Apples-to-Apples: Clustering and Ranking NHL Players Using Location Information and Scoring Impact

Oliver Schulte, Zeyu Zhao, Mehrsan Javan, Philippe Desaulniers / Simon Fraser University, SPORTLOGiQ / oschulte@sfu.ca

**PLAYER CLUSTERING**

Identify groups with similar styles and roles, using no prior such as position

**APPROACH**

- Discretize rink
- Compute activity heat map for each player
- Cluster heat maps with machine learning

**PLAYERS PERFORMANCE ASSESSMENT**

Evaluate player performance based on impact player has on team results

**APPROACH**

Aggregate action values, based on Markov game model:

- For each action, estimate the probability that the player’s team scores the next goal in the game before the action, and after the action

**PLAYERS RANKING WITHIN CLUSTERS**

Use scoring impact as a tool to find undervalued players, compare to other widely used metrics

<table>
<thead>
<tr>
<th>NAME</th>
<th>SCORING IMPACT</th>
<th>GP</th>
<th>GOALS</th>
<th>PASSES</th>
<th>TO/I/Y GAME</th>
<th>SALARY (G$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Taylor Hall</td>
<td>4.775</td>
<td>81</td>
<td>26</td>
<td>320</td>
<td>19.204</td>
<td>6</td>
</tr>
<tr>
<td>Pavel Datsyuk</td>
<td>4.675</td>
<td>60</td>
<td>14</td>
<td>159</td>
<td>19.655</td>
<td>7</td>
</tr>
<tr>
<td>Evgeni Malkin</td>
<td>4.556</td>
<td>57</td>
<td>27</td>
<td>168</td>
<td>19.569</td>
<td>9.5</td>
</tr>
<tr>
<td>Sidney Crosby</td>
<td>4.475</td>
<td>80</td>
<td>36</td>
<td>277</td>
<td>20.409</td>
<td>12</td>
</tr>
<tr>
<td>Anze Kopitar</td>
<td>4.398</td>
<td>81</td>
<td>25</td>
<td>218</td>
<td>19.867</td>
<td>7</td>
</tr>
<tr>
<td>Aleksander Barkov</td>
<td>4.361</td>
<td>57</td>
<td>22</td>
<td>158</td>
<td>19.430</td>
<td>0/925</td>
</tr>
<tr>
<td>Ryan Getzlaf</td>
<td>4.394</td>
<td>67</td>
<td>12</td>
<td>201</td>
<td>19.506</td>
<td>9.25</td>
</tr>
<tr>
<td>Jack Eichel</td>
<td>4.335</td>
<td>71</td>
<td>21</td>
<td>241</td>
<td>19.122</td>
<td>0/925</td>
</tr>
</tbody>
</table>

**RELATION WORK**

- Perfekse, by Diemme et al., Sloan 2014.
- Similar method for assessing player impact
- Different upon NEU, different stats (complete tracking)
- Markov Game Model, by Rubles and Schulte, Uncertainty in AI conference 2015.
- No location data
- 20 second time-window for action impact on goal scoring

**DRILL DOWN AND EXPLAIN RANKINGS**

Use the scoring impact breakdown to assess game context where player has biggest impact compared to replacements

**AVAILABLE DIMENSIONS**

- Action type
- Rink location
- Manpower situation
- Score differential

Taylor Hall’s slot vs. random cluster player spread and at even strength