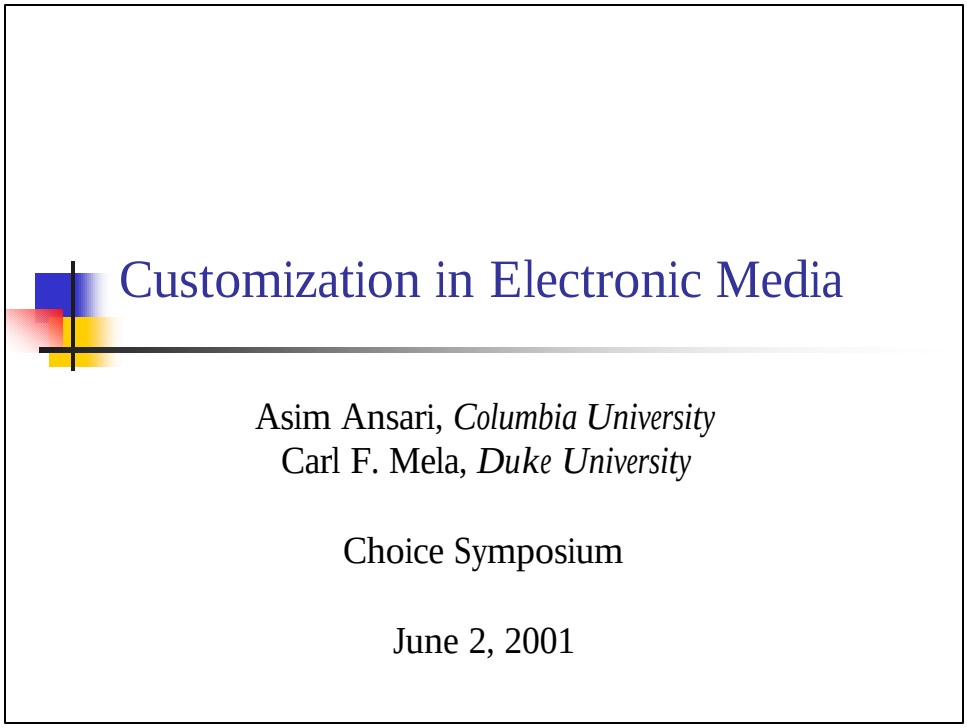
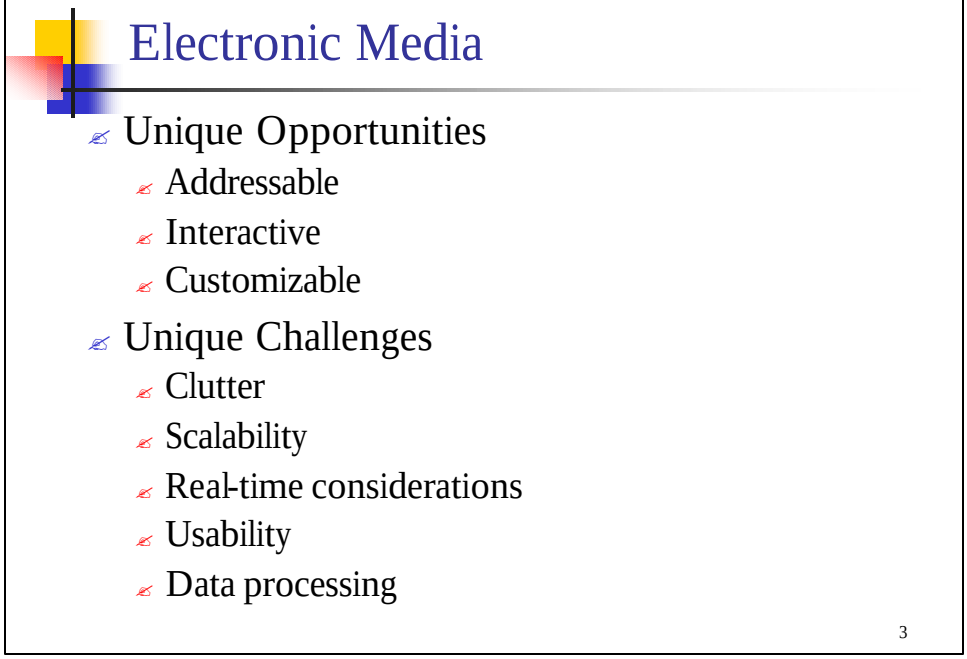
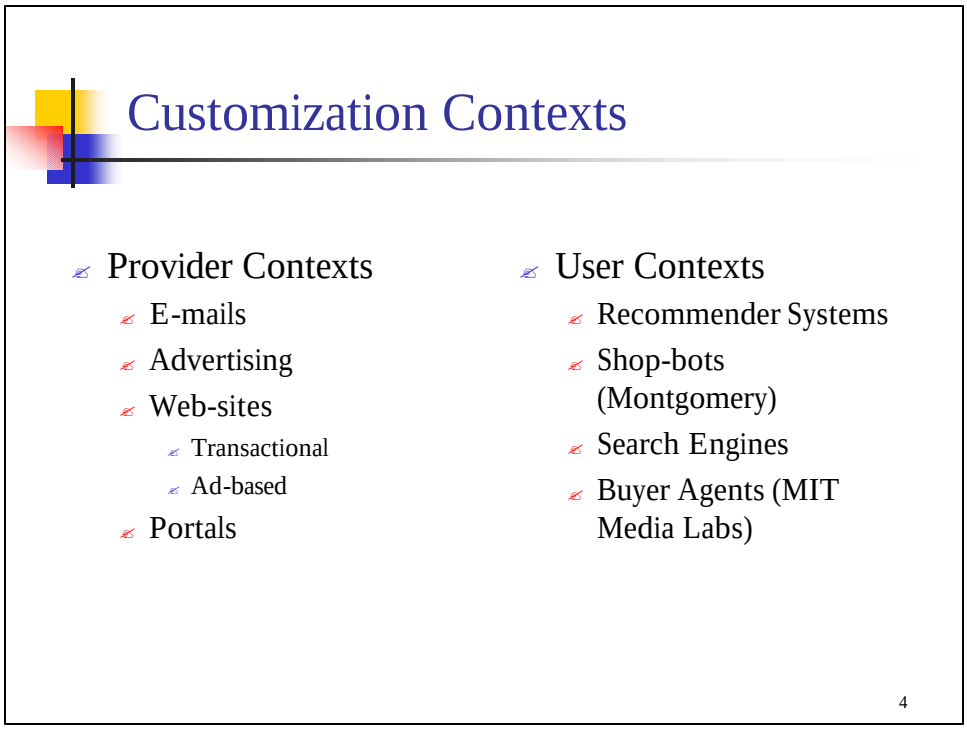
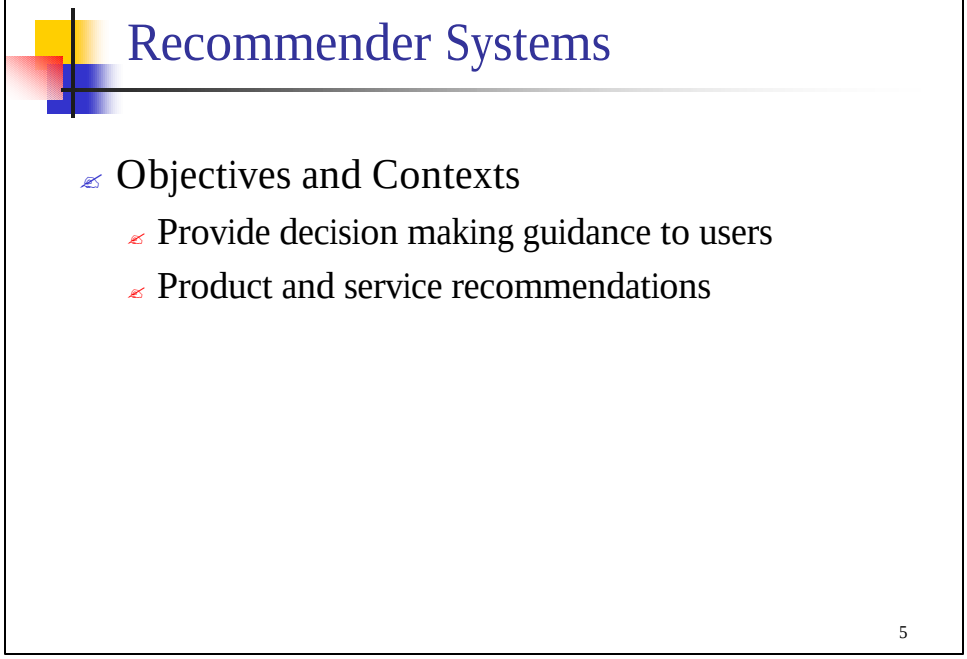
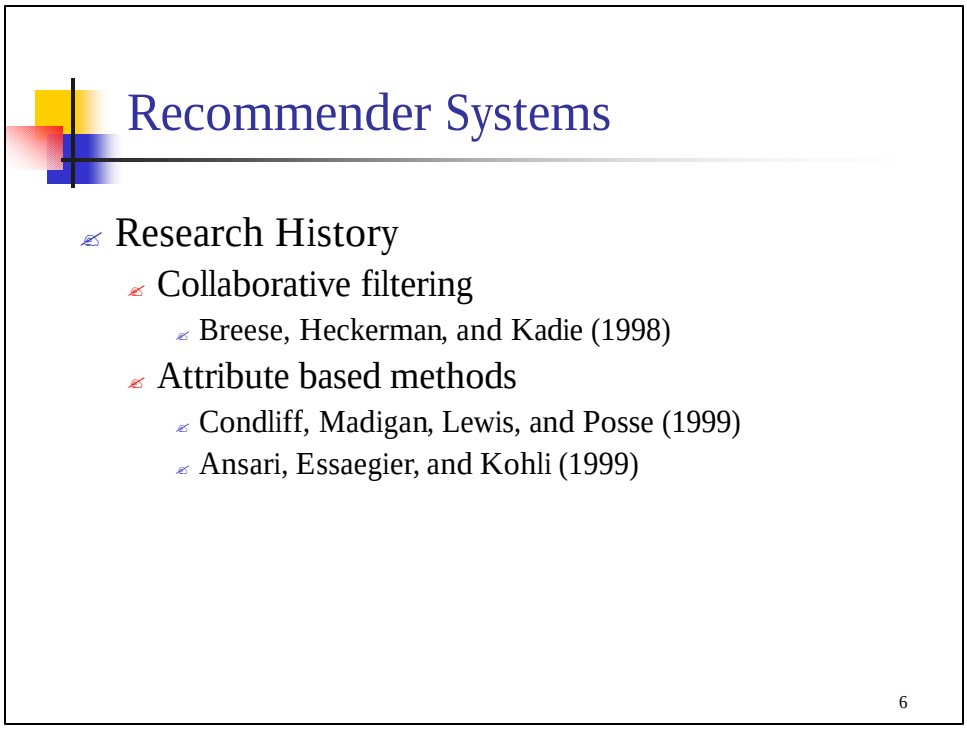

Customization in Electronic Media
Asim Ansari, *Columbia University*
Carl F. Mela, *Duke University*
Choice Symposium
June 2, 2001

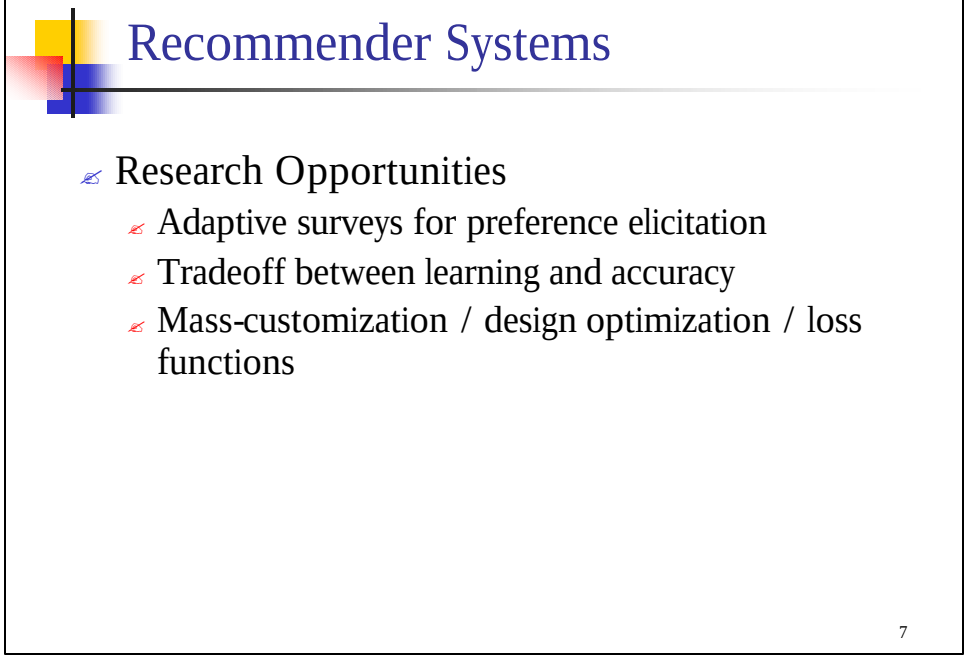

Past Research
Targeted Promotions
Coupon values
Database Marketing
List segmentation
Conjoint Analysis
Sales Account Targeting
Etc.
2

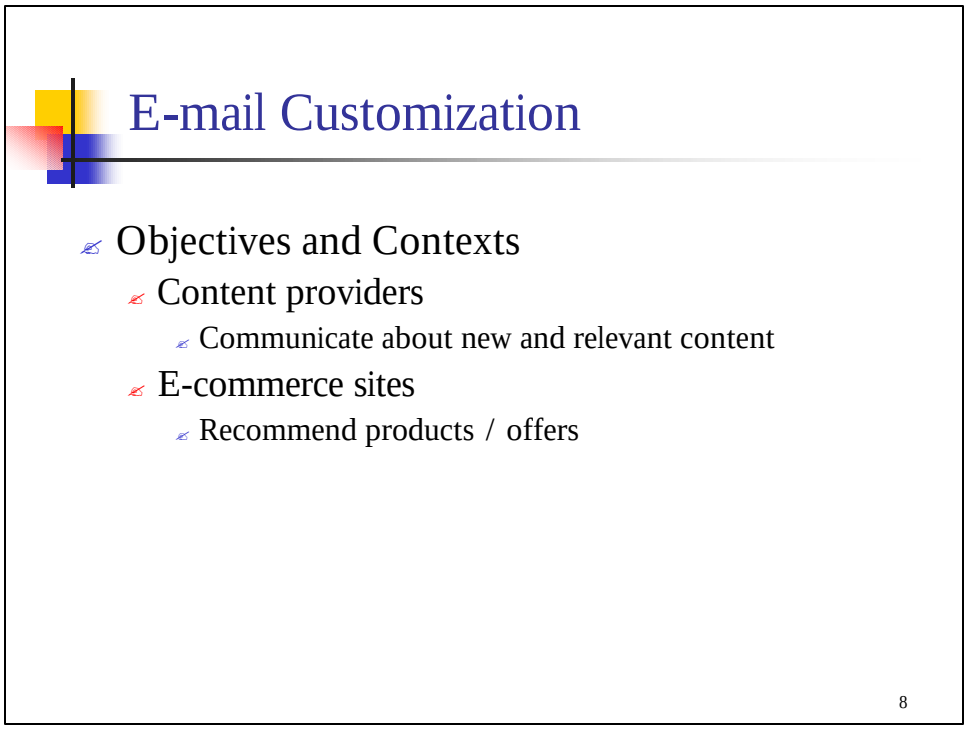

Electronic Media
Unique Opportunities
Addressable
Interactive
Customizable
Unique Challenges
Clutter
Scalability
Real-time considerations
Usability
Data processing
3

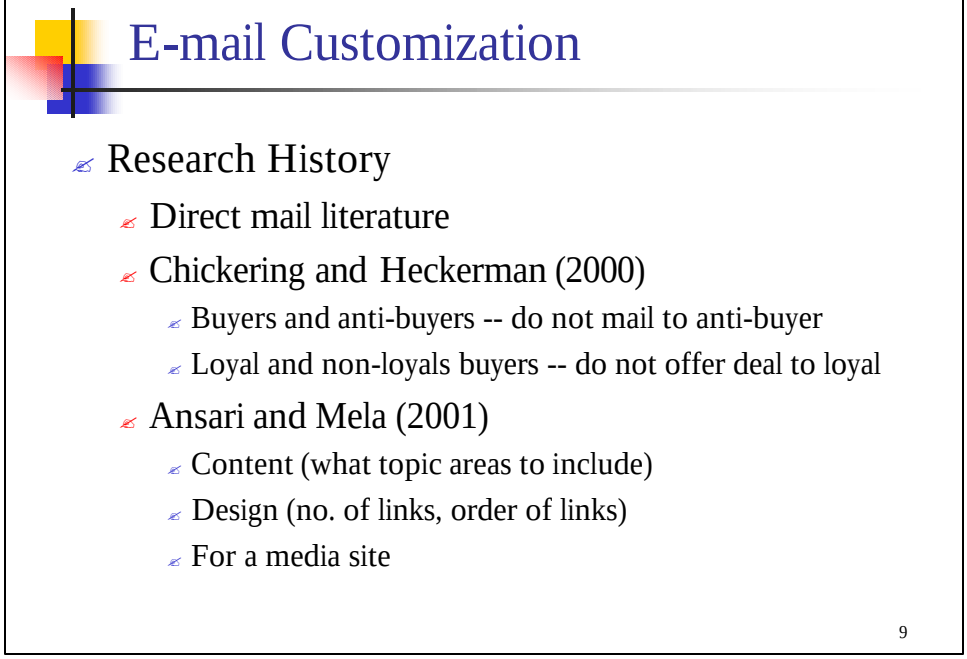

Customization Contexts
Provider Contexts
E-mails
Advertising
Web-sites
Transactional
Ad-based
Portals
User Contexts
Recommender Systems
Shop-bots (Montgomery)
Search Engines
Buyer Agents (MIT Media Labs)
4


Recommender Systems
Objectives and Contexts
Provide decision making guidance to users
Product and service recommendations
5

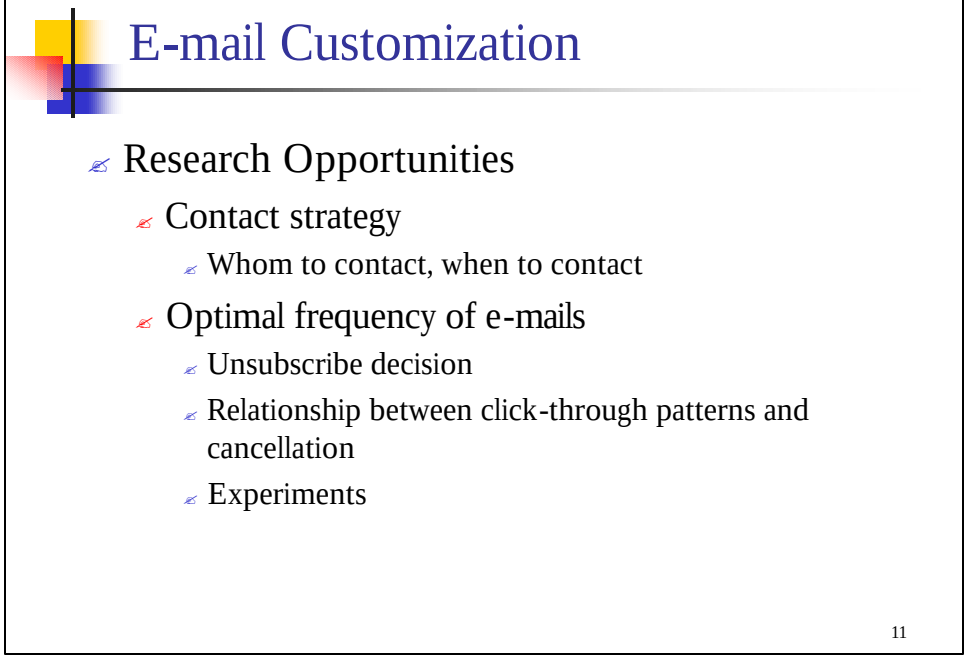

Recommender Systems
Research History
Collaborative filtering
Breese, Heckerman, and Kadie (1998)
Attribute based methods
Condliff, Madigan, Lewis, and Posse (1999)
Ansari, Essaegier, and Kohli (1999)
6

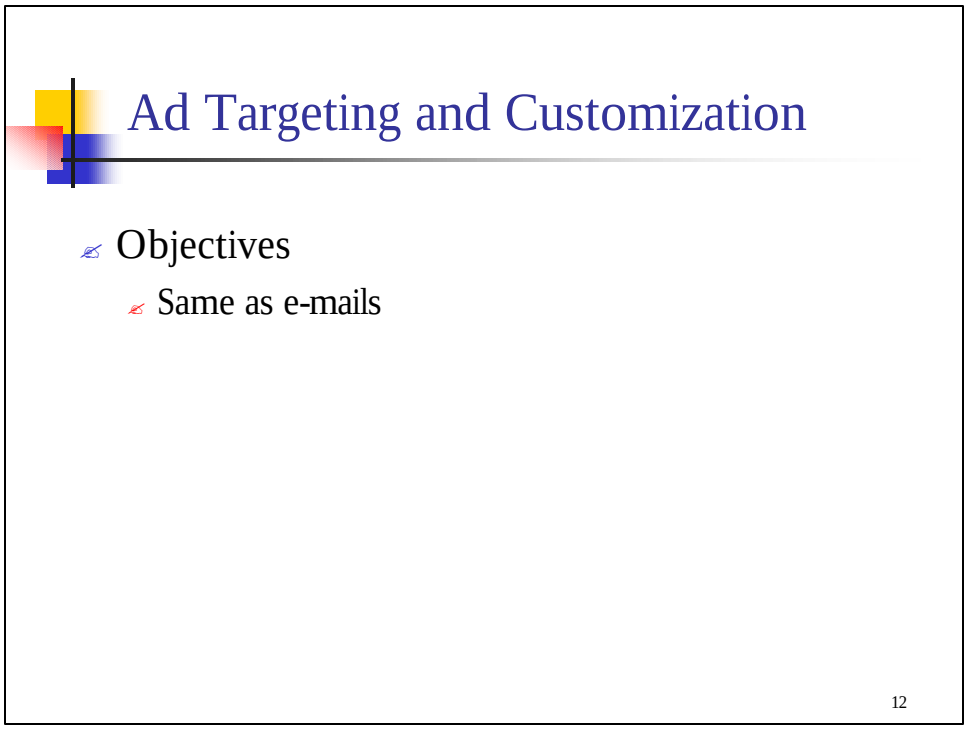

Recommender Systems
Research Opportunities
Adaptive surveys for preference elicitation
Tradeoff between learning and accuracy
Mass-customization / design optimization / loss functions
7


E-mail Customization
Objectives and Contexts
Content providers
Communicate about new and relevant content
E-commerce sites
Recommend products / offers
8


E-mail Customization
Research History
Direct mail literature
Chickering and Heckerman (2000)
Buyers and anti-buyers -- do not mail to anti-buyer
Loyal and non-loyals buyers -- do not offer deal to loyal
Ansari and Mela (2001)
Content (what topic areas to include)
Design (no. of links, order of links)
For a media site
9


E-mail Customization
Research Opportunities
Transactional e-mails (often non-repeat)
Which products
Elements of collaborative filters and attribute based systems
Repeat vs. non-repeat
What descriptions
Features to emphasize
10


E-mail Customization
Research Opportunities
Contact strategy
Whom to contact, when to contact
Optimal frequency of e-mails
Unsubscribe decision
Relationship between click-through patterns and cancellation
Experiments
11


Ad Targeting and Customization
Objectives
Same as e-mails
12

Ad Targeting and Customization

- Research History
  - Engage.com (adjust on the fly across sites by comparison of CPM and hit rate)
  - Search words
  - Yahoo “targeting” model (more specific the domain, the more demo criteria, the higher the fee)
  - Chickering and Heckerman (1999)
    - Optimize placements subject to budget constraint
    - p (click ij) = counts of times that segment j clicks on ad i
    - Determine optimal number of clicks s.t. budget and uniformity criteria
    - 20 to 30% improvement in click rates

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Ad Targeting and Customization

- Research Opportunities
  - Content, design (same as e-mail)
  - Contact strategy (same as e-mail)
    - Location, targeting and frequency
  - Pricing (referrals, clicks, exposures, clicks, or mix)
  - Sparse data problem
    - Except for ads on computer games (5% click rate), good null is no clicks
    - Oversampling or rare alternatives?

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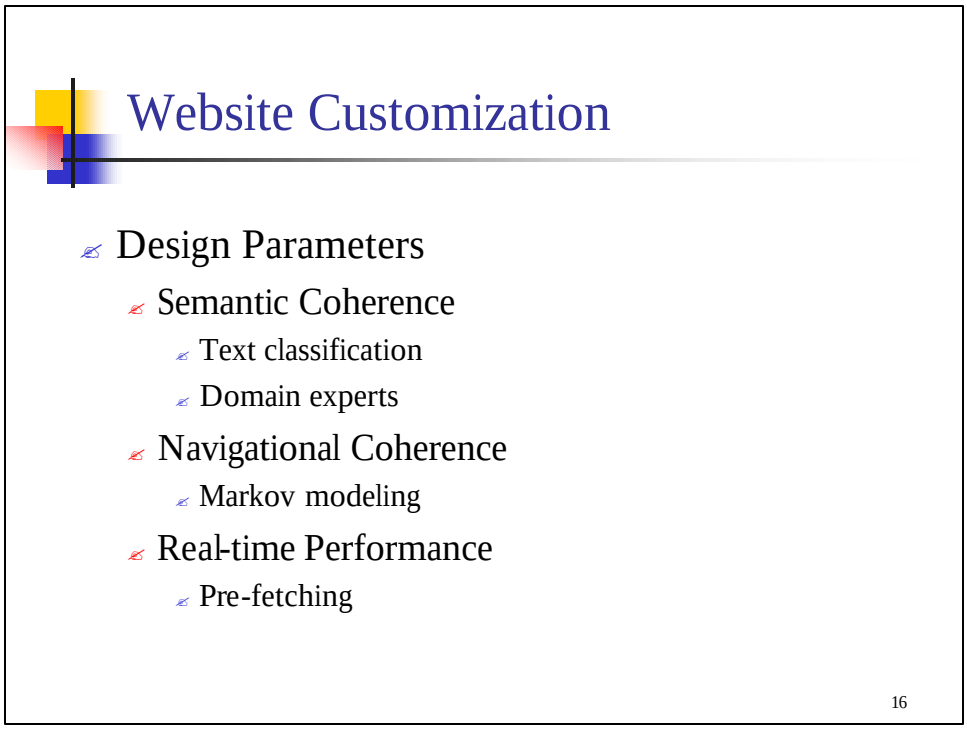
Website Customization
Objectives
User objectives
Usability
Topicality
Provider objectives
Improve browse to buy ratios
Cross-sell
Up-sell
Referrals
15


Website Customization
Design Parameters
Semantic Coherence
Text classification
Domain experts
Navigational Coherence
Markov modeling
Real-time Performance
Pre-fetching
16

Website Customization

- Research History
  - Navigational Coherence
    - Cadez et al. (2000)
      - Latent class Markov navigation model with entry point model
      - Visualization tool
    - Sen and Hansen (2001)
      - Bayesian Markov chain models
      - Variety seeking / Inertia literature?
    - Perkowitz and Etzioni (2000)
      - Clustering for Index page synthesis
  - Semantic Coherence
    - Nigam et al. (2000)
      - EM algorithm for Naïve Bayes classification

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Website Customization

- Research Opportunities
  - Optimization
    - Probability of exit
    - Time / clicks on site
    - Referrals
  - Other Methods
    - Hidden Markov models
    - Mixture transition models
  - Modeling for self-customization
    - Choosing levels and number of attributes to present,
    - Order of questions

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Portal Customization

- Web sites integrate pages, portals integrate websites
- Objectives
  - Locate sites
  - Integrate/organize sites

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Portal Customization

- Research History
  - Questionnaire-based
  - McCallum, Nigam, Rennie, and Seymore (2000)
    - Find documents (web spider)
    - Infer information from documents (hidden Markov models)
      - Enumerate likelihood of document characteristics from text (title, author, affiliation)
    - Find topic hierarchy (categorization)
      - Word probabilities given a category
- Research Opportunities
  - Customization
    - Questionnaire based
    - Clickstream based

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Search Engine Customization

- Wheras portals integrate sites in a fixed fashion, search engines are more dynamic
- Objectives
  - Locate sites
  - Prioritize sites to align with user interests
    - Inferring search goals

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Search Engine Customization

- Research History
  - Bradlow and Schmittlein (2000)
    - Measuring ability of web sites to find information of interest
  - Lau and Horvitz (1999)
    - Infer search goals from log file data
      - Type (e.g., new or reformulation, interrupt)
      - Content (e.g., products/services, adult)
      - Inter-query interval
    - Bayesian networks implies inter-query interval and type predicts content
      - Could be used to order search results

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Search Engine Customization

- Research Opportunities
  - Efficient spidering
  - Prioritizing sites
    - Collaborative approach
    - Attribute approach
      - # of clicks from search, pages down into search
  - Efficiency
    - Longer wait vs. better results
  - Approaches
    - Markov transition probabilities
      - P(exit search), P(re-specify search), P(return on next search)

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Marketing vs. Internet Research

- New Research Philosophies Needed
- Different Disciplines
- New Methods
- New Empirical Challenges

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Research Philosophies

Marketing

- Theory / Explanation
- Rigorous
- Decision Support

Internet

- Prediction
- Useful/ Practical
- Decision Automation

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Base Areas

Marketing

- Econometrics
- Economics
- Game Theory
- Social Psychology
- Cognitive Psychology
- Behavioral Decision Theory
- Statistics

Internet

- Information Retrieval
- Machine Learning
- Artificial Life
- Human Computer Interaction

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Methods

Marketing

- Logit
- Probit
- Regression / Anova
- Structural Equation Models
- Dynamic Programming
- Optimal Control

Internet

- Radial Basis Function Networks
- Multi-layered Perceptrons
- Support Vector Machines
- Reinforcement Learning
- Boosting
- Bagging

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Empirical Challenges

- Scalability
  - Data Structures
  - Sampling
    - Data squashing
  - Scalable algorithms
- Real Time Performance
  - Adaptive models
- Ability to deal with open environments
- Ability to deal with different types of data

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