Social Computing Systems

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EECS 498, Fall 2018
(http://tiny.cc/socsClass)
Games!
(and gamification)
Genres
More Genres...
Games Don’t Have to be Complex

http://clickingbad.nullism.com/

http://www.levelgame.net/

http://progressquest.com/play/newguy.html
Example: Click Bad

Batches (purity is Deadly)
0
0 per second (net)
0 per second (gross)

COOK!

Cash Money ($0.50 ea)
$0
$0 laundered
$0 per second

SELL!

You have a nearly impossible chance of a DEA raid (0%)
You have a nearly impossible chance of an IRS audit (0%)

Welcome to Clicking Bad, bitch.
Games can be “Addictive”
Multiplayer Games
Cooperative Games
Competitive Games

[ something without shooting? ]
Competitive Games
In-Person Multiplayer
Game Elements
Challenge

- Games have to be challenging!
  - Without needing effort, rewards aren’t rewarding
- But not TOO challenging
- Types of challenge:
  - Mental/sensory (puzzles, strategy games, Tetris)
  - Dexterity (reflex games, first-person games, etc.)
  - Team coordination (Space Team, recent Mario games)
  - Creativity (Minecraft, Mario Builder, etc.)
Measures of Success

- Scores
- Rankings / leaderboards
- Levels
- Achievements / badges
Status Sharing
Uniqueness

- Story/setting elements
- Gameplay elements
- Team/multiplayer elements
- In-game items / interactions
- Atmosphere
- …
Uniqueness

- Story/setting elements
- Gameplay elements
- Team/multiplayer elements
- In-game items / interactions
- Atmosphere

...
More About Game Design

Jeremy [Gibson] Bond’s book (*former UM prof!*):

*Intro to Game Design, Prototyping, and Development*

Other readings (also borrowed from Prof. Bond):

*Game Programming Patterns* by Robert Nystrom

*The Art of Game Design* by Jesse Schell

*Game Design Workshop* by Tracy Fullerton & Chris Swain

*Characteristics of Games* by Elias, Garfield, and Gutschera

*Fundamentals of Game Design* by Ernest Adams
Why Games?
Gaming

- Interactive storytelling (making it a sharing medium)
- Supports enjoyable (casual) interaction
- Skills practice (teamwork, dexterity, etc.)
Gaming

- Interactive storytelling (making it a sharing medium)
- Supports enjoyable (casual) interaction
- Skills practice (teamwork, dexterity, etc.)
- ...  
- Games engage us.
Serious Games
Techniques for Gamification

- **Leveling**
  - Numeric levels
  - Badges
  - Points / scoring

- **Add an underlying story**

- **Aesthetic appeal (visual/art)**

- **Goal + challenge**
  - E.g., puzzle, mission, etc.
Reward Are The Key

All of these are different forms of reward

... we’ll get back to this...
Games with a *Purpose*
ESP Game

Provide a label for what you see…

that your partner will agree with (without being able to chat with you)
Squigl

Annotate the part described in text…

with a bonus based on how well you agree with your partner
Tag a Tune (‘Input Agreement’)

Identify if you’re listening to the same music as your partner…

based only on their descriptions of the same audio / music

(“input agreement”)
Galaxy Zoo
Planet Hunters
Higgs Hunters
Uncover the building blocks of the universe. Help search for unknown exotic particles in the LHC data.

Get Started

Floating Forests
Discover Floating Forests. We're studying how kelp forests grow and change. Help find these forests in images from space!

Get Started

Radio Galaxy Zoo
Match growing black holes to their jets. We need help to compare infrared and radio data to spot black holes.

Get Started

Bat Detective
You're on the trail of bats! Help scientists characterise bat calls recorded by citizen scientists.

Get Started

Chicago Wildlife Watch
Monitor wildlife in urban Chicago. We need your help to tag animals around Chicago's parks and urban areas.

Get Started

Operation War Diary
Explore soldiers' diaries from the First World War. Annotate and tag diaries from the First World War.

Get Started

Plankton Portal
Dive into the planktonic world. No plankton means no ocean life. Identify different plankton to assess the health of our seas.

Get Started

Notes from Nature
Take Notes from Nature. Transcribe museum records to take notes from nature, contribute to science.

Get Started

Condor Watch
California condors need your help. By tracking their location and social behavior, you can help this endangered species.

Get Started

Planet Four
Explore the Red Planet. Planetary scientists need your help to discover what the weather is like on Mars.

Get Started
Cyclone Center
Classify over 30 years of tropical cyclone data. Scientists at NOAA's National Climatic Data Center need your help.

Get Started

Disk Detective
Find the birthplace of planets. Help comb our galaxy, looking for stars that could harbour planet-forming disks.

Get Started

Milky Way Project
How do stars form? Help us find and draw circles on infrared image data from the Spitzer Space Telescope.

Get Started

Ancient Lives
Study the lives of ancient Greeks. The data you'll gather helps scholars study the Oxyrhynchus collection.

Get Started

Old Weather
Model Earth's climate using historic ship logs. Help recover observations made by US Navy and Coast Guard ships.

Get Started

Asteroid Zoo
Help us discover near-Earth asteroids: protect Earth, find potential future resources, and understand our Solar System.

Get Started

Worm Watch Lab
Track genetic mysteries. We can better understand how our genes work by spotting the worms laying eggs.

Get Started

Orchid Observers
Help measure the effect of climate change. Photograph and classify orchids to assist climate research.

Get Started

Planet Four: Terrains
Help planetary scientists characterize surfaces on Mars by examining images taken with the Context Camera.

Get Started

Penguin Watch
Spy on penguins for science. Tag penguins in remote regions to help us understand their lives and environment.

Get Started
Planet Hunters
Find planets around stars. Lightcurve changes from the Kepler spacecraft can indicate transiting planets.
Get Started

Snapshot Serengeti
Go wild in the Serengeti! We need your help to classify all the different animals caught in millions of camera trap images.
Get Started

Sunspotter
Sorted out sunspots. Help us organize images by complexity to better understand the Sun's magnetic activity.
Get Started

Cell Slider
Analyze real life cancer data. You can help scientists from the world's largest cancer research institution find cures for cancer.
Get Started

Seafloor Explorer
Help explore the ocean floor. The HabiCam team and the Woods Hole Oceanographic Institution need your help!
Get Started

Space Warps
Help astronomers find elusive gravitational lenses to help us understand the universe.
Get Started

Snapshot Supernova
Help in the hunt for supernovae, live!
Get Started
Today (recap so far)

- Social gaming
  - Supports enjoyable, casual interaction between groups of people

- Gamification / serious games
  - Help solve real tasks using ideas from games that make interaction more enjoyable
Reward Are The Key

All of these are different forms of reward
Intro to Game Theory

(Just enough to impress your friends at parties)
What is game theory?

**Definition**: “the study of mathematical models of conflict and cooperation between intelligent rational decision-makers”

**Translation**: The study of *rational* motivation.

- A “rational” player seeks the biggest reward
Coordination in Games

**Cooperative**: Contracts / communication allowed

- *Contract* = “we’re 100% committed to what we claim”

**Non-cooperative**: There is uncertainty in others claimed response
More Game Properties

**Simultaneous / Sequential**: Are decisions made at once or seq.?

**Temporal setting**: Is the setting discrete or continuous?

- If continuous, is feedback (R) “separable”?

**Length**: Is the game played for 1 round, or 50? 1 minute or 10 days?
More Game Properties (Cont.)

**Perfect/imperfect info**: Do players know everything that is happening?

**Symmetry**: Are all players rewarded the same as each other?

**Zero-sum / non-zero-sum**: Does 1 player winning mean another loses?
What is the “Game” Configuration?

Cooperative/Non-Cooperative

Simultaneous / Sequential

Discrete/Continuous (separable?)

Length

Perfect/imperfect info

Symmetry

Zero-sum / non-zero-sum
Prisoner’s Dilemma

- 2 people arrested: A and B

- Police offer:
  - Rat out your friend, we’ll arrest them, you go free. They’ll get 10 years.
  - If no one says anything, we charge you with a minor crime (~1 year)
  - If we get evidence on both, you each get 5 years.

- What do you do as the suspects?
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></th>
<th>Reveal</th>
<th>Hold Out</th>
</tr>
</thead>
<tbody>
<tr>
<td>P1 Reveal</td>
<td>(5yr, 5yr)</td>
<td>(10yr, Free)</td>
</tr>
<tr>
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<td>(Free, 10yr)</td>
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Now

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

- How else can we include these ideas in Social Computing Systems?
  - Gamification helps us connect rewards to non-monetary settings

- 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

- Surge Pricing
- Earn up to $100 for inviting new drivers
- Maps showing current surge pricing areas
Incentive Mechanisms in Practice

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

- Value: $76
- Discount: 54%
- You Save: $41

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

SOLD OUT
5,500 bought

The Fine Print
- Expires 05/05/2013
- 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
Reputation Systems

P1

Honest

(H_{\text{Now}} + H_{\text{Later}},
H_{\text{Now}} + H_{\text{Later})}

Cheat

(H_{\text{Now}},
H_{\text{Now}} + H_{\text{Later})}

P2

Honest

(H_{\text{Now}} + H_{\text{Later}},
H_{\text{Now}})

Cheat

(H_{\text{Now}},
H_{\text{Now}}, H_{\text{Now}})
Reputation Systems
(in Collective Intelligence systems)

<table>
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<tr>
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<th>Honest</th>
<th>Cheat</th>
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<tbody>
<tr>
<td>Honest</td>
<td>((R_{Now} + R_{Later}, R_{Now} + R_{Later}))</td>
<td>((R_{Now}, R_{Now} + R_{Later}))</td>
</tr>
<tr>
<td>Cheat</td>
<td>((R_{Now} + R_{Later}, R_{Now}))</td>
<td>((R_{Now} + R_{Later}, R_{Now} + R_{Later}))</td>
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</tr>
<tr>
<td>Cheat</td>
<td>$(R_{\text{Now}} + R_{\text{Later}}, R_{\text{Now}})$</td>
<td>$(R_{\text{N}} + R_{\text{L}}, R_{\text{N}})$</td>
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<td>$(R_{\text{N}}, R_{\text{N}})$</td>
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<td>$(R_{\text{N}}, R_{\text{N}})$</td>
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<td>Cheat</td>
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<td>(</td>
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Reputation Systems in Practice

$15.00

Submit Rating
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
Example: ESP Game

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

What do you see?

- taboo words
- plugs
- buds
- grey

Type in words to describe the image

Score: 400
Time: 1:04

Headphones...
Example: ESP Game

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

What do you see?

taboo words
plugs
buds
grey

Type in words to describe the image

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

- Multiple Equilibria
- 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?

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 in 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

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.
The end!

(see you next time)