Recommendation
Applications and Systems at Electronic Arts

Meng Wu¹ | John Kolen¹ | Navid Aghdaie² | Kazi A. Zaman²

¹ EADP Intelligent Systems
² EADP Data Platform
INSPIRE THE WORLD TO PLAY

EA DIGITAL PLATFORM
Recommendations everywhere

**Outside**
- Games for you
- Info from the web

**Between**
- Maps and modes for you
- Matchmaking

**Within**
- Dynamic difficulty
- Objectives

Recommendations as Next Best Activity
Outside

• Games for you
Outside
• News and info from the web
Between
• Maps and modes for you

8 game modes          20+ maps      4 character classes
Game Mode Recommendation
For Optimal Player Journey

New players
Team Death Match < Possession

Old and recent players
Team Death Match = Possession

Old and inactive players
Team Death Match > Possession
Between
• Matchmaking

Fair is not enough

<table>
<thead>
<tr>
<th>Last 3 Outcomes</th>
<th>Churn Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>DLW</td>
<td>LLW</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>WWW</td>
<td>3.7%</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>DLL</td>
<td>LWL</td>
</tr>
<tr>
<td>WWL</td>
<td>4.9%</td>
</tr>
<tr>
<td>LLL</td>
<td>5.1%</td>
</tr>
</tbody>
</table>
Matchmaking for Maximal Entertainment

\[ \mathcal{M}^* = \arg\min_{\mathcal{M}} \sum_{(p_i, p_j) \in \mathcal{M}} \Pr(p_i \text{ churns} \mid s_i, s_j) + \Pr(p_j \text{ churns} \mid s_j, s_i) \]
Within
• Dynamic Difficulty Adjustment

One EA match three game, 06/2016 - 07/2016
Within

- Controlling Player Progression with DDA

Difficulty assignment for Level/Trial to maximize engagement
Generate engaging daily/weekly ”To Do” lists

• Make three goals
• Play Galactic War mode
• Apply a vehicle mod

Multiarmed bandit to maximize retention
Challenges

- Games
- Players
- Data
Player Challenges

Motivations

Competitor  Leader  Storywriter

Acquisition

Organic  Trial  Guest  Subscriber
Data Challenges

- Session days
- Duration
- Last player time
- Veteran
  - Match count
  - Skill
  - Wins/loses (indiv)
  - Goals
  - Real Madrid fan

- Session days
- Duration
- Last player time
- Veteran
  - Match count
  - Skill
  - Wins/loses (group)
  - Kills/deaths
Our Strategy

- Systems over models
- Process over solutions
- One architecture to rule them all
Outline

- Recommendation System
- Applications
- Challenges
- Recommendation System
- Conclusion
Conclusion

- Many opportunities for recommendation systems in game industry beyond products.
  - Recommendations as next best activity.

- Recommendation systems have an impact at EA
  - Improved click-through-rate by 80% and player engagement by 10%.

- EA studios share a unified recommendation system platform
  - Machine learning models as first class citizens
  - Tightly coupled with experimentation
Questions?

Join our Intelligent Systems group
jkolen@ea.com