Understanding Online Reviews and Recommendations

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Improving Online Recommendations

'My Research'
- Refining recommendation models
- Developing new approaches to improve accuracy of recommendations
- Impact of recommendations on product sales analysis
- How consumption patterns affect future recommendation accuracy

'Evaluating Recommendations'

'Recommended just for you'
"Recommended just for you"
Customers are overloaded

Today a person is subjected to more new information in a day than a person in the middle ages in his entire life!
But they really need and consume only a few of the products!
The idea of Recommender Systems

To recommend products customers may like
- Amazon: > 30% of sales
- Netflix: 75% of watched videos
Evaluating Recommendations

- How do we know the recommendation is good?
- Needs to refer to memory
- Check pictures, number and overall presentation
- Think about writing,枕典 example
- Other methods:
  - Remember, maybe citations, politically, commercial use.
Braveheart

1995  R  2hr 57m

Our best guess for Jingjing: 3.8 stars
Average of 11,038,522 ratings: 4.2 stars

Enraged at the slaughter of Murron (Catherine McCormack) -- his new bride and childhood love -- legendary Scottish warrior William Wallace (Mel Gibson, who also directed the film) slays a platoon of the local English lord's soldiers. This leads the village to revolt and, eventually, the entire country to rise up against English rule. With vivid battle scenes and a heaping portion of legend, Gibson's epic won five Oscars, including Best Picture.
• How do we know the recommendation is good?

• Mostly measured by **Accuracy**
  - Closeness between predicted preference and user's actual preference

• Predictive accuracy isn't enough

• Other metrics:
  • diversity, novelty, robustness, profitability, consistency, etc.
My Research

- Define a new evaluation metrics: *Stability*
  - Develop novel approaches to improve stability of recommendations

- Impact of recommendations on *products sales diversity*

- How consumption patterns affect future *recommendation accuracy*
Consumer Biases in Online Marketplace

Feedback Loop

De-Biasing
How can we rectify the anchoring biases of consumers' preference ratings caused by interacting with recommender systems?

De-biasing solutions:
- Reflective approach: Post-hoc rating adjustment
- Proactive approach: Bias-aware interactive design

General research question: How do recommendations affect consumer decision making?

- Consumer Preference
- Economic behavior
Feedback Loop

**Predicted Ratings** (expressing recommendations for unknown items)

**Recommender System** (Consumer preference estimation)

**Actual Ratings** (expressing preferences for consumed items)

**Accuracy**

**Consumer** (Preference, Purchasing, Consumption)
General research question: How do recommendations affect consumers' decision making?

Consumer Preference

Economic behavior
Experiment Procedure:
- Watched an episode of a TV show
- Received an artificial rating of 4.5 or 1.5
  - High vs. Low anchor
- Provided preference immediately after consumption

![Average Consumer Preference Graph]

- High Recommendation: 3.48
- No Recommendation: 3.22
- Low Recommendation: 2.78
General research question: How do recommendations affect consumers' decision making?

Consumer Preference

Economic behavior
Anchoring biases on economic behavior:

- Stimulus pool: 200 popular songs
- Willingness-to-pay judgements for 40 songs [$0, $0.99]
  - High: $\sim U[4 \text{ stars, 5 stars}]
  - Mid: $\sim U[2.5 \text{ star, 3.5 stars}]
  - Low: $\sim U[1 \text{ star, 2 stars}]
  - Control: no recommendation

![Willingness to Pay by Treatment Group](image_url)
Implications

- Recommendations not only impact preference ratings, but also economic behavior

- Effects observed with artificial recommendations, and also with perturbed system-based recommendations

- Effects is linear
De-Biasing

How can we correct the anchoring biases of consumers’ preference ratings caused by interacting with recommender system?

De-biasing solutions:

- **Reactive** approach: Post-hoc rating adjustment
- **Proactive** approach: Bias-aware interface design
Mining Online Reviews

- Analyze consumer's personality traits based on online reviews
- Incorporate personality traits in enhancing recommendations

Other Research Topics

- Mobile Apps: app life cycle management
  - Version update strategy
  - What version updates to release?
  - When to release version updates?

- Healthcare:
  - Online support network for weight loss community
  - Impact of hospital IT systems
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