

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

Introduction to Recommender Systems

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

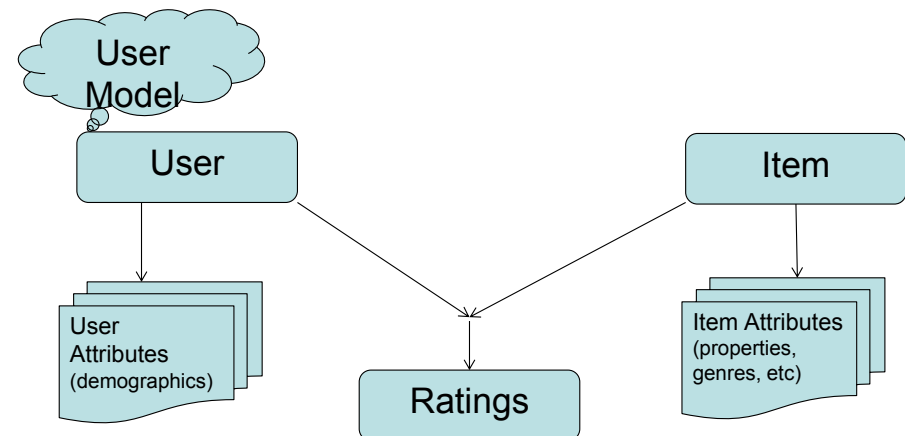
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From the Abstract to the Specific

- Basic Model
 - Users
 - Items
 - Ratings
 - (Community)

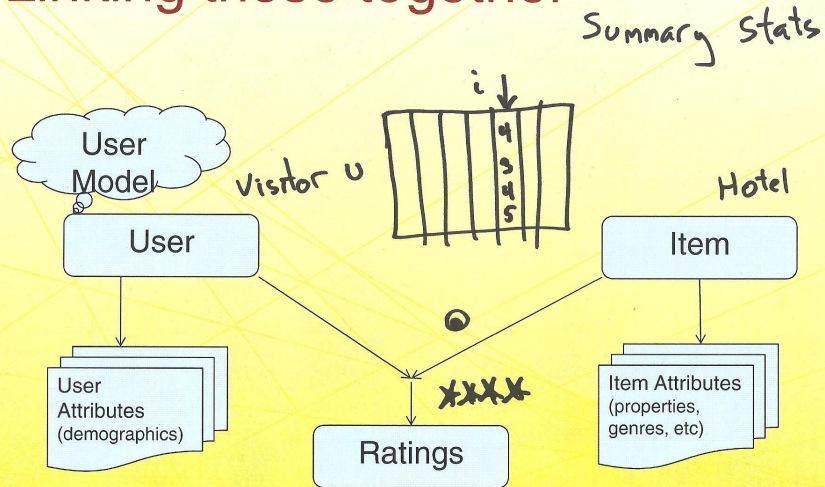
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Linking these together

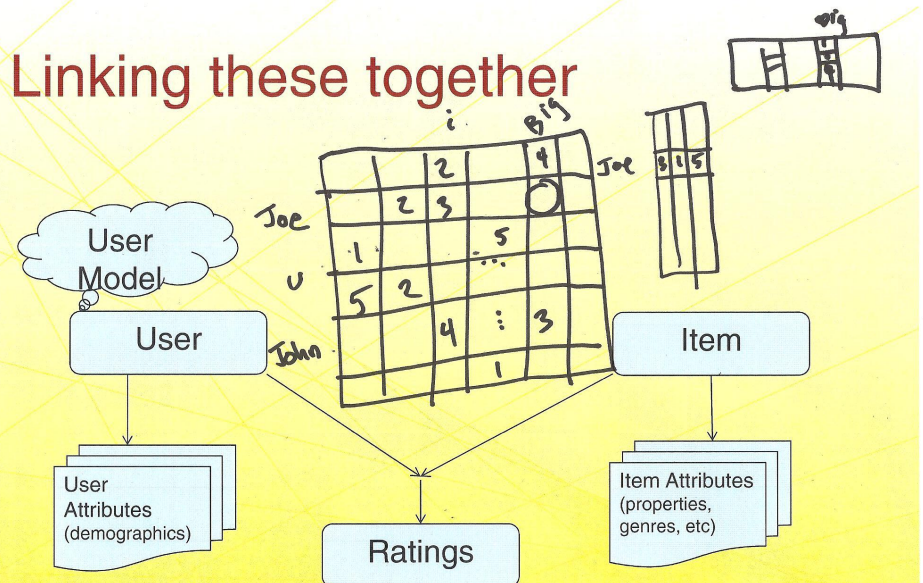


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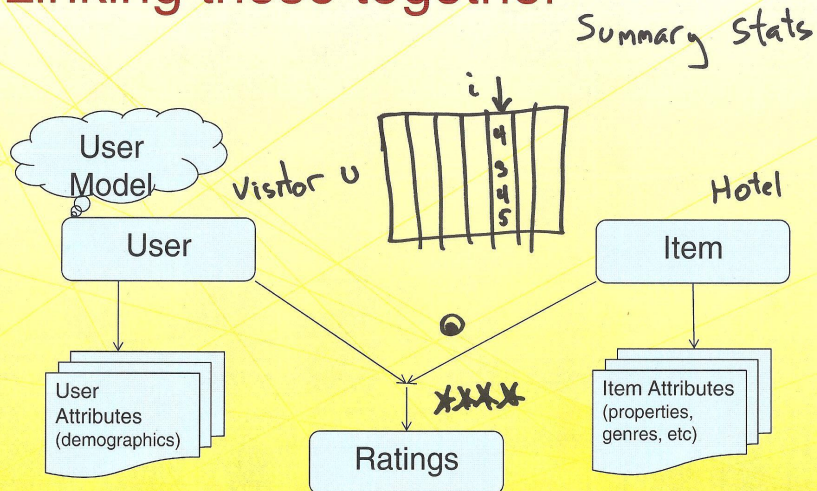
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Linking these together



Linking these together



Non-Personalized Summary Stats

- External Community Data
 - Best-seller; Most popular; Trending Hot
- Summary of Community Ratings
 - Best-liked
- Examples
 - Zagat restaurant ratings
 - Billboard music rankings
 - TripAdvisor hotel ratings

Content-Based Filtering

- User Ratings x Item Attributes => Model
- Model applied to new items via attributes
- Alternative: knowledge-based
 - Item attributes form model of item space
 - Users navigate/browse that space
- Examples
 - Personalized news feeds
 - Artist or Genre music feeds

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Personalized Collaborative Filtering

- Use opinions of others to predict/recommend
- User model – set of ratings
- Item model – set of ratings
- Common core: sparse matrix of ratings
 - Fill in missing values (predict)
 - Select promising cells (recommend)
- Several different techniques

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Collaborative Filtering Techniques

- User-user
 - Select neighborhood of similar-taste people
 - Variant: select people you know/trust
 - Use their opinions
- Item-item
 - Pre-compute similarity among items via ratings
 - Use own ratings to triangulate for recommendations
- Dimensionality reduction
 - Intuition: taste yields a lower-dimensionality matrix
 - Compress and use a taste representation

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Note on Evaluation

- To properly understand relative merits of each approach, we will spend significant time on evaluation
 - Accuracy of predictions
 - Usefulness of recommendations
 - Correctness
 - Non-obviousness
 - Diversity
 - Computational performance

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Other Approaches

- Interactive recommenders
 - Critique-based, dialog-based
- Hybrids of various techniques

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Moving Forward

- Next Lecture: A Tour of Amazon.Com, organized by our taxonomy
- Then, you should be able to:
 - Analyze a recommender application on your own
- Course Structure:
 - We step through the recommendation algorithms, with six major modules
 - Related topics intermingled

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