Social Computing Systems

Walter S. Lasecki
EECS 498, Winter 2016
(http://tiny.cc/socsClass)
A Quick Note on MVPs

● “Minimum Viable Product”
  ○ Emphasis on the work `product`

● When prototyping, you won’t always HAVE a product
  ○ In fact, you **almost never should** in an early prototype

● Prototypes INFORM the product, they are not the product itself
  ○ You won’t have a market-ready product in April, **you’ll have an MVP**

● If your prototype plan is an MVP, that’s risky — it’s due in ~2 weeks
  ○ One of which doesn’t count because it’s spring break

● **If your definition was a bit off for Assignment A; fix it for B and C!!**
Pre-Class Notes

- Slides from last time are posted. With additional annotations.

- **Team Assignment B** is due this week! Thursday (Feb. 25th), 11:59PM

- “Big Quiz” Thursday! We will review at the end of class, if needed.
More About Project Status

- Where we are: proposed ideas, got feedback, are now designing
  - This will get us to an actionable plan
- What’s next? Prototyping
- What’s later? Testing your prototypes, iterating, building MVPs
- What you should be doing:
  - Starting to build the basis for your system. All the parts you’ll need either way (e.g., base app, login screen, DB, etc.)
  - Getting feedback early and often. Log all feedback you get (you can turn it in as supporting material for your project)
Last Class (review)

- Methods for analyzing incentives in participation
  - Game theory helps us predict what will happen if our users are “rational” agents
What does a solution look like?

A decision or policy. How do we get there?

- Compare outcomes
- Pick the best one

Ex:

Prisoner’s Dilemma

<table>
<thead>
<tr>
<th>P1</th>
<th>Revealed</th>
<th>Hold Out</th>
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<tbody>
<tr>
<td>Revealed</td>
<td>(5yr, 5yr)</td>
<td>(10yr, Free)</td>
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<td>Hold Out</td>
<td>(Free, 10yr)</td>
<td>(1yr, 1yr)</td>
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What is the “Game” Configuration?
Today (recap)

- Understanding how design can influence participation
  ○ Mechanism design helps us build reward schemes to encourage the “right” behavior

- How do these incentives play out at scale?
  ○ Markets are an example of how incentives can lead to interesting, useful outcomes
Intro to Mechanism Design

(Just enough to confuse your friends at parties)
Changing the Rules of the Game

The other side of game theory: writing the rules

Influence behavior by setting up the game
Incentive Mechanisms in Practice
Incentive Mechanisms in Practice

Today's Deal: $35 for a Champagne-Brunch Cruise from Hornblower Cruises & Events ($76 Value)

Sold Out

Value $76  Discount 54%  You Save $41

This deal sold out at: 3:55PM 05/08/2010

The Fine Print

Expires 05/06/2013
Limit 4 per person. Reservation required. Valid for Champagne Brunch Cruise only. Not valid with other offers. Not valid on May 9, May 22, June 8, June 26, or for other special events. Read the Deal FAQ for the basics.

Highlights
- Champagne and brunch
- Scenic views of the Bay
- Eco-friendly cruise ships

5,500 bought
### Reputation Systems

#### Reward Functions:

- **Honest**
  - When both players are honest, the reward is \( R_{\text{Now}} + R_{\text{Later}} \), \( R_{\text{Now}} \), \( R_{\text{Now}} + R_{\text{Later}} \)

- **Cheat**
  - When one player is cheating, the reward is \( R_{\text{Now}} \), \( R_{\text{Now}} + R_{\text{Later}} \), \( R_{\text{Now}} \), \( R_{\text{Now}} \)

#### Payoffs:

- **P1**
  - Initial interaction rewards are based on \( R_{\text{Now}} \) and \( R_{\text{Later}} \)

- **P2**
  - Future interactions are influenced by current rewards and reputation.
### Reputation Systems

(in Collective Intelligence systems)

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(in Collective Intelligence systems)

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**P1**

**P2**
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(in Collective Intelligence systems)

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P1

P2
Reputation Systems in Practice
Limitations of Game Theory and Mechanism Design

(a few of them anyway)
Uncertainty of Player Strategies
Uncertainty

We never really know exactly what people will really do.

Game theory helps us take a logical guess.
Reward Strength

We don’t always know how much our rewards impact people

Most of our rewards in Social Computing Systems are pretty minor

- **Usually**: points, stars, ‘karma’, etc.
Reward Strength

We don’t always know how much our rewards impact people.

Most of our rewards in Social Computing Systems are pretty minor:

- **Usually**: points, stars, ‘karma’, etc.

- **Hardly ever**:
  - piles of cash
  - speed boats
  - large parts of WY
  - immortality
Limits of Collective Intelligence in Games

Collective Intelligence methods use agreement to determine correctness

This leads to “regression to the mean”

Why? How?
Example: ESP Game

What do you see?

- taboo words
  - plugs
  - buds
  - grey

Type in words to describe the image
Example: ESP Game

Sony MDRAS40EX Sport Over-the-Ear Headphones!
Example: ESP Game

What do you see?

tag words
plugs
buds
grey

Type in words to describe the image

Headphones...
Example: ESP Game

Sony MDRAS40EX Sport Over-the-Ear Headphones!
Example: ESP Game

What do you see?

Type in words to describe the image

headphones...
Example: ESP Game

What do you see?

- taboo words
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Type in words to describe the image

Headphones...
Example: ESP Game?
Plenty of Topics We Didn’t Cover!

- Pareto Optimality
- Kripke structures
- Incentive Compatibility
Markets
crowds, prediction, and valuation
What is a market?

“A market is one of the many varieties of systems, institutions, procedures, social relations and infrastructures whereby parties engage in exchange.” — Wikipedia

- A place for exchange between people.
  - No surprises here

- But what do we really mean?
  - Examples: stock markets, futures markets
Analysis of an Example Exchange

One seller (S) with an item of no use to them any longer

One buyer (A) who makes an offer of $25

Result: S sells to A
Analysis of an Example Exchange

New buyer (B) comes in, offers $35

Result: S sells to B
Analysis of an Example Exchange

A offers more ($50)

Result: S sells to A
Analysis of an Example Exchange

A offers more ($50)

Result: S sells to A
Analysis of an Example Exchange

What happened?

Seller A offered more

Competition resulted in a final ‘market price’

This price is a valuation on the product

— The highest price at which it’s still worth paying

This turns out to be very, very accurate in the long term!
Why are markets good at prediction?

Collective intelligence — many of us are better than any of us

Ex. (From “Wisdom of Crowds” by James Surowieck)

In 1906, there was a county fair in Plymouth, England

800 people guessed the weight of an ox — oxes are big, people aren’t great at this

The average of these guesses was within 1lb of the ox’s true weight
Why are markets good at prediction?

Collectively, all of the buyers in a financial market are trying to predict the true value.
And collectively, they’re usually better than any one person.
Prediction Market Examples

Iowa Electronic Markets — predict presidential race

PredictWise — everything from Oscars to Sports

Vegas line — sports, mainly (through almost anything else too)

What about the Lottery?

Other examples?
Why do we care for Social Computing?

- **Predict value**
  - eBay/Amazon/etc. product prices

- **Collective prediction can yield better data for a service**
  - Yelp restaurant reviews / Uber driving ratings
  - eBay seller ratings
  - … any other user-generated reviews, at least over time

- **Collect information**
  - Pintrest
  - Facebook

- **Other examples?**
Limitations of Markets

It takes time for these collective decisions to stabilize naturally
  — We’ll see how we may be able to overcome this later

Missing knowledge may still exist in the system/collective

Popular opinion is not always well-informed (again, “regression to the mean”)
  — Subject to bias, incorrect info, etc.
Generalizing: Collective Intelligence

“Emergent behaviors”

Not constrained to humans — swarms of animals also exemplify this (e.g., flocks)

Evolutionary algorithms

Wikipedia / info. curation (libraries)

… more next lecture!
Today (recap)

- Understanding how design can influence participation
  - Mechanism design helps us build reward schemes to encourage the “right” behavior

- How do these incentives play out at scale?
  - Markets are an example of how incentives can lead to interesting, useful outcomes
Next Class ➤

- **Lecture Topic:**
  - The ‘Big Quiz’ — then break!
  - After that: Crowdsourcing!

- **Readings (for this week):**
  - None

- **Assignments:**
  - **Team Assignment B** — *DUE Feb. 25th, 11:59 PM (ET)*
  - See the web page for details