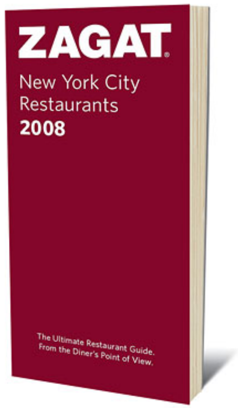
2-1: Introduction to Non-Personalized Recommenders

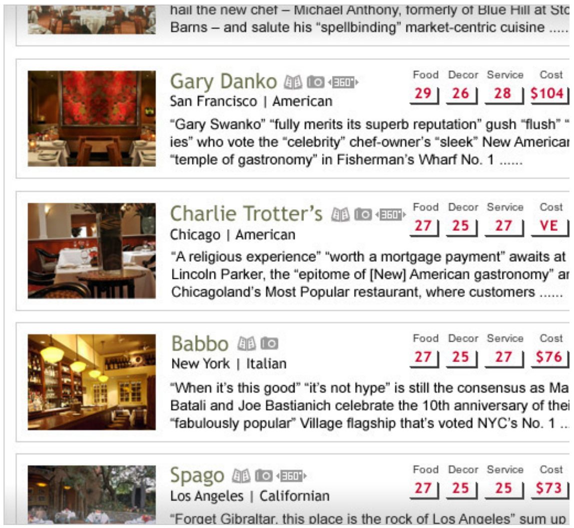
Learning Objectives

- To understand the value of non-personalized recommenders, and domains where they are most useful
- To understand the drawbacks of non-personalized recommender systems
- To understand the basics of:
  - Aggregated opinion recommenders
  - Basic product association recommenders
- Review examples of the above …

The Story of Zagat



The Zagat Guide …



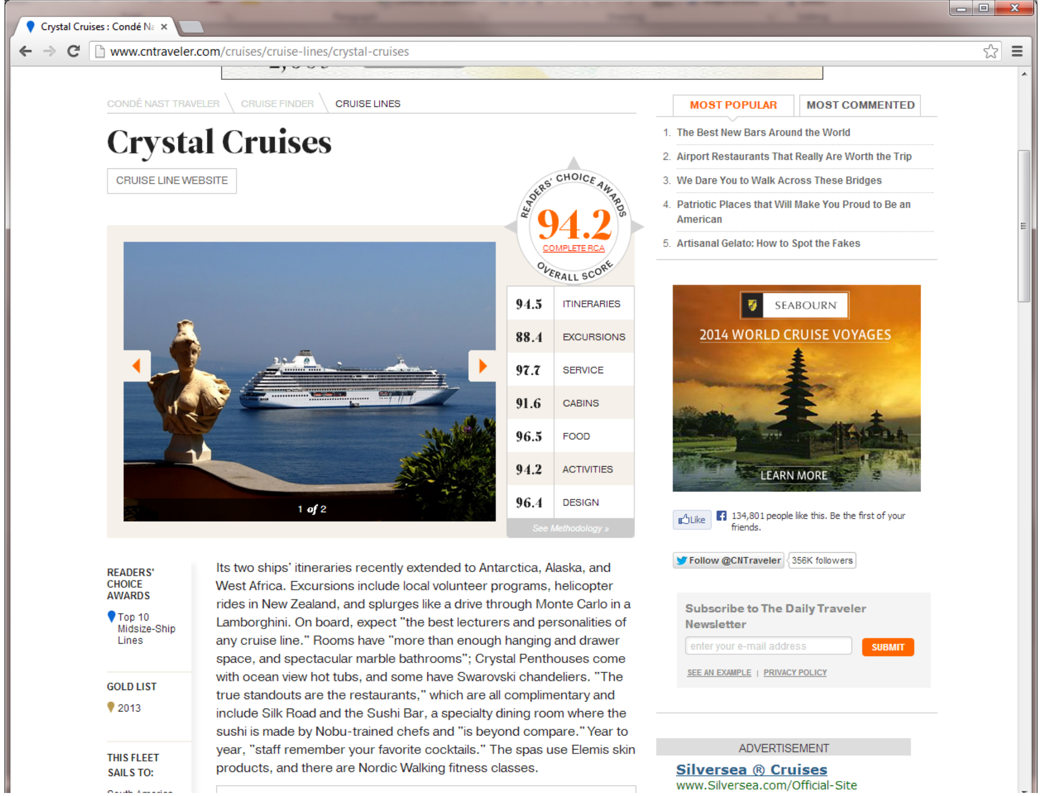
Secrets Revealed!

- The "secret" formula

  Rating = {0, 1, 2, 3}

  Score = round (MEAN(ratings) * 10)

  – OK, maybe not so secret – but effective!

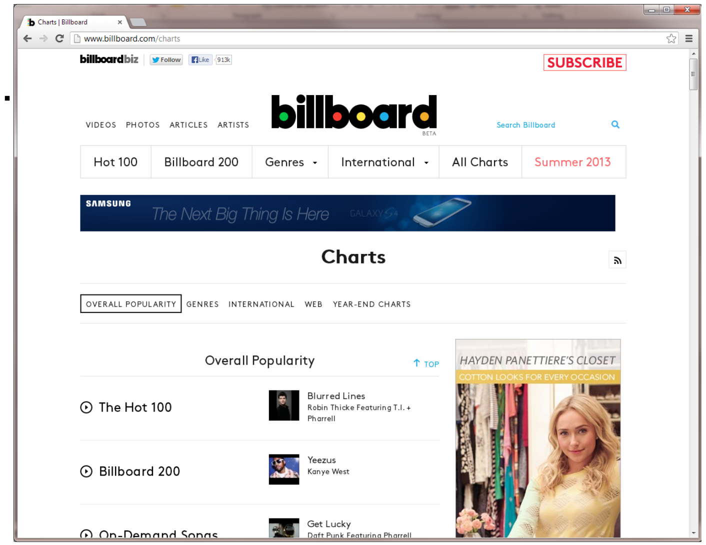


Same idea, different formula

- Conde Nast Traveller tallies the percentage of people who rate a particular hotel, cruise, etc. as "very good" or "excellent"
- Relative merits of the two techniques …
  – How do we treat a score of "good" vs. "awful"

Many other examples

- Tripadvisor travel reviews and ratings
- Billboard top 200/100/20 …
- Movie charts by box office revenue
- All non-personalized



Averages can be Misleading

- Later this module … we'll discuss ways to mislead using averages.
- See if you can come up with examples or ideas (post to the class forum, and vote up the ones you find most compelling)

Averages Lack Context …

- Ordering an ice-cream sundae
  - You want a recommendation for a sauce
  - Do you want to hear that ketchup is the most popular sauce?
- One interesting context is a current product (or set of products) – what sauce is most commonly associated with a sundae??
- This leads to the concept of product association recommenders!

People who X also Y …

- Great idea, but how to formalize
- First, what's our dataset
  - User profiles (people who ever bought one and the other)? – not good for ketchup
  - Transaction data (people who bought them at the same time)? – not good for follow-up sales
  - User profiles but time-constrained (within a month, afterwards, …)?

Computing the ranking

- Start simple: percentage of X-buyers who also bought Y

$$\frac{X \text{ and } Y}{X}$$

  - Intuitively right, but is it useful? What if X is anchovy paste and Y is bananas??
  - Challenge – doesn't compensate for overall popularity of Y

Take two – does X make Y more likely??

- Let's adjust by looking at whether X makes Y more likely than not X(!X)

$$\frac{\dfrac{\text{X and Y}}{\text{X}}}{\dfrac{\text{!X and Y}}{\text{!X}}}$$

  – This formula focuses on increase in Y associated with X

Take two – does X make Y more likely??

- Let's adjust by looking at whether X makes Y more likely than not X(!X)

anchovy banana

100x $\frac{50}{100}$ $\frac{1}{2}$ $\frac{\text{X and Y}}{\text{X}}$ $\frac{95}{100}$

= 1

$\frac{450}{99,900}$ $\frac{9}{2000}$ $\frac{\text{!X and Y}}{\text{!X}}$ $\frac{99,905}{99,900}$

  – This formula focuses on increase in Y associated with X

Other solutions …

- Association rule mining brings us the lift metric:

$$\frac{P(X \text{ AND } Y)}{P(X) * P(Y)}$$

  – This looks at non-directional assocation
  – More generally association rules look at baskets of products, not just individuals

Back to Zagat

- Some early Zagat fans argue the guide has been getting worse. Why?
  – Too many mediocre restaurants with good scores
  – Too many excellent restaurants with mediocre scores
- What's happening here?
  – Self-selection bias
  – Increased diversity of raters

Some take-away lessons

- Non-personalized averages can be effective in the right application
  - Need to understand relationship between average and user need; correct average
- Product associations can provide useful non-personalized recommendations in a context
  - Need to identify context; data source/scope
- Still face challenges in a clustered diverse population (e.g., maybe we don't all want bananas)

Moving Forward

- Assignments this Module
  - Review an existing recommender
  - Hand-exercise: non-personalized recommender
  - Programming: non-personalized recommender
- Next lectures: about ratings, predictions and recommendations, rating scales
- Then, you should be able to:
  - Work out non-personalized recommendations
  - For programmers: program them too!

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