

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

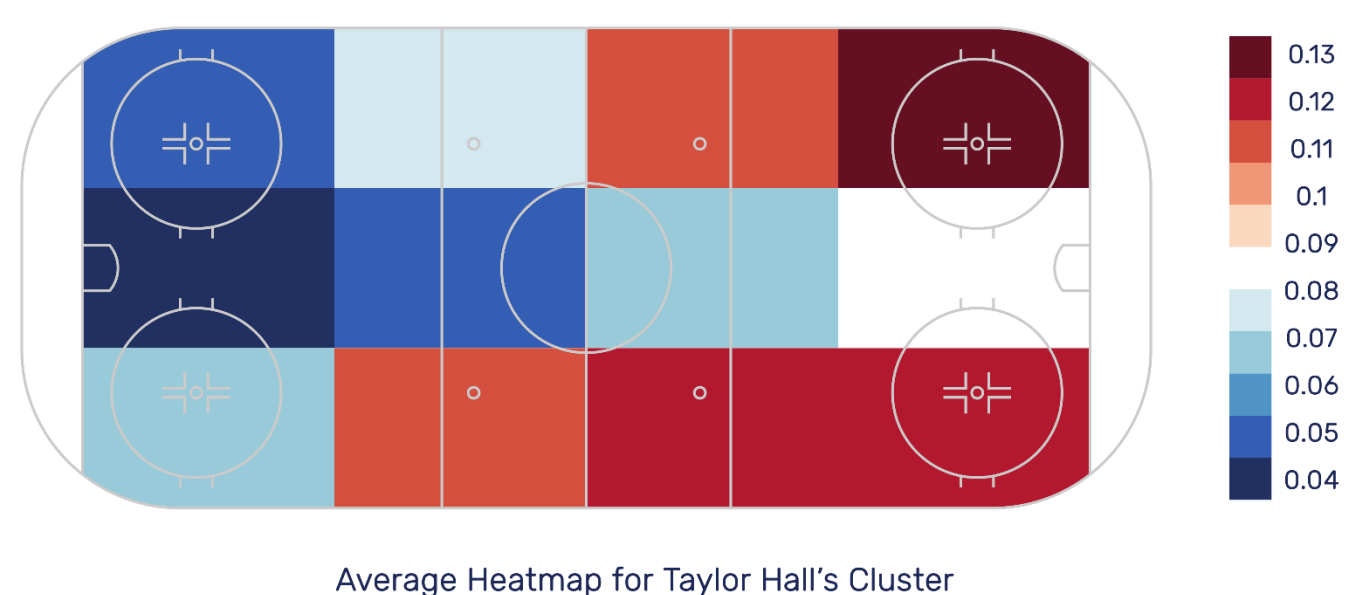
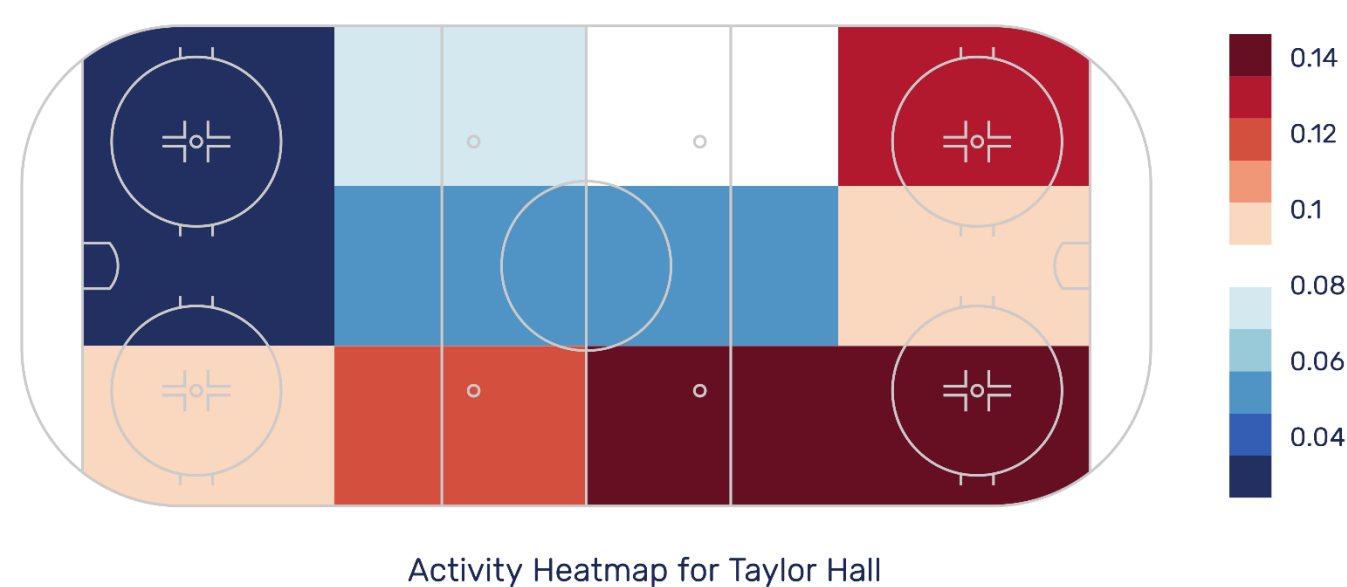
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PLAYER CLUSTERING

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

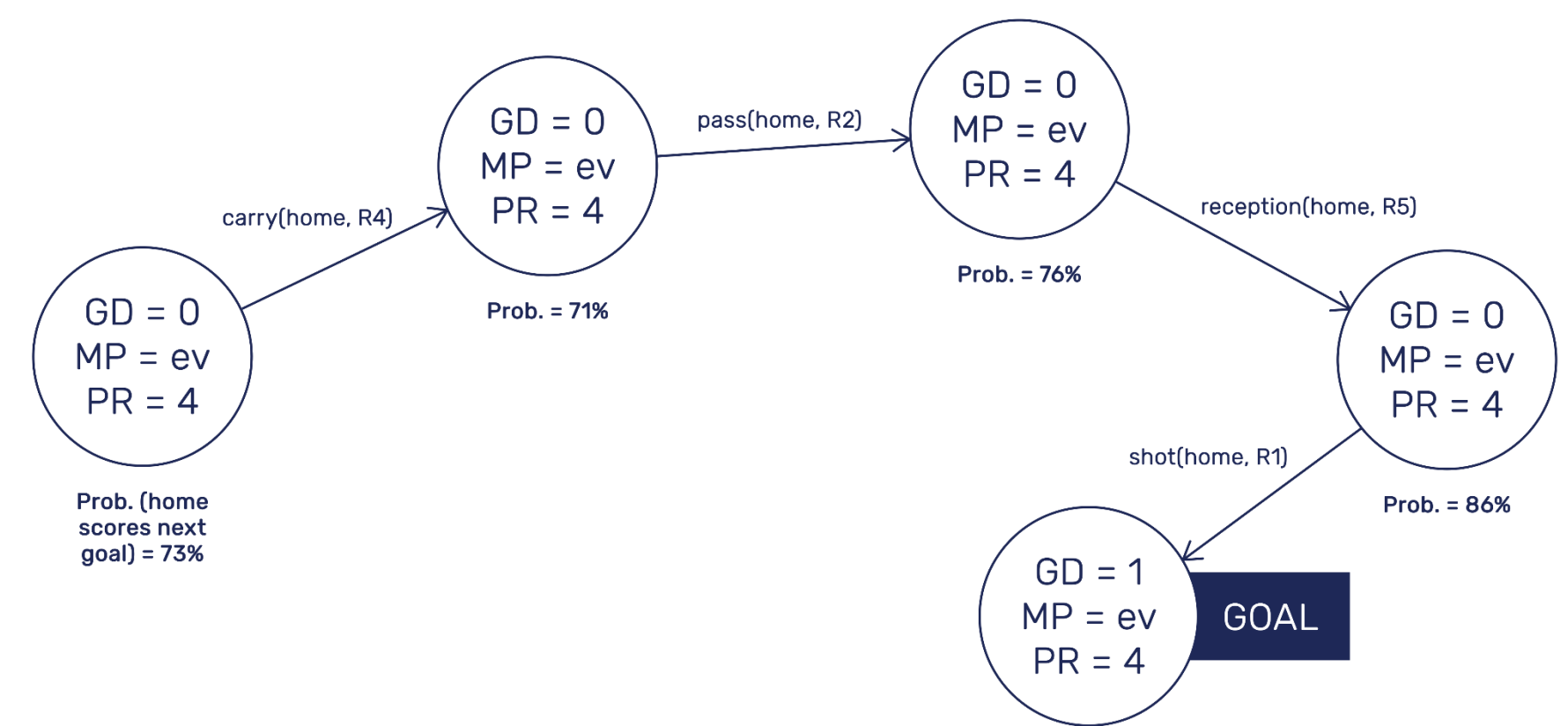


PLAYERS PERFORMANCE ASSESSMENT

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



Difference = impact on scoring probability = value of action

ACTION → VALUE → SCORING IMPACT (SI)
Context-aware medium-term consequences → Aggregate value of all player actions

SPORTLOGiQ

PLAY-BY-PLAY DATASET

13 ACTION TYPES:

- | | | |
|----------|---------|-----------------|
| BLOCK | GOAL | PUCK PROTECTION |
| CARRY | ICING | RECEPTION |
| CHECK | LPR | SHOT |
| DUMP-IN | OFFSIDE | |
| DUMP-OUT | PASS | |

LOCATION OF PUCK POSSESSION EVENTS
2015-2016 NHL SEASON
3.3M EVENTS
1,140 GAMES

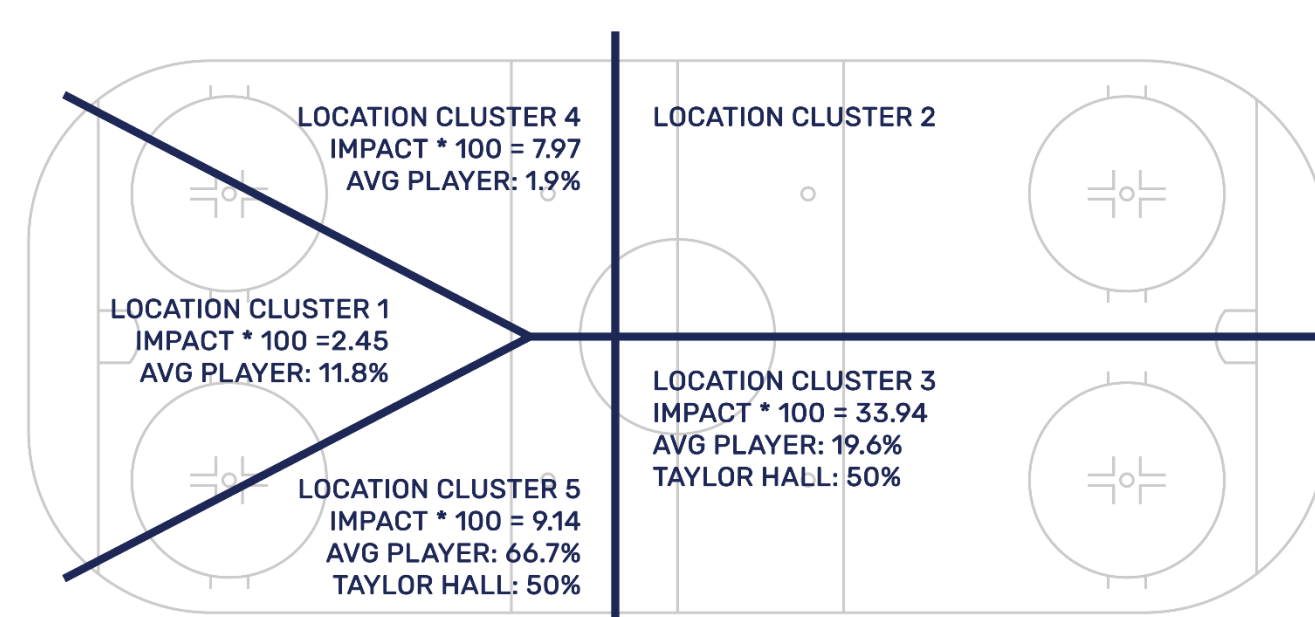
PLAYERS RANKING WITHIN CLUSTERS

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

NAME	SCORING IMPACT	GP	GOALS	PASSES	TOI PER GAME	SALARY (\$M)
Taylor Hall	4.775	81	26	320	19.204	6
Pavel Datsyuk	4.675	60	14	159	19.655	7
Evgeni Malkin	4.536	57	27	190	19.369	9.5
Sidney Crosby	4.475	80	36	277	20.469	12
Anze Kopitar	4.398	81	25	218	20.867	7.7
Aleksander Barkov	4.396	57	22	138	19.430	0.925
Ryan Getzlaf	4.394	67	12	261	19.506	9.25
Jack Eichel	4.335	71	21	241	19.122	0.925

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 blocks vs. random cluster player, tied and at even strength

RELATED WORK

- Pointwise, by Cervone et al., Sloan 2014.
 - similar method for assessing player impact
 - different sport (NBA), different data (complete tracking)
- Markov Game Model, by Routley and Schulte, Uncertainty in AI conference 2015.
 - no location data
- THoR, by Shuckers and Curro, Sloan 2013.
 - 20 second time-window for action impact on goal scoring