Social Networks Analysis of BBO Fans, an Online Social Gaming Community

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What’s in a name?

Massively Social Gaming
(online) games with massive numbers of players (100K+), for which social interaction helps the gaming experience

1. Virtual world
Explore, do, learn, socialize, compete
+

2. Content
Graphics, maps, puzzles, quests, culture
+

3. Game analytics
Player stats and relationships
MSGs are a Popular, Growing Market

- 25,000,000 subscribed players (from 150,000,000+ active)
- Over 10,000 MSGs in operation
- Market size 7,500,000,000$/year

Sources: MMOGChart, own research. Sources: ESA, MPAA, RIAA.
Social Networks: Buzzword? Science?

- **Social Network** = undirected graph, **relationship** = edge
- **Community** = sub-graph, density of edges between its nodes higher than density of edges outside sub-graph
FarmVille, a Massively Social Game

Key advantage over market: Use [Social Network] analysis to improve gameplay experience

Zynga CTO
Agenda

1. Background on Massively Social Gaming
2. Bridge, the Running Example
3. Research Question
4. Addressing the Research Question
5. Conclusion
Bridge, A Traditional Team Card Game

- Bridge as traditional card game
  - 2 pairs (4 players) play hands (bidding + play)
  - Duplicate bridge: same hand at every table, eliminates luck
  - Only team game at last World Mind Sport Games, Beijing, 2008

- Bridge as special use case of social networks
  - Complex agreements between partners (like a social partnership)
  - A good pair forms in a very long period of time (like a social …)
  - **How to find a good partner?**
BBO (Fans): Massively Social Gaming

- Bridge Base Online (BBO) [http://www.bridgebase.com](http://www.bridgebase.com)
  - Largest online bridge platform, free to play
  - 1M active players, also attracts many professional players
  - Friends and enemies, filtering by skill and nationality
  - No advanced social networking features, e.g., No Friends-of-Friends

  - Uses BBO for actual gameplay
  - Better social network facilities
  - Community tools: awards, ranking, rated tournaments, etc.
Research Question: Characteristics of an Online Bridge Community?

• Study the activity and soc.net. characteristics of BBOFans

• Why is this interesting?
  • Unique type of social network? (new knowledge)
  • Unique type of social gaming network? (new knowledge)
  • Use results to develop new services (matchmaking, rating)
  • Use results to improve online game operations (player retention)
  • “Real-world” applications: other social network results applied in economics; adversarial settings good for management and psychology studies; etc.
Agenda

1. Background on Massively Social Gaming
2. Bridge, the Running Example
3. Research Question

4. Addressing the Research Question
   • Method
   • Data
   • Activity Levels
   • Social Network Properties

5. Conclusion
Analysis of BBOFans

Method

1. Gather data from BBO logs
2. Analyze activity levels
3. Transform the play data in a $G = (V, E)$, $V$=set of players, $E$=set of social relations.
   • Social relations = play-as-pair relationships
   • Use a parameter $p$ (number of hands played together) to establish when two players have a social relation
4. Analyze properties of graph $G$
   • Traditional soc.net. analysis, e.g., clustering coefficient
   • Player type analysis
Analysis of BBOFans

1. Gathered Data

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Users, All (incl. BBOFans)</td>
<td>142,401</td>
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<tr>
<td>Users, BBOFans</td>
<td>8,609</td>
</tr>
<tr>
<td>Hands, All (incl. BBOFans)</td>
<td>3,115,536</td>
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<tr>
<td>Hands, 1+ BBOFans pair</td>
<td>565,799</td>
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<tr>
<td>Hands, only BBOFans</td>
<td>116,237</td>
</tr>
</tbody>
</table>

- Domain-specific web crawler
- BBO + BBO Fans data

Analysis of BBOFans

2. Activity Levels: Popular, Synch’d.

- **BBOFans ~ FaceBook**
  Top-1,000 app (DAU)
- **BBO/BBOFans ~ Top-500**

Large (~10K) online comms. can coordinate
Analysis of BBOFans

3/4. Properties of Social Graph (1)

<table>
<thead>
<tr>
<th>$p$</th>
<th># of edges</th>
<th>NC</th>
<th>NLCC</th>
<th>CS</th>
<th>Avg. Degree</th>
<th>CC</th>
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<tbody>
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<td>1,100,647</td>
<td>351</td>
<td>71,771</td>
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<td>2</td>
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<td>200</td>
<td>1,339</td>
<td>71,116</td>
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<td>500</td>
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<td>1.00</td>
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</tr>
</tbody>
</table>

- Weakly connected community, weaker than FB, YouTube
- Many small communities, one large component, Fans+
Analysis of BBOFans

3/ 4. Properties of Social Graph (2)

• Player Types
  • **Community Builder**
    plays many hands with many other players
  • **Community Member**
    plays mostly with a few community members
  • **Faithful Player**
    1-2 stable partners
  • **Random Player**
    no stable partner

(Memory jog: Creating a bridge relationship takes longer than creating a relationship in FaceBook, Orkut, …)
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Massively Social Gaming

- Million-users, multi-bn. market
- Content, World Sim, Analytics

Current Technology

- Complete game mechanics
- Basic social network tools
- Makes players unhappy
- Many starters quit

Our Vision

- Social Network Analysis + Applications = BridgeHelper

Ongoing Work

- More analysis
- Ranking
- Matchmaking

The Future

- Scalability, efficiency
- Happy players
Thank you for your attention!
Questions? Suggestions? Observations?

More Info:
- [http://www.st.ewi.tudelft.nl/~iosup/research_gaming.html](http://www.st.ewi.tudelft.nl/~iosup/research_gaming.html)
- [http://BridgeHelper.org](http://BridgeHelper.org) (soon)

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