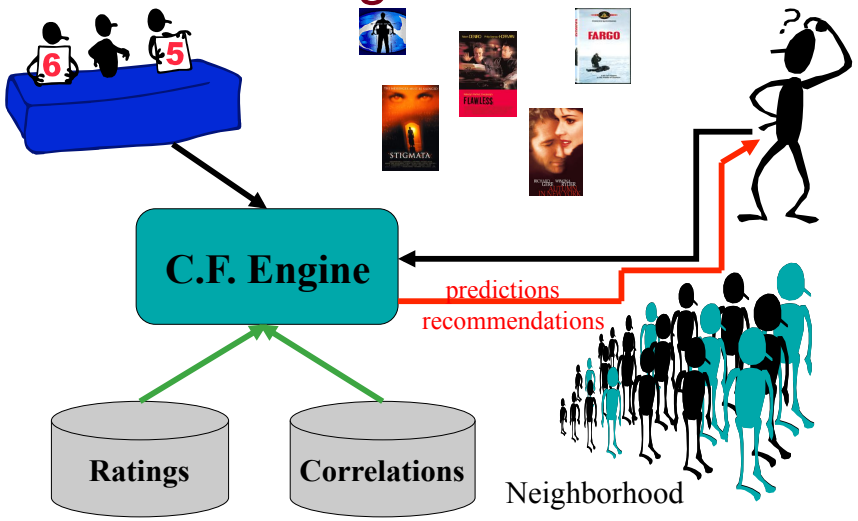
CF Classic: Request Recommendations



CF Classic: Identify Neighbors



CF Classic: Select Items; Predict Ratings



Understanding the Computation

	Hoop Dreams	Star Wars	Pretty Woman	Titanic	Blimp	Rocky XV
Joe	D	A	B	D	?	?
John	A	F	D		F	
Susan	A	A	A	A	A	A
Pat	D	A		C		
Jean	A	C	A	C		A
Ben	F	A				F
Nathan	D		A		A	

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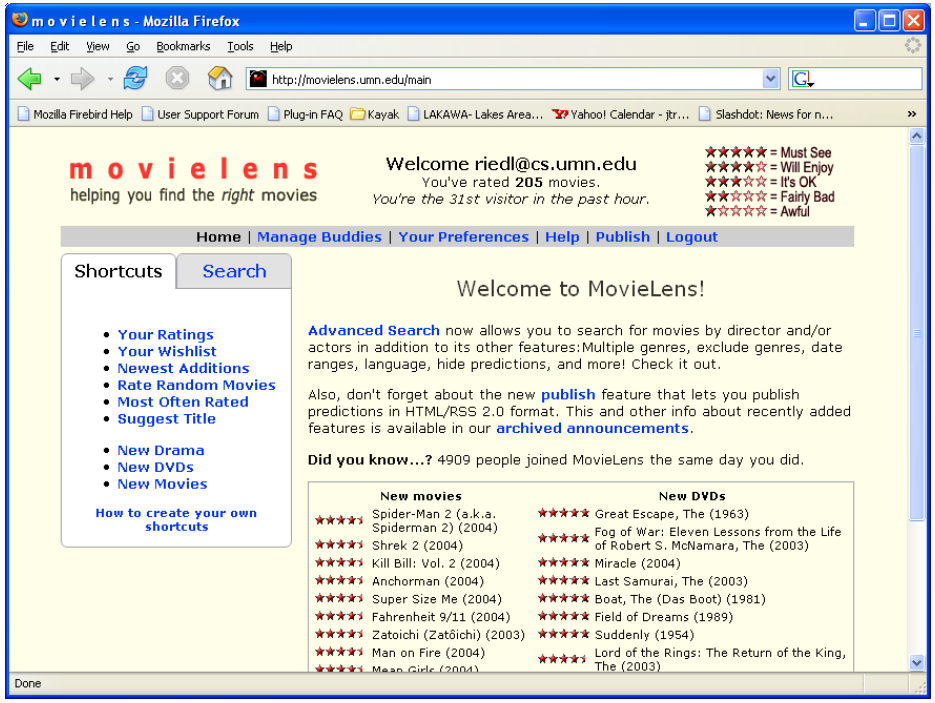


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helping you find the right movies
Welcome riedl@cs.umn.edu
You've rated 206 movies.
You're the 31st visitor in the past hour.
★★★★★ = Must See
★★★★☆ = Will Enjoy
★★★☆☆ = It's OK
★★☆☆☆ = Fairly Bad
★☆☆☆☆ = Awful
Home | Manage Buddies | Your Preferences | Help | Publish | Logout
Shortcuts
Search
Search Titles
Go!
Use selected buddies!
Search Genres
Sci-Fi
2000s
Domain: All movies
Use selected buddies!
Search Genres!
Advanced Search
Found 71 movies, sorted by Prediction
Genres: Sci-Fi | Exclude Genres: None
Dates: 2000s | Domain: All | Format: All | Language: All
Show Printer-Friendly Page | Download Results | Suggest a Title
Page 1 of 5
page 2>
Predictions for you
Your Ratings
Movie Information
Wish List
Not seen
Eternal Sunshine of the Spotless Mind (2004) info | imdb
Comedy, Drama, Romance, Sci-Fi
X-Men 2 (a.k.a. X2: X-Men United) (2003) DVD, VHS, info | imdb
Action, Adventure, Sci-Fi
Donnie Darko (2001) DVD, VHS, info | imdb
Drama, Mystery, Romance, Sci-Fi
Dune (miniseries) (2000) DVD, VHS, info | imdb
Drama, Fantasy, Sci-Fi
Spider-Man (a.k.a. Spiderman)
Done


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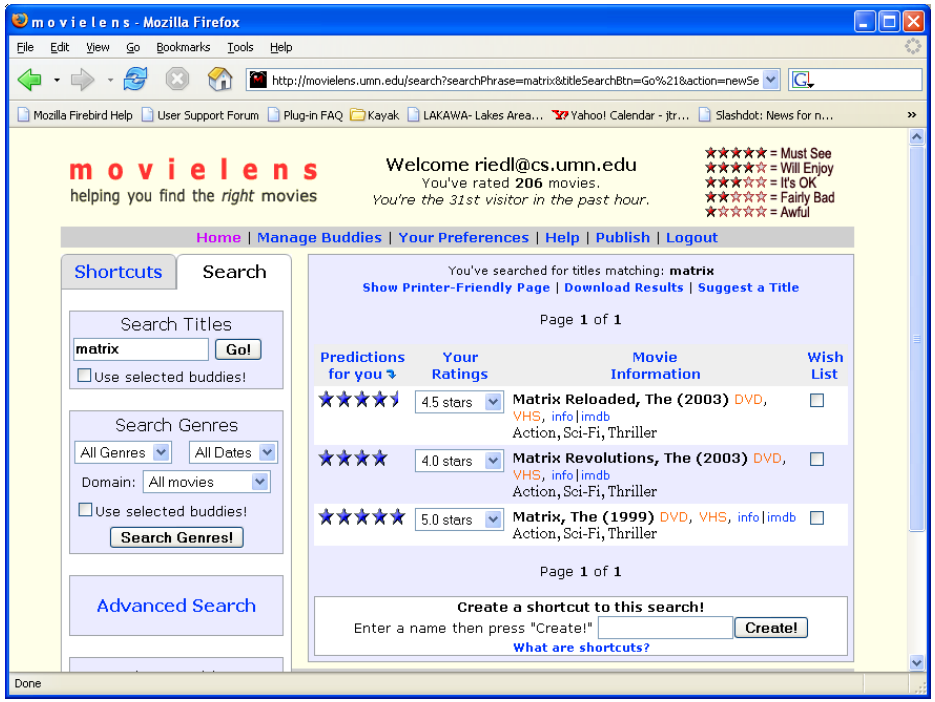
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Action, Sci-Fi, Thriller
Matrix Revolutions, The (2003) DVD, VHS, info | imdb
Action, Sci-Fi, Thriller
Matrix, The (1999) DVD, VHS, info | imdb
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Page 1 of 1
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Create!
What are shortcuts?
Done


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Buddy Search with: Joe, Maureen
Results restricted to movies that have predictions for each buddy.
Page 1 of 301 | Go to page:
1...60...120...180...240...300...last
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Combined Preds
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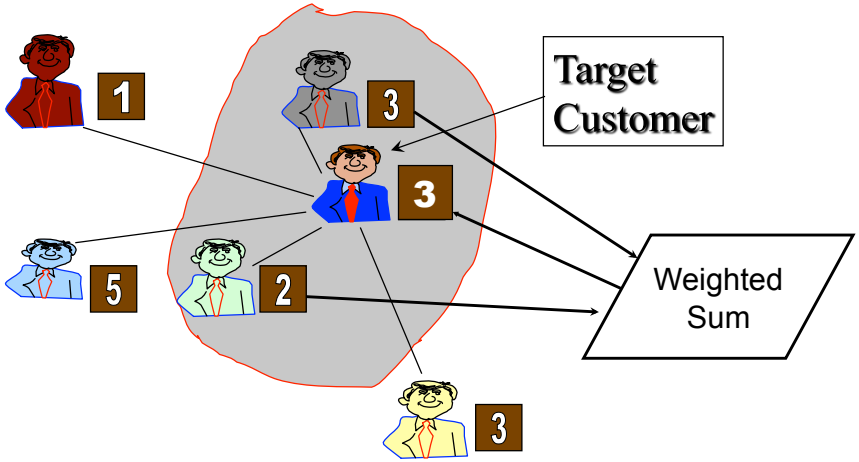
Decade Under the Influence, A (2003) DVD, VHS, info | imdb
Documentary
Miracle Worker, The (1962) DVD, VHS, info | imdb
Drama
Enter the Dragon (1973) DVD, VHS, info | imdb
Action, Crime, Drama
Done

User-User Collaborative Filtering



Recommenders

- Tools to help identify worthwhile stuff
  - Filtering interfaces
    - E-mail filters, clipping services
  - Recommendation interfaces
    - Suggestion lists, “top-n,” offers and promotions
  - Prediction interfaces
    - Evaluate candidates, predicted ratings

A Little Vocabulary

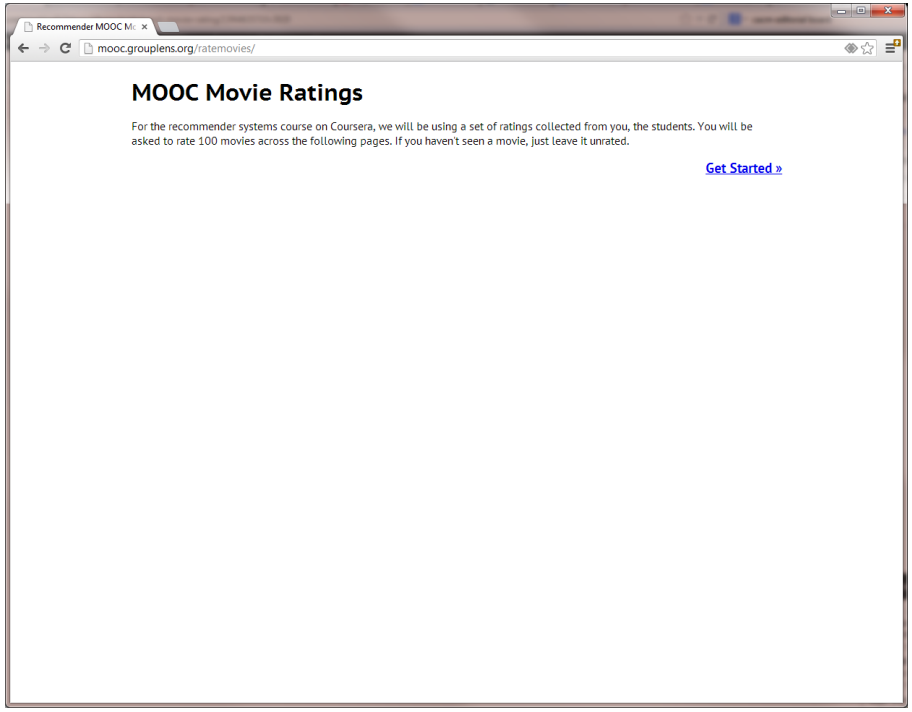
- Rating – expression of preference
  - Explicit rating (direct from the user)
  - Implicit rating (inferred from user activity)
- Prediction – estimate of preference
- Recommendation – selected items for user
- Content – attributes, text, etc.
- Collaborative – using data from other users

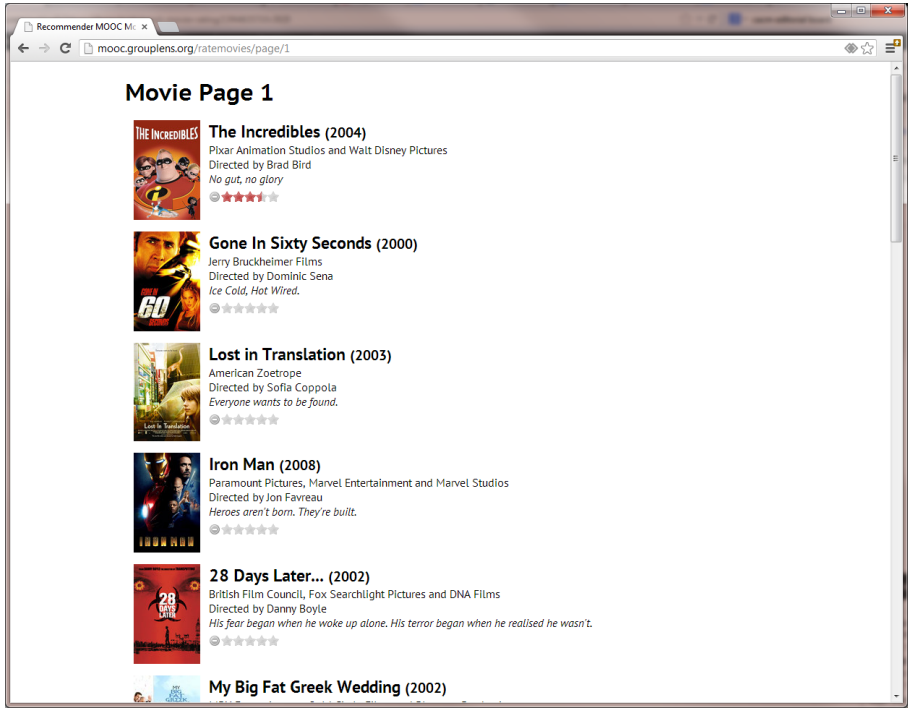
Historical Challenges

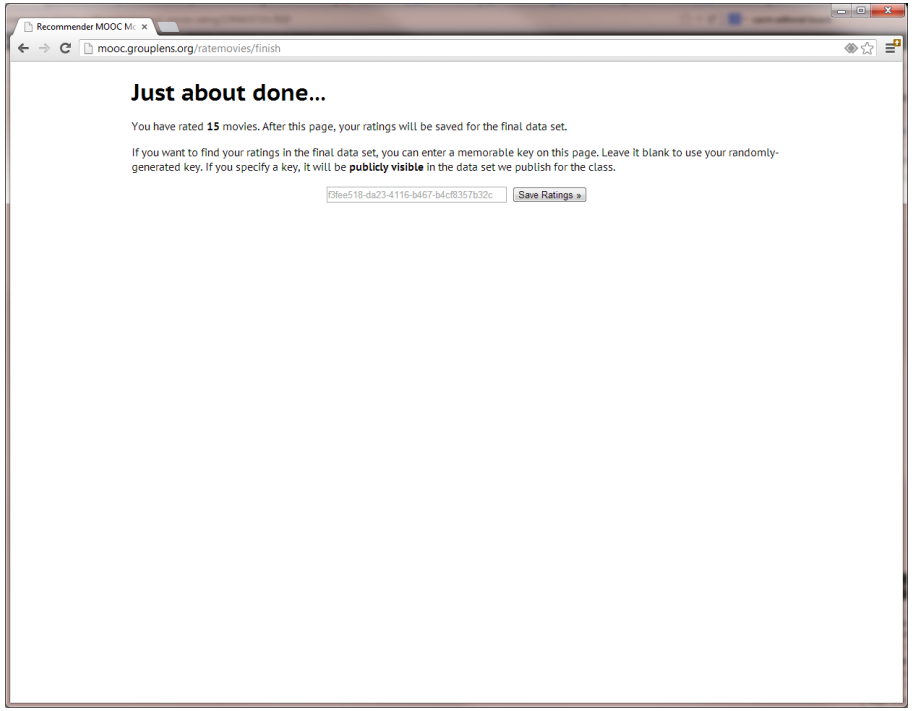
- Collecting Opinion and Experience Data
- Finding the Relevant Data for a Purpose
- Computing the Recommendations
- Presenting the Data in a Useful Way

Your First Assignment

- We are building a class ratings dataset using the MovieLens infrastructure
  - This will be used for several of the assignments
- Your assignment is to rate movies through our interface:
  - http://mooc.grouplens.org/ratemovies/







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  - Only rate movies you've seen
  - You can create a key to follow your preferences forward (or save the random key)

Moving Forward …

- Next Lecture: Formal Course Introduction
- Rest of this Week
  - Technical details for programmers
  - Taxonomy
  - Tour of Recommenders in Amazon.com
- If not familiar with recommenders at all:
  - Spend some time using them (movielens.org)

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