CS 136: Economics and Computation

Lecture 16
Reputation Systems

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Market platforms

• E.g., Amazon, eBay, Uber, Airbnb,…
• Some design features:
  – matching, search
  – flexible pricing (incl. auctions)
  – reputation systems

• Crucial in enabling safe transactions between strangers
• Note: trust also established through certification, insurance.
Role of Reputation Systems

• Moral Hazard
  – *Low quality actions* are useful because of incentive misalignment.
    • E.g., seller doesn’t ship
  – Reputation system addresses via “sanctioning”

• Adverse selection
  – *Low quality entry* is useful because of information asymmetry.
    • E.g., fraudulent sellers enter
  – Reputation system addresses via “signaling”
What’s required for a well functioning reputation system?

Sanctioning/Moral Hazard:
1. The publicly reported information reflects the past (requires unbiased ratings).
2. Buyers correctly interpret the reputation information.
3. Leading sellers to change action because of this “shadow on the future.”

Signaling/Adverse selection
1. 2. 3. Low quality sellers no longer enter.
The Design Space

- **Who**: One-way or two-way feedback?
- **Who**: Restricted, Anyone, or Required?
- **Timing**: Sequential- or simultaneous report?
- Explicit *incentive* for feedback?
- What to *elicit*, how to aggregate/share?
- Allow *private messaging* between parties?

### Examples

<table>
<thead>
<tr>
<th></th>
<th>direction</th>
<th>who</th>
<th>elicit</th>
<th>incentives</th>
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<td>2-way (seq)</td>
<td>restrict</td>
<td>${+, 0, -}$, text</td>
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<tr>
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<td>detailed seller rating</td>
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<td>restrict</td>
<td>stars, text</td>
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<td>1-way</td>
<td>anyone</td>
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<td>Google Local Guides</td>
<td>1-way</td>
<td>anyone</td>
<td>stars, text</td>
<td>yes</td>
</tr>
</tbody>
</table>

Figure 20.1: The design features of different reputation systems.
eBay Feedback 1.0

Airbnb

Public info on a listing  Rating of host (public and private)  Rating of guest (private)
Google Local Guides

Figure 20.8.: Google Local Guides: Crowdsourced Feedback with Points.

Reputation Game
Why leave feedback

- Social experience (community)
- Explicit rewards (TB / 20% discount)
- “warm glow”
- Hedonistically rewarding
- Retaliate against seller
- Hard to avoid (Uber?)

Feedback Bias

- Sometimes, negative ratings may be more costly to leave than positive ratings. Why?
- Sometimes, positive ratings may be missing. Why?
- Sometimes, neutral ratings may be missing. Why?
- Sometimes, ratings may be upward bias. Why?
Feedback Bias

• Sometimes, negative ratings may be more costly to leave than positive ratings. Why?
• Sometimes, positive ratings may be missing. Why?
• Sometimes, neutral ratings may be missing. Why?
• Sometimes, ratings may be upward bias. Why?
• Leads to feedback bias
  – non-participation
  – omitted, false information if do make a rating

eBay F1.0 (pre 2007)

percentage positive score
PP = n_pos / n_ratings

67% of sellers had PP = 1.0
81% of sellers had PP >= 0.99
Pre-2007 Design

• Both parties can both leave {-1, 0, +1} feedback

• *Sequential-reveal:* can see feedback by other party before leaving own feedback.

• Concerns?

(Bolton, Grenier & Ockenfels'11)
Lab experiment (2007)  
(Bolton, Grenier & Ockenfels’11)

- **Simultaneous**
  - Only share after both report, or after deadline
  - Seemed to reduce strategic behavior, but reduced quantity

- **Detailed seller ratings (DSR)** (additional 1way feedback from buyer, only after seller feedback or deadline for seller)
  - Seemed to reduce strategic behavior, detailed feedback correlated quality, and did not reduce quantity

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eBay Feedback 2.0 (2007+)

- Introduce additional feedback from buyer
- Only made public anonymously, and after seller provides feedback or at seller deadline
Example Purchase (2013)

Reputation system (2013)
eBay 2.0 vs eBay 1.0 ratings

Distr of Average Scores
Distr of Average Scores

2008 onwards
eBay Feedback 3.0 (Spring’08)

• Problem with F2.0: internal click logs show only 1% of buyers look at DSR information!

• Change: change options for sellers in conventional feedback, so that they can leave no feedback or positive feedback.

• No retaliation threats possible!

2011 onwards
Feedback Bias Persists!
(Nosko and Tadelis’15)

• Despite FB3.0, analysis of 2011 buyer cohort over 3 years shows median PP 1.0, mean 0.99!
• For October 2011 transactions:
  – 0.4% negative feedback
  – 1% dispute ticket
  – Looks like 3.4% transactions unsatisfactory if also count low DSR as evidence
  – June’11 study also found 3.3% post-tx private messages from B to S were neg.
• Still seems to be a bias. Why?

Effective Percent Positive
(Nosko and Tadelis’15)

\[ PP = \frac{n_{pos}}{n_{ratings}} \]

Data on sellers associated with a 2011 cohort of eBay buyers
**Effective Percent Positive**  
(Nosko and Tadelis’15)

\[
PP = \frac{n_{pos}}{n_{ratings}} \quad \text{EPP} = \frac{n_{pos}}{n_{tx}}
\]

Data on sellers associated with a 2011 cohort of eBay buyers

Dec 2011 experiment: random 10% buyers see sellers promoted with higher EPP. These buyers were significantly more likely to return and purchase again within 180 days.
Related: Airbnb Redesign

(Fradkin et al. 2016)

• **Sequential-reveal** before May’14 (30 days, any review immediately posted)
  – Seemed to be working ok
  – If private –ve recommendation, reflected in less than 10% of public *overall rating* being 5*.
  – If private +ve recommendation, reflected in public *overall rating* 74% 5* and 20% 4*.

• Still, May 2014 experiment on switch to simult.
  – 1/3 trips simultaneous-reveal, 14 day; 1/3 trips seq reveal, 14 day; 1/3 trips seq reveal, 30 day

• Result: Airbnb now uses **simultaneous-reveal**
Summary: Reputation

• Reputation systems have a crucial role in promoting trust in market platforms
• A stylized model is as “reputation game.”
• A large design space
• Biased reports can be a concern, prompting investigation of sequential- vs simultaneous reports