



The Quest for the "right item":
How to use search, recommender systems and online community to help users find what they want.

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Summary of the talk

- Users have different types of information needs.
 - How open / close-ended is the need?
 - If need is close-ended, then users generally want more control over their exploration and vice versa.
- Same interface cannot serve all needs.
 - **Search/Browse systems more appropriate for users**
 - Who have somewhat specific needs
 - Wants to be in control of the information exploration
 - **Recommender Systems are appropriate when users**
 - Needs are somewhat open-ended
 - They are willing to give up control (in exchange for being introduced to new interesting items).

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Brief Overview of Interface Types

Search:

Simple: Exists on most sites
Boolean:

Integrated Search/Browse Interface

Browse:

Simple: Amazon, CDNow
Advanced: Tower Records

Systems that predict user tastes:

Product Advisor: Sony Digital Camera Advisor

Recommender System: Amazon, MediaUnbound Music Recommender System

Community & Expert Opinions

Peer Review & Ratings: Epinions, Amazon

Expert Review & Ratings: Cnet,

Popularity Indicators (Sales, Downloads etc.): CDNow

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Example User Needs

- **Looking for architectural images** (architectural student exploring environmentally sound architecture design in UK. Especially interested in the use of different materials for design.)
 - Need is pretty specific, less open-ended
 - **Appropriate Interface:** Search/Browse interface that lets me explore the dataset at my own pace
- **Looking for some new music...** (I am tired of my old records, looking for something new. I am open to ideas and suggestions)
 - more open-ended
 - often about “individual taste”
 - **Appropriate Interface:** Recommender system that allows me to explore my tastes



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User experience in Browse Interfaces is like



driving a car...

- More of a controlled experience
- Every movement (forward, making a turn, backwards) is a conscious choice. (need information at every step)
- User might make mistakes, and retract (go back) a step or two or start again. Each of these is a conscious choice.

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User experience in Recommender systems is like



riding a roller coaster...

- user has less control over specifics of the interaction.
- System does not provide information about specifics of action
- more of the black box model (some input from user, output from systems).

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Flamenco Interface: an innovative Search/Browse interface

- Information architecture should be designed to integrate search throughout.
 - Complete integration of search and browse. Can switch from one to the other effortlessly.
 - Use metadata to show user where to go next. More flexible than canned links
- Allow users to expand, refine, and also move laterally
- Innovative use of breadcrumbs & query previews
- Avoid 0 results
- CHESS METAPHOR: Start Game > Middle Game> End Game

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Type of questions we tried to answer

Architectural database: ~40,000 images, 9 hierarchical facets, rich faceted hierarchical data



- How can metadata be effectively used to build an easy to use Search / Browse system?
 - How many facets should be displayed at once?
 - Should facets be mixed and matched?
 - How much is too much?
- How should hierarchies be revealed (progressively, one step at a time)?
- How should large categories be displayed?
- How should refinement & expansion of query be supported?

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Flamenco Interface: Begin Game

The screenshot shows the 'Begin Game' interface with a search bar at the top. Below it are several categorized lists of filters:

- People:** agency (244), architect (14248), artist (7773), author (298), culture (880), designer (278), developer (81), historical figure (228), instructor (720), photographer (183).
- Locations:** Africa (744), Antiqua (37), Asia (264), Australasia & Pacific Islands (118), Central America (7), Eastern Europe (118), Middle East (1113), North America (1788), South America (86), Southeast Asia (86), Western Europe (1174).
- Structure Types:** architectural elements (588), bookshelves (70), buildings (by design) (84), buildings (by function) (2144), buildings (by height) (28), buildings (by location or context) (58), buildings (by massing or shape) (74), cultural landscapes (42), details (328), human settlements (by human settlements (by base) (80), human settlements (by more...
- Styles:** African (88), Ancient (74), Asian (378), Australasian & Pacific Island (70), Bronze Age (28), Central American (2), Early Mediterranean (212).
- View Types:** asymmetrical (114), city aerial views (74), city details (28), city general views (28), city maps and plans (28), construction views (27), decorative elements (4), design domain drawings (178), elevations (24), exterior detail exterior views more...
- Concepts:** access (7), biomimetic design (4), circulation (2), cultural (28), economic (2), environmental (2), in the arts (27), legal (2), philosophical (78), political (78), psychological (2).

Task: Looking for environmentally sound design in UK

Overview of category structure with query previews providing an easy entry into the metadata

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Flamenco Interface: Middle Game

The screenshot shows the 'Middle Game' interface with search results grouped by concepts. Annotations include:

- Option to refine:** A red circle around the 'Refine your search further within these categories' link.
- Review / remove search terms:** A red circle around the 'Concepts: environmental' filter with an 'X' icon.
- Group:** A red circle around the 'People' category link.
- Category structure:** A green arrow pointing to the 'People' category link.
- Ungrouped results:** A green arrow pointing to a result card in the 'environmental impact' section.

The search results are grouped by concepts, showing 471 items. Visible results include:

- energy resources:** Energy Pavilion, Berthely, Van der Ryn, Sin; Glen Canyon Dam, Colorado River; Laredo Demonstra... Laredo Park, Piny II.
- environmental impact:** 25 items.

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Grouped by Location

Refine your search further within these categories:

People: [personnel](#) (1), [architect](#) (20), [artist](#) (6), [author](#) (7), [culture](#) (6), [designer](#) (1), [photographer](#) (6)

Locations: [Africa](#) (5), [Antarctica](#) (1), [Asia](#) (3), [Australia & Pacific Islands](#) (2), [Eastern Europe](#) (4), [Middle East](#) (1), [North America](#) (1), [South America](#) (1), [Southeast Asia](#) (1), [Western Europe](#) (4)

Structure types: [architectural elements](#) (4), [buildings by design](#) (14), [buildings by function](#) (7), [buildings by height](#) (4), [buildings by location or context](#) (5), [buildings by massing or shape](#) (1), [cultural landscapes](#) (3), [details](#) (1), [human settlements by economic base](#) (3), [human settlements by planning concept](#) (1), [more...](#)

Materials: [concrete](#) (1), [brick](#) (4), [building materials](#) (7), [glass](#) (7), [metal](#) (1), [plant material](#) (4), [recycled](#) (1), [wood](#) (1), [brick](#) (4), [soil](#) (1), [water](#) (1)

Periods: [contemporary](#) (1), [20th Century](#) (4), [Modern](#) (1)

These terms define your current search. Click the **X** to remove a term

Concepts: [environmental](#) (1)

Search all items within current results

471 items (grouped by location)

Asia 3

[Doha](#) (1) [Hong Kong](#) (1) [Singapore](#) (1)

Australia & Pacific Islands 2

[Perth](#) (1) [Sydney](#) (1)

Results grouped by locations

Group by another attribute

Searching options

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Individual Item View

item 13 of 14 [back to results](#)

Palm House

[View image](#)

Current search: [start a new search](#)
People: [architect](#) - [Burton, Decimus](#) (1)

Select any link to see items in a related category:

more general categories: [information about the item](#)

PEOPLE: [architect](#) (2144) [Burton, Decimus](#) (1)

LOCATIONS: [Western Europe](#) (1740) [Great Britain](#) (140) [England](#) (751) [London](#) (1)

STRUCTURE TYPES: [architectural elements](#) (540) [conservation](#) (51) [stage](#) (48) [buildings by function](#) (2144) [greenhouses](#) (20) [greenhouses](#) (4)

MATERIALS: [metal](#) (57) [glass](#) (54) [concrete](#) (1)

PERIODS: [19th Century](#) (1)

STYLES: [European](#) (236) [English](#) (29)

VIEW TYPES: [VIEW TYPES](#)

Option to see related items

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User controls the exploration in Search/Browse interface

- User decides where to go next
- Interface needs to be flexible enough to support the user's exploration
 - Allow refining, expanding
 - Allow grouping of items by the metadata
 - Alternating between search and browse
 - Avoid "0" results (by query previews)



Next: When the user gives up some of the control...

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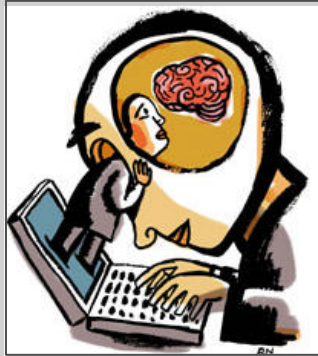
When the user gives up some of the control

- Recommender systems use collaborative filtering algorithms (that help find people whose tastes are similar)
 - Basic Logic: If tastes of two people in books match, then you can recommend books liked by one to the other.
- Based on social filtering: People rely on recommendations by friends or others with similar tastes
 - "I went to watch that movie because my friend told me it was great. I trust her judgment."
- Such systems have become increasingly popular in domains where individual tastes matter



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I know what you'll read next summer (Amazon, Barnes&Noble)



- what movies you should watch...
(Reel, RatingZone, Amazon)
- what music you should listen to...
(CDNow, Mubu, Gigabeat)
- what websites you should visit
(Alexa)
- what jokes you will like (Jester)
- & who you should date (Yenta)

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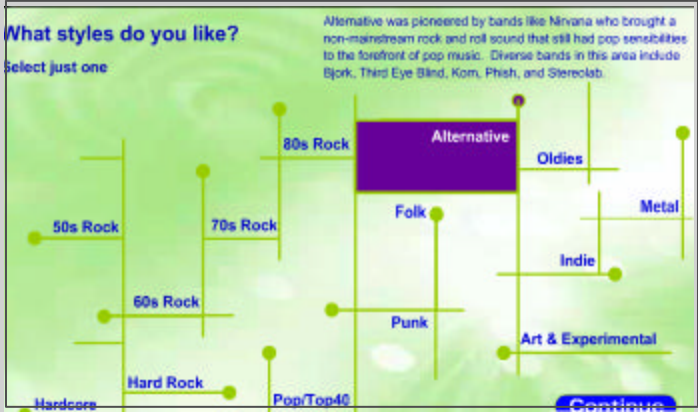
Amazon's Interaction Paradigm

The screenshot shows the Amazon.com interface. At the top is the search bar with the text "Search All Products:" and a "GO!" button. Below the search bar, a personalized greeting "Hello, Rashmi" is displayed, with a link to "click here" if the user is not Rashmi. A red circle highlights the text "Enter a favorite author, musician, movie, or game:" and the input field containing "campay segundo". Below this, there are examples: "Star Wars, Photography, Pokemon, Baseball". To the right, there are navigation tabs for "RECOMMENDATIONS", "YOUR COLLECTION", and "IMPROVE YOUR RECOMMENDATIONS". Below these is a "Recommendations Explorer" section with a "Show: All Products" dropdown and a "GO!" button. The first recommendation is for "Las Flores De La Vida" by Campay Segundo, with an average customer rating of five stars and a price of \$14.99. At the bottom of the recommendation card are "I own it" and "Not interested" buttons.

Contrast interaction with Search /Browse Systems

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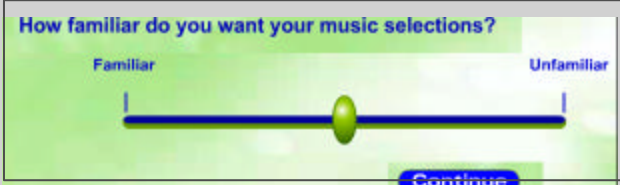
Interaction paradigm for a music recomender System (MediaUnbound)



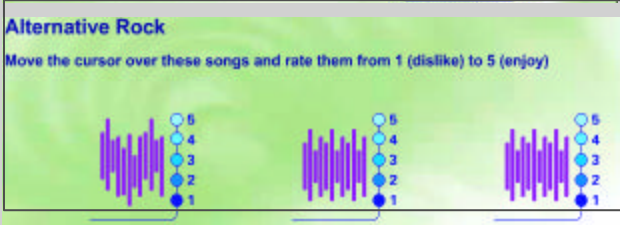
35 questions in all
 First screen: Select a genre

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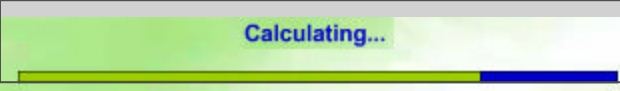
Stages in the recommendation process



Level of Familiarity



Rating some songs



Feedback at Every stage

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Keeping the user informed

Great! We're starting to get a good sense of what you like to hear. For the next stage of this session, we'll present you with groups of songs that might interest you. Since we'll be exploring the boundaries of your musical tastes, it is expected that you may not like all of the music presented.

Continue

Exploring tastes

What did you dislike about this song?



Beastie Boys: Super Disco Breakin'

- Don't like the artist
- Don't like this style of music
- Don't like how it sounds
- Something else about it...

How would you compare this song with the c



- Like it more
- About the same
- Like it less

Verifying preliminary recommendations

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Do people like recommendations from friends or from online systems



- 11 systems (book, movies, music). Each user got recommendations from 3 friends and 3 systems
 - Results: People strongly prefer recommendations from friends to system
 - But, they do like recommendations from online systems

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Users like being able to find new, unknown items

Some quotes

- “Suggested a number of things I hadn’t heard of, interesting matches.”
- “It was like going to Cody’s (a bookstore)—looking at that table up front for new and interesting books.”
- “Systems can pull from a large database—no one person knows about all the movies I might like.”

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A few design guidelines for recommender systems

- **Trust, Trust, Trust:** Good system is not enough, users need to trust that system understands their tastes
- **System Transparency:** Users like to understand system logic (why an item was recommended).
 - **Justify your recommendations:** Provide detailed item information & explanation for why item was recommended.
- **New Unexpected Items:** Recommend some, users expect it.

Out of the box solutions for Recommender Systems:

- NetPerceptions, MediaUnbound, DigitalMC
- Many companies design their own solutions

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Community Ratings and Reviews

- When users are introduced to new, previously unknown items, then they need reassurance that they will really like item
 - For unfamiliar items users often turned to community reviews whenever available
 - This was more true when they found items through recommender systems rather than through browsing



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Example: Looking for some new music...

MUSIC INFORMATION
Explore this album
buying info
[listen to samples](#)
[editorial reviews](#)
[customer reviews](#)

RATE THIS ITEM
I dislike it I love it
1 2 3 4 5
 I own it
[Edit your rating](#)

Customers who bought this title also bought:

- [Buena Vista Social Club](#) ~ Buena Vista Social Club, et al
- [4 Folia Cuba Le Gusta](#) ~ Afro-Cuban All Stars
- [Buena Vista Social Club Presents Omara Portuondo](#) ~ Omara Portuondo
- [Chancho 40](#) ~ Ruben Gonzalez
- [Lo Mejor de la Voz](#) ~ Compay Segundo

Received a recommendation (Amazon thinks I will like this artist)

Will I like really it?

What do others think of it

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What do others think of it, read reviews, examine ratings

Introducing... Ruben Gonzalez

Spotlight Reviews (what's this?)
[Write an online review](#) and share your thoughts with other customers.

Avg. Customer Review: ★★★★★

22 of 22 people found the following review helpful:

★★★★★ **my every day need : like a cup of coffee ; my piece of mind**, April 22, 2002
Reviewer: Carl_de_Vries@hotmail.com from from the Netherlands
when I bought this cd it was after I heard Ruben playing with the Buena Vista social club. The song 'Pueblo Nuevo' opened my eyes to the fact that I was listening to the greatest piano player in Cuba

13 of 13 people found the following review helpful:

★★★★★ **on a desert island with Ruben Gonzalez**, April 13, 2000
Reviewer: tom from Vancouver, BC
Like most, I discovered Ruben Gonzalez through the Buena Vista album, which I played every day for 10-14 year olds driving them to school, then to myself, commuting (commuting) 40 minutes to work to know the songs very well. The more I listened to them, the more I felt I was getting closer to some

★★★★★ **IS THIS A 5 STAR CD ?...YES INDEED !!**, August 20, 2002
Reviewer: Nat Valentine from New York, NY USA
Ignore the negative critiques. This is beautiful music played by a man who should not only be a national treasure of Cuba, but one who should be treasured by all who love musical genius. True, this music does not have the intensity of Buena Vista Social Club, but so what !! It stands on its own merit. Buy this

Was this review helpful to you? yes no

Rating of item

How many people found it useful

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Greater weight given to someone's advice

- Consumer decision making:
 - People are not always rational decision makers. Often they use heuristics (short-cuts)
 - One heuristic is that people are unduly influenced by people like them. People like to know what people like them thought of a book, movie, TV, software, laptop.
- Lesson for designers:
 - Users can offer valuable advice to each other.
 - Create the infrastructure for a community and give them the chance to communicate
 - Lots of good, easy to setup community software out there
 - Use out of the box models rather than setup your own
 - Integrate it with rest of your site as far as possible

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In conclusion

Collaborators

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