

1-4(a): Taxonomy of Recommender Systems (part 1 of 2)

Introduction to Recommender Systems

Analytical Framework

- Dimensions of Analysis
 - Domain
 - Purpose
 - Recommendation Context
 - Whose Opinions
 - Personalization Level
 - Privacy and Trustworthiness
 - Interfaces
 - Recommendation Algorithms

Introduction to Recommender Systems

Learning Objectives

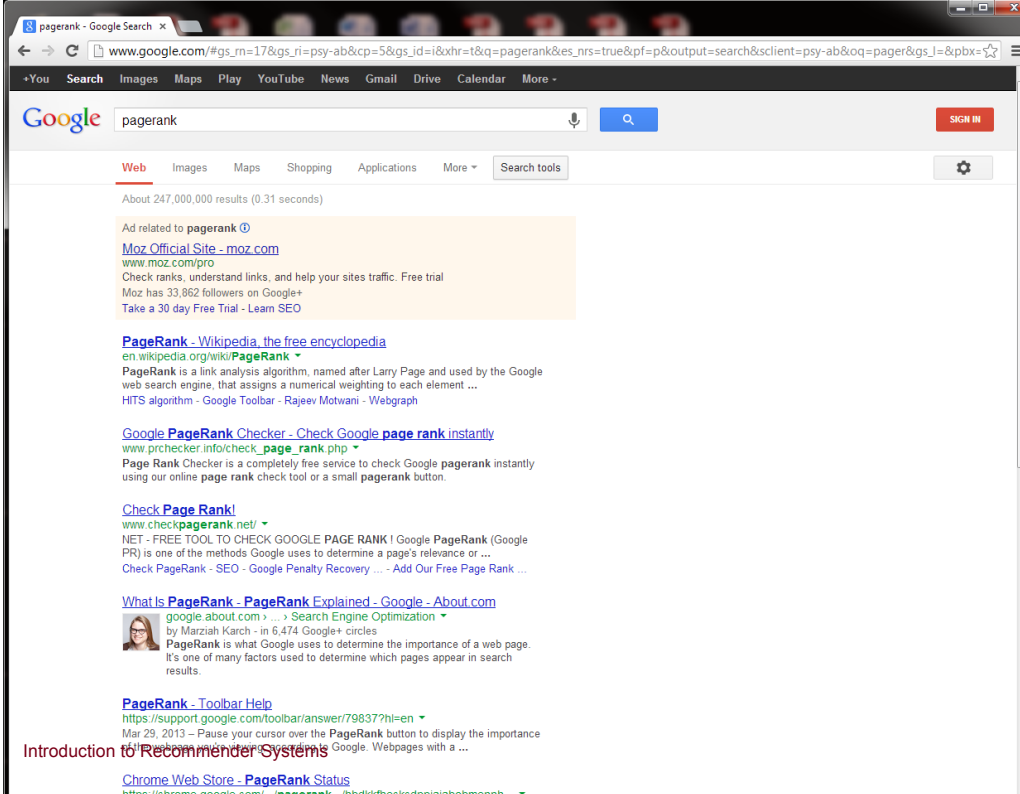
- To understand the different types of recommender systems
 - A framework for analyzing recommender systems in general
 - A specific overview of different recommendation algorithms
- To acquire a roadmap for the rest of the course, based on the algorithms studied

Introduction to Recommender Systems

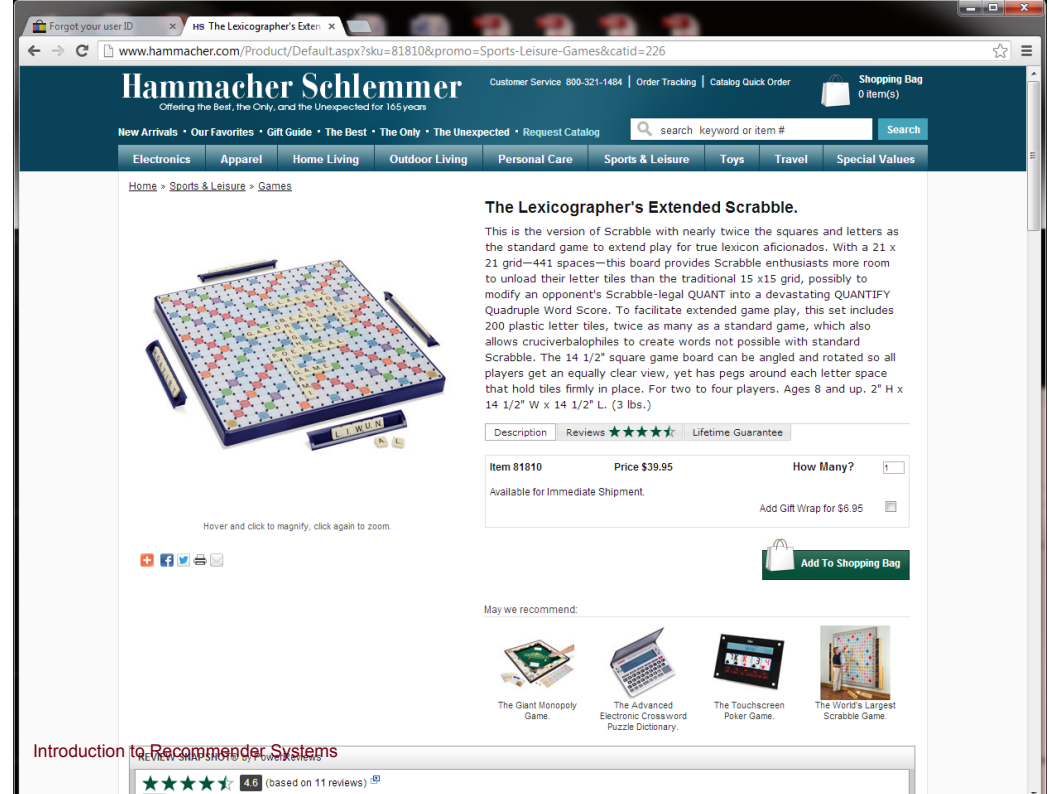
Domains of Recommendation

- Content to Commerce and Beyond
 - News, information, “text”
 - Products, vendors, bundles
 - Matchmaking (other people)
 - Sequences (e.g., music playlists)
- One particularly interesting property
 - New items (e.g., movies, books, ...)
 - Re-recommend old ones (e.g., groceries, music)

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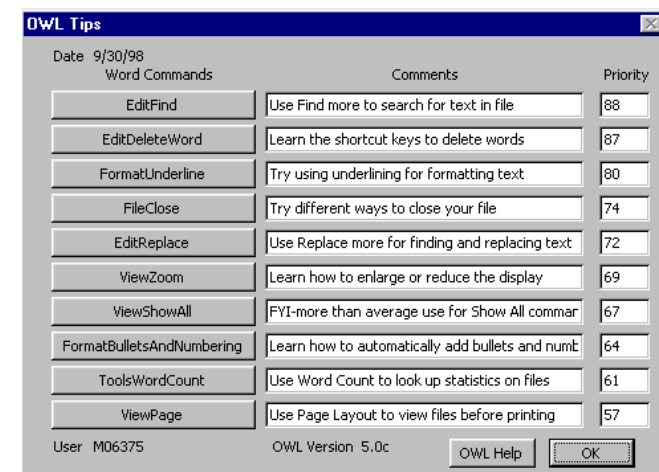


Introduction to Recommender Systems

Purposes of Recommendation

- The recommendations themselves
 - Sales
 - Information
- Education of user/customer
- Build a community of users/customers around products or content

OWL Tips



Las Vegas Hotels: Comparison

www.tripadvisor.com/Hotels-g45963-Las_Vegas,Nevada-Hotels.html

Eleanor Steinman and Ramesh Jain are friends with reviewers of Mandarin Oriental, Las Vegas

Mandarin Oriental, Las Vegas ★★★★★
Special Offer 3rd Night Free
Ranked #1 of 271 hotels in Las Vegas
1,798 reviews
"a truly deserve 1st place!" 06/27/2013
"oasis of tranquility" 06/27/2013
Professional photos | Traveler photos (951) | Map

Elizabeth Churchill and Dan Bodenheimer are friends with reviewers of Four Seasons Hotel Las Vegas

Four Seasons Hotel Las Vegas ★★★★★
Special Offer USD 100 Hotel Credit
Ranked #2 of 271 hotels in Las Vegas
2,016 reviews
"Superior Hotel on the Vegas Strip" 06/28/2013
"Luxury in Sin City" 06/28/2013
Professional photos | Traveler photos (648) | Map

Staybridge Suites Las Vegas ★★★★★
Special Offer Save on Hotel Packages!
Ranked #3 of 271 hotels in Las Vegas
431 reviews
"Best hotel!" 06/26/2013
"Very Nice Hotel off the strip" 06/25/2013
Professional photos | Traveler photos (225) | Map

ARIA Sky Suites
Ranked #4 of 271 hotels in Las Vegas
210 reviews
"A unique thing of beauty" 06/28/2013
"the Vegas Strip" 06/27/2013
Traveler photos (121) | Map

Top picks in Las Vegas

Belagio Las Vegas ★★★★★ 5,761 Reviews
Las Vegas, NV
Show Prices

Venetian Resort Hotel Casino ★★★★★ 8,884 Reviews
Las Vegas, NV
Show Prices

Mandarin Oriental, Las Vegas ★★★★★ 1,798 Reviews
Las Vegas, NV
Show Prices

Friends' activity nearby

The Strip
Andrew Fetterer rated this attraction
★★★★

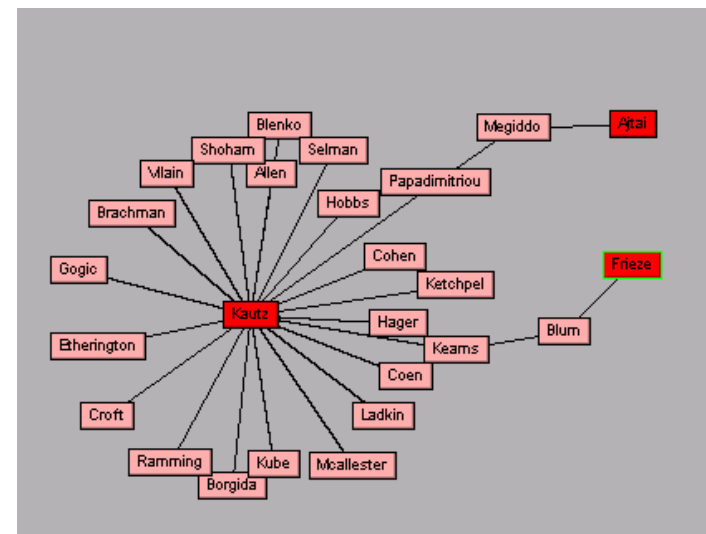
Springs Preserve
J B Lawton III likes this attraction

Belagio Fountains
Andrew Fetterer rated this attraction
★★★★

37 friends have been to Las Vegas & nearby towns

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ReferralWeb



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Recommendation Context

- What is the User doing at the time of recommendation?
 - Shopping
 - Listening to Music
 - Hanging out with other people
- How does the context constrain the recommender?
 - Groups, automatic consumption (vs. suggestion), level of attention, level of interruption?

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Forgot your user ID

Pandora Radio - Listen to

www.pandora.com/station/play/1489067864220916656

PANDORA

Billy Joel Radio

register | sign in | help

New Station Type in artist, genre, or composer

0:18 -2:55

Now Playing

Shuffle

Billy Joel Radio

add variety options

Goodbye Yellow Brick Road by Elton John on Goodbye Yellow Brick Road

Lyrics

When are you gonna come down
When are you going to land
I should have stayed on the farm
I should have listened to my old man
show more

About Elton John

In terms of sales and lasting popularity, Elton John was the biggest pop superstar of the early '70s. Initially marketed as a singer/songwriter, John soon revealed he could craft Beatlesque pop and pound out rockers with full bio

Similar Artists

The Beatles
Eagles

Your Ad Here

xfinity

XFINITY® TRIPLE PLAY
EXCLUSIVE ONLINE OFFER

GET STARTED AT \$99 A MONTH FOR 12 MONTHS

\$100 VISA® PREPAID CARD

LEARN MORE

Ads by Google

2013 MAZDA3 SKYACTIV
Up to 40 MPG Highway.
Efficiency & Performance all in one
www.MazdaUSA.com

Nursing School Online
Earn Your RN To BSN in 3 Semesters.
Online, Affordable & User Friendly!
www.Chamberlain.edu

Want to go back on BIRTH CONTROL?

why ads? skip

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Whose Opinion?

- “Experts”
- Ordinary “phoaks”
- People like you

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The screenshot shows a web browser window with the address bar displaying a URL from phoaks.com. The page title is "People Helping One Another Know Stuff". Below the title, there are navigation links: "Recency", "Top", "Area", "Summary", "Help", and "Posters". A search bar is present with the text "Search" and a note: "* Searches for posted web pages that contain any of the above words". Below the search bar, there is a section titled "Frequently Mentioned Resources". This section contains a table with columns: "Resource Title", "Distinct Posters", and "Click on Bars for Message Context(s)". The table lists 10 resources, with the first one being "Bob Dylan - Bob Links" with 23 distinct posters. Below the table, there is a note: "* Note: each square represents the posting of one resource (e.g., URL) by one person. The lighter the square, the more recent the post. Click on a square to view messages where this resource was mentioned. Posting a web resource does not necessarily imply endorsing that resource. Sometimes it may actually mean the opposite. Consult the relevant newsgroup messages to obtain context."

Introduction to Recommender Systems

The screenshot shows the wine.com website. The main content area displays the product "1997 Casa Lapostolle Cabernet Sauvignon, Rapel Valley, Chile". The price is \$9.95. There are buttons for "Add to Cart" and "Add to My Wish List". To the right, there is a section titled "Our Wine Experts Recommend..." with links to "1997 Domaine Bascou Vin de Pays d'Oc (Cabernet Sauvignon), France" and "1997 Meridian Cabernet Sauvignon, California". Below this, there is a "Peter's Tasting Chart" with a grid of intensity, body, acidity, tannin, oak, and complexity. The chart shows various levels of these attributes, such as "delicate" to "powerful" for intensity and "light body" to "very full body" for body. Below the chart, there is a paragraph about Casa Lapostolle, a partnership between French and Chilean winemaking families. On the left side of the page, there is a "Wine Selector" with dropdown menus for Category, Price, and Origin, and a "Go" button. Below the selector, there are "More Search Options" and "Short Cuts" for various wine types like Red Wines, White Wines, and Rare Wines.

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Personalization Level

- Generic / Non-Personalized
 - Everyone receives same recommendations
- Demographic
 - Matches a target group
- Ephemeral
 - Matches current activity
- Persistent
 - Matches long-term interests

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landsend.com - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites History

Address

Shopping Bag Checkout My Account My Model Personal Shopper Ask Us

Welcome Women's Men's Kids' For the Home Luggage Gifts

1-800-963-4816

Lands' End Store Overstocks Corporate Sales

Search for go

In All Products

Catalog Quick Order go

Enter an Item Number

Sign up!

- Subscribe to our e-mail newsletter
- Request our Catalog
- Join our Affiliate program

Special Services

- Gift Certificates
- Track your Order status

International Sites

- Shop in your local language

Our Company

- General Information
- Investor's Corner

It makes looking good look easy.

The slimming Faille Tankini – just \$58!

AS SEEN ON TV!

The magic word is Faille (say it "file"). It's a revolutionary ribbed fabric that feels slimming and comfortable.

With a liberating – yet discreet – 2-piece style, our [Faille Tankini](#) works its magic at a very down-to-earth price: \$58.

Want a pile of faille? See [all of our slimming Faille favorites](#).

Let Swim Finder locate your perfect suit!

Quickly sorts through hundreds of Suits by:

- Body Shape
- Anxiety Zones
- Leg Height
- Bra Style
- 18W-26W
- Mastectomy
- and more!

It's fast...it's fun! [Try Swim Finder today!](#) Or, [click here](#) to see new styles, swim separates, and more.

Important Notice!

Lands' End has agreed to be acquired by Sears. Read the [announcement](#) by Lands' End CEO David Dyer, and see the companies' [joint press release](#).

Design your own pants right here:

- New! Men's Custom Jeans
- Men's Custom Chinos
- New! Women's Custom Jeans
- Women's Custom Chinos

Subscribe!

News! Special! Enter your e-mail address to subscribe:

Land's End Custom

Land's End Maternity

Internet Exclusive!

Click here to see new styles, swim separates, and more.

http://www.landsend.com/cd/fp/prod/0,,1_2_1930_10433_38642_30064_5:view=593,00.html?sid=620802

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Brooks Brothers - Classically Modern Men's and Women's Apparel - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Back Forward Stop Search Favorites History

Address http://www.brooksbrothers.com/

productsearch go shoppingbag

enter an item number or keyword to find your product.

Welcome! Please [sign-in](#) or [register](#) with us and save \$10!

men women clearance specialtyshops

light, luxurious linen

save 25%

on all men's and women's linen through 5.27

VIEW THE COLLECTION

THE GOLDEN FLEECE POLO NOW 3 FOR \$85 COMPARE & SAVE

BECOME A MEMBER & SAVE faster and easier shopping plus \$10 OFF REGISTER TODAY

MEN'S & WOMEN'S CLEARANCE UP TO 80% OFF BEGIN SAVING

brooks.buys gifts top ten boys brooks.mail about us 1.800.556.7039

emailsignup submit stores catalog brooks card privacy help members | sign-in

https://www.brooksbrothers.com/dynaset.asp?html=members&secure=yes

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CDNOW : Album Advisor - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://www.cdnw.com/cgi-bin/mserver/SID=1648068516/pagename=/RP/Al/album_advisor.html

CDNOW

Folk & Blues up to 30% off Save on Country music, too!

Stay Awake at Work with Non-Stop Music from CDMW Radio

MUSIC VIDEO GIFTS MY CDMW HELP

Gift Certificates Album Advisor Box Sets Movies as Gifts

Shopping Cart contains 0 items

Artist Search Search Classical

Album Advisor™

Tell us what you like and we'll make several recommendations. Great for buying gifts or broadening your musical horizons.

To start, enter the names of up to three artists below and click on the **Recommend** button.

gordon bok

enya

Recommend

Album Advisor™ Home

日本語 Deutsch Español Français Italiano Nederlands Português

Music Video Gifts My CDMW Help Shopping Cart

Artist Search Search Classical

Introduction to Recommender Systems

CDNOW : Album Advisor - Microsoft Internet Explorer

File Edit View Favorites Tools Help

Address http://www.cdnw.com/cgi-bin/mserver/SID=1648068516/pagename=/RP/Al/album_advisor.html/view=findartists

Listen

"Cruel Summer"

[Real Audio](#)

[Windows Media](#)

[See complete track list and more album info.](#)

Ace Of Base Cruel Summer

List \$16.97

Add to Cart \$12.99

Listen

"Symphony No.5"

[Real Audio](#)

[See complete track list and more album info.](#)

Fantasia 2000 Score

List \$17.97

Add to Cart \$13.99

Listen

"Lay All Your Love On Me"

[Real Audio](#)

[Windows Media](#)

[See complete track list and more album info.](#)

Erasure Abba-Esque

List \$6.97

Add to Cart \$6.89

Vangelis Opera Sauvage

List \$11.49

Hymne

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Privacy and Trustworthiness

- Who knows what about me?
 - Personal information revealed
 - Identity
 - Deniability of preferences
- Is the recommendation honest?
 - Biases built-in by operator
 - “business rules”
 - Vulnerability to external manipulation
 - Transparency of “recommenders”; Reputation

Introduction to Recommender Systems

Interfaces

- Types of Output
 - Predictions
 - Recommendations
 - Filtering
 - *Organic vs. explicit presentation*
 - Agent/Discussion Interface
- Types of Input
 - Explicit
 - Implicit

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Recommendation Algorithms

- Non-Personalized Summary Statistics
- Content-Based Filtering
 - Information Filtering
 - Knowledge-Based
- Collaborative Filtering
 - User-User
 - Item-Item
 - Dimensionality Reduction
- Others
 - Critique / Interview Based Recommendations
 - Hybrid Techniques

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