triplot4python:

the remedy for dealing with correlated features in explanations

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MI2 SUMMER CONF

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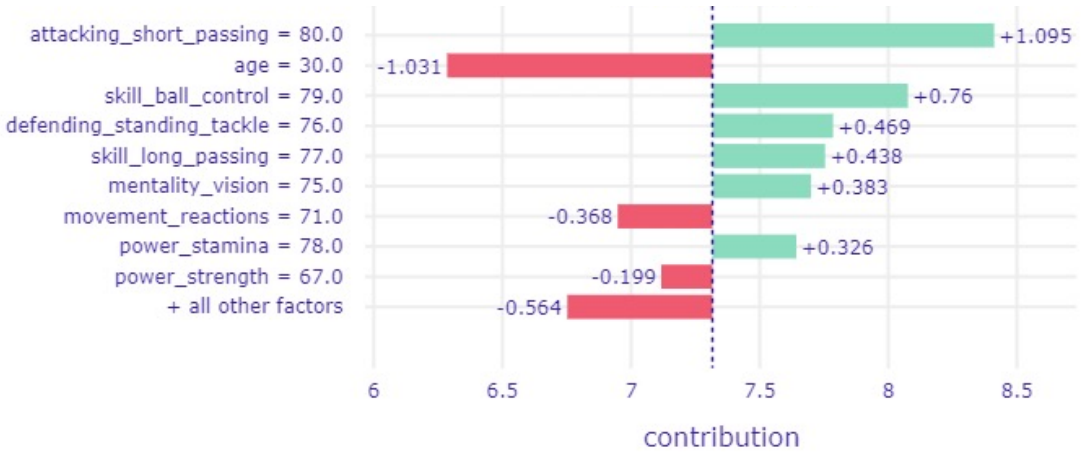
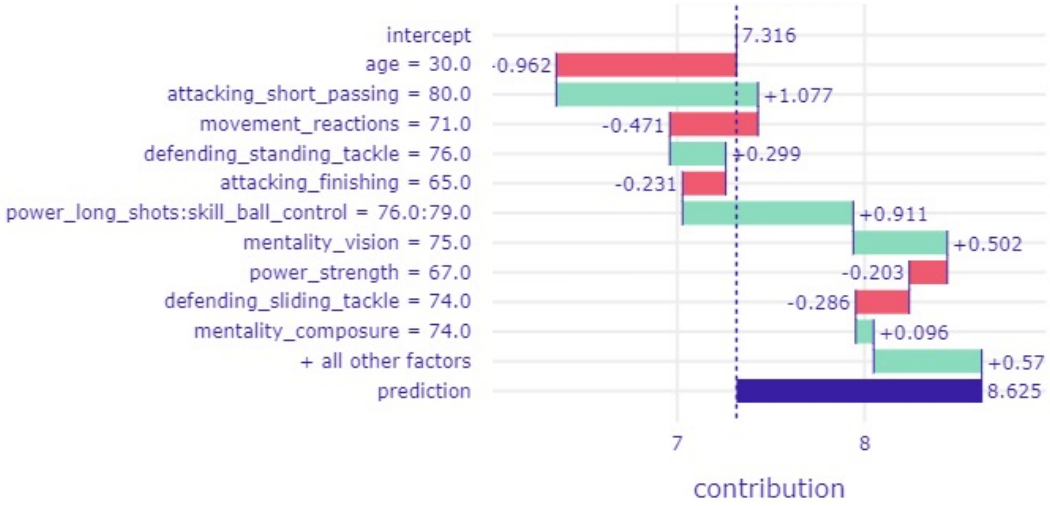
Motivation



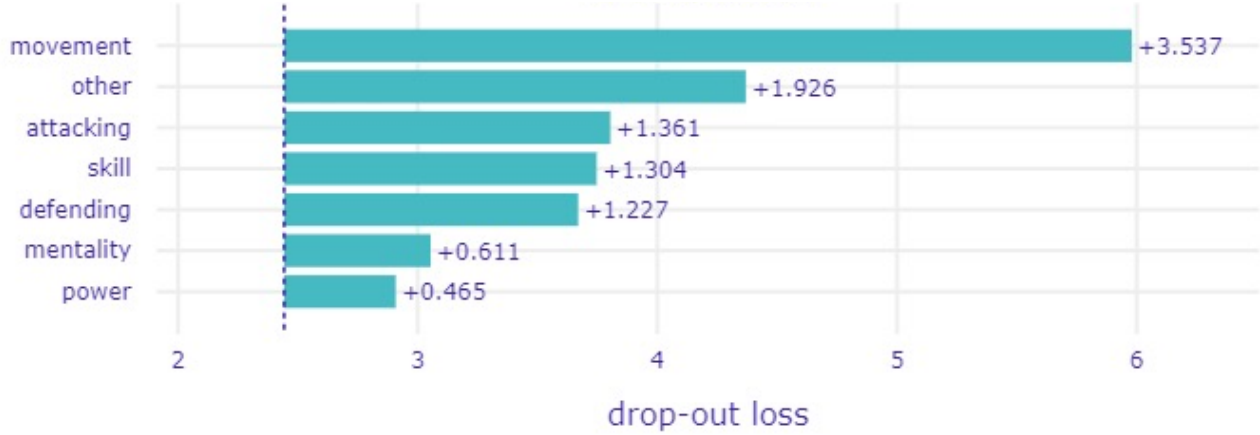
SHAP



Break Down

Many methods…
but each has the same problem:

unused information about dependencies between features → unrealistic settings and misleading explanations



Variable Importance

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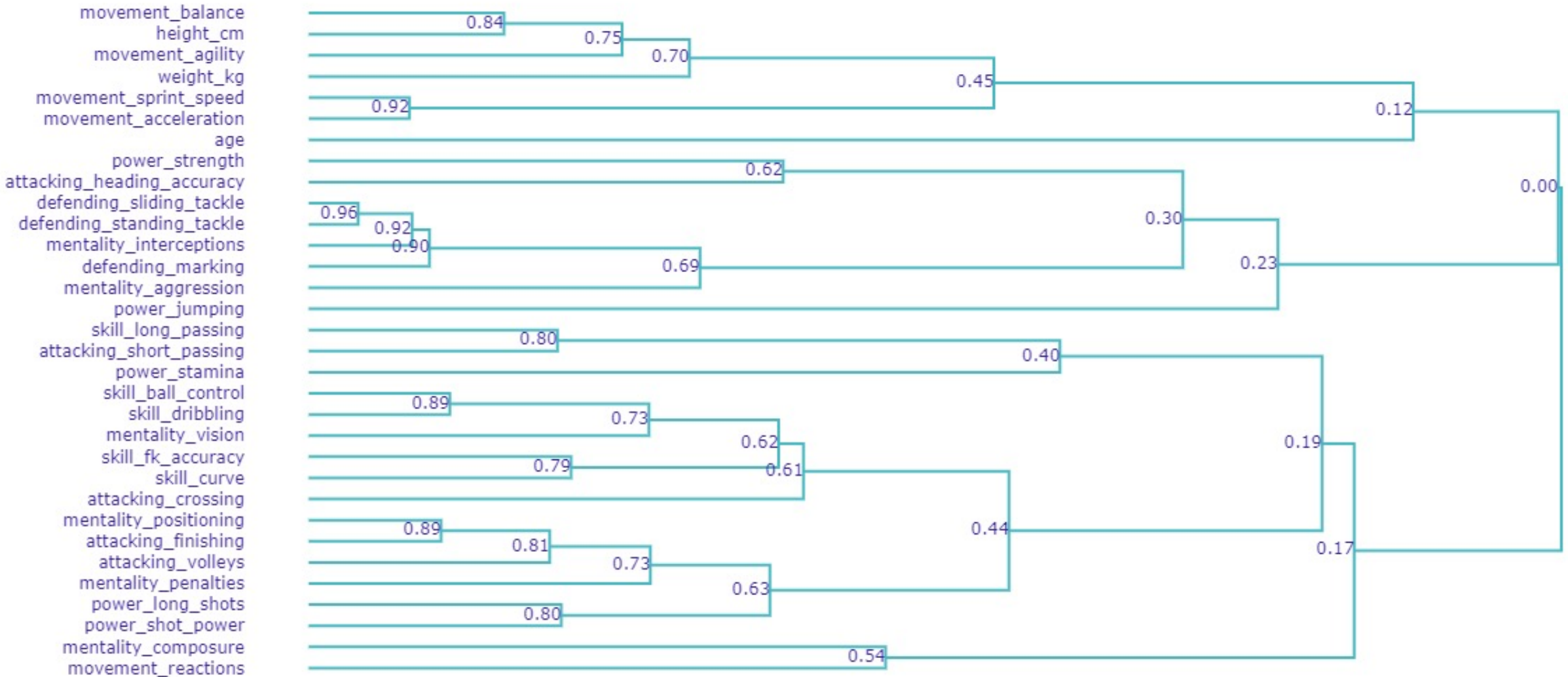
Solution: triplot

K. Pękala, K. Woźnica, and P. Biecek
Triplot: model agnostic measures and visualisations for variable importance in predictive models that take into account the hierarchical correlation structure

ADVANTAGES

- giving **more holistic explanation** of the importance of features
- using **automatically calculated** information about **associations** between features to create explanations in groups

Hierarchical clustering



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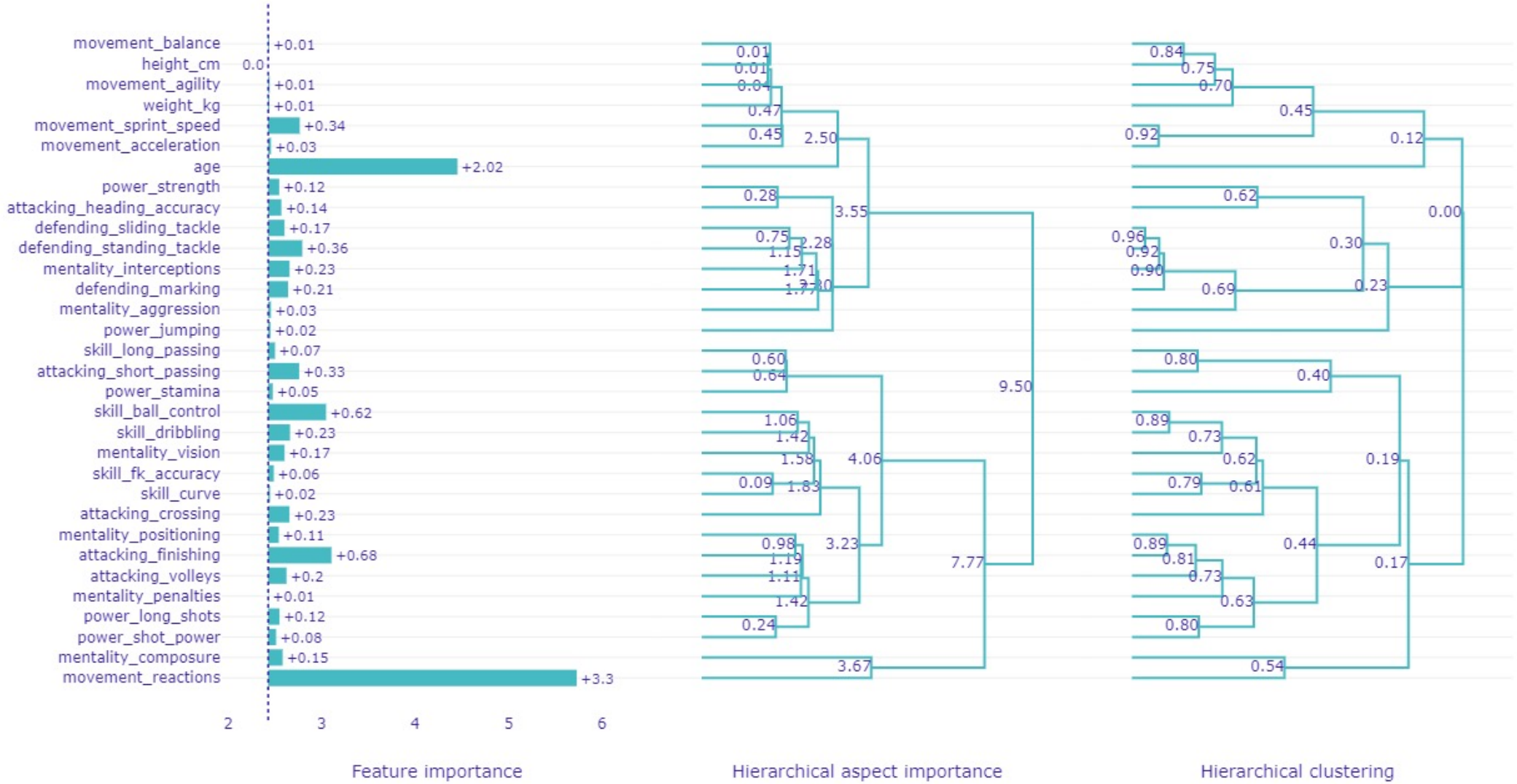
Computing association between features

two numerical features	$\lvert\rho\rvert$ the absolute value from the Spearman's rank correlation coefficient
two categorical features	$\tilde{V}$ the value of Cramer's V with bias correction (based on Pearson's chi-squared statistic)
numerical and categorical feature	η^2 the value of eta-squared (based on H-statistic from Kruskal-Wallis test)

Model Triplot



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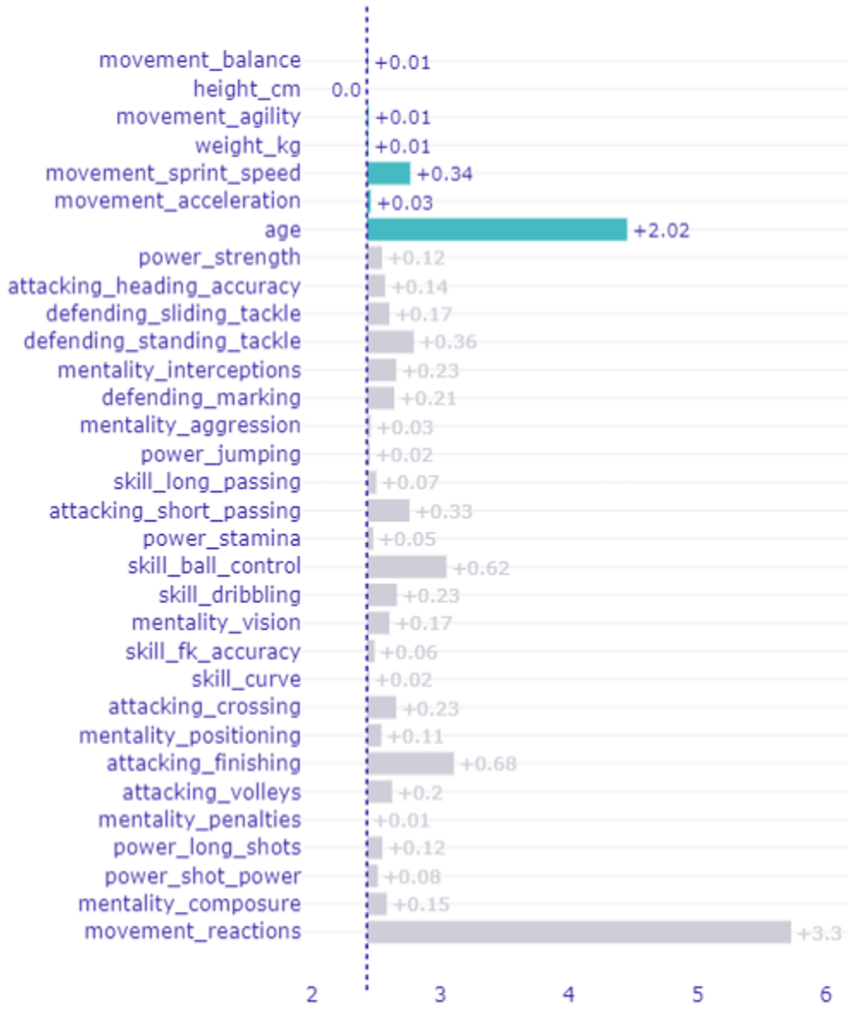
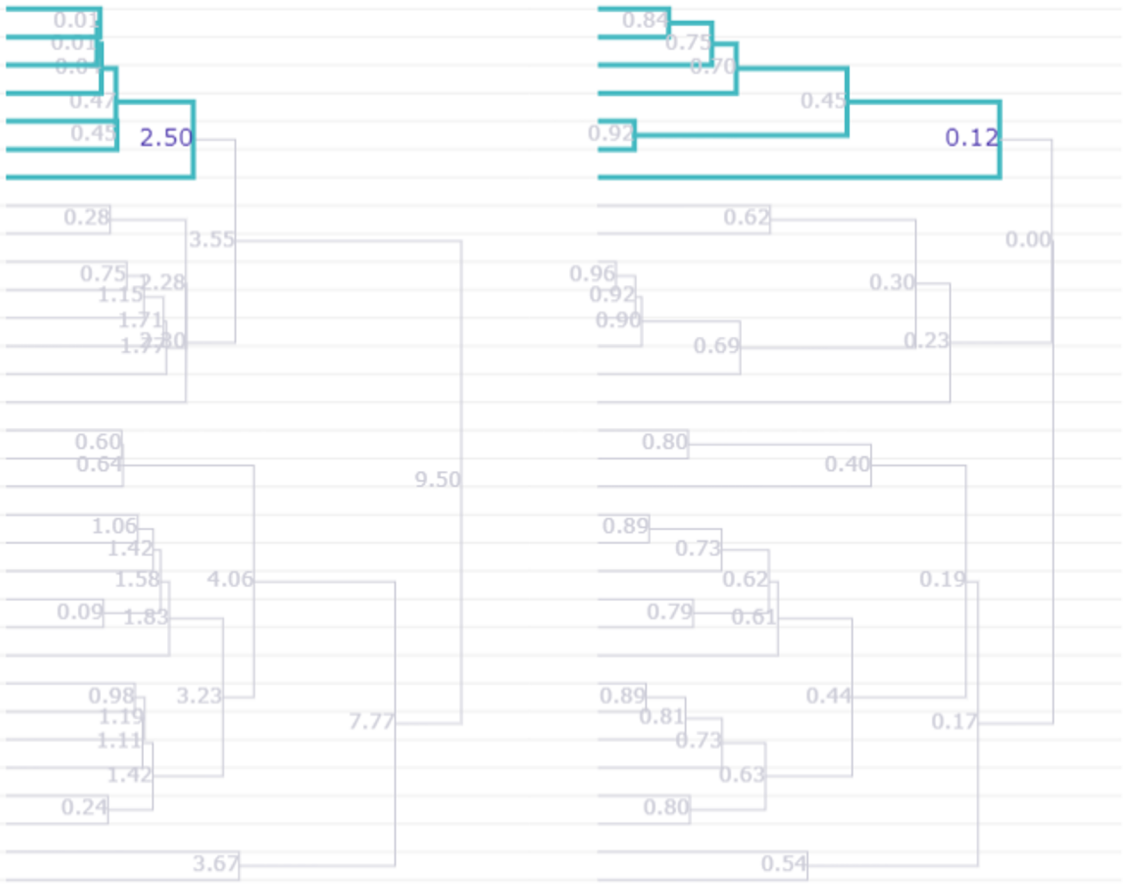
Model Triplot



Feature importance



Hierarchical aspect importance

Hierarchical clustering

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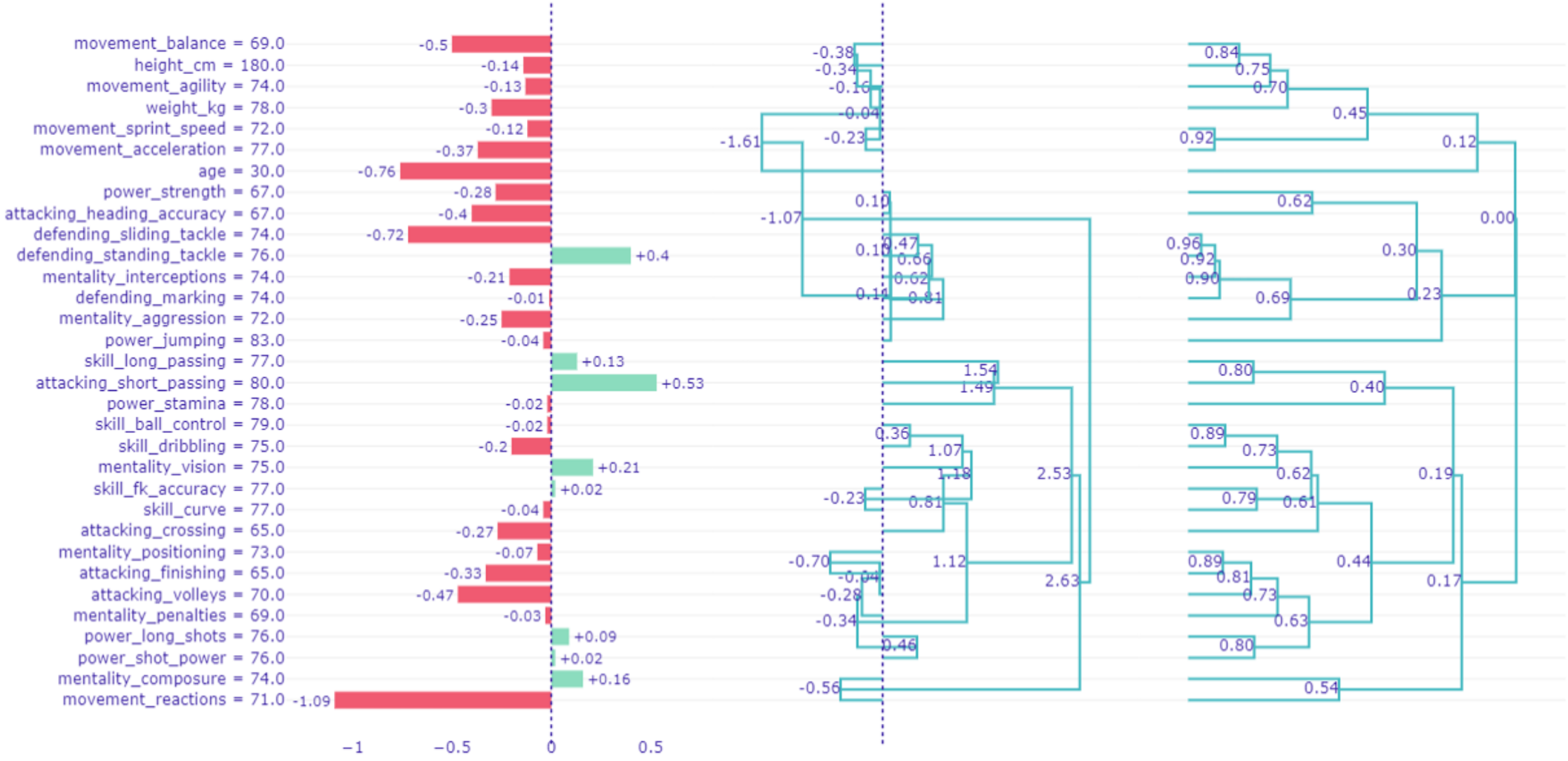
Predict Triplot



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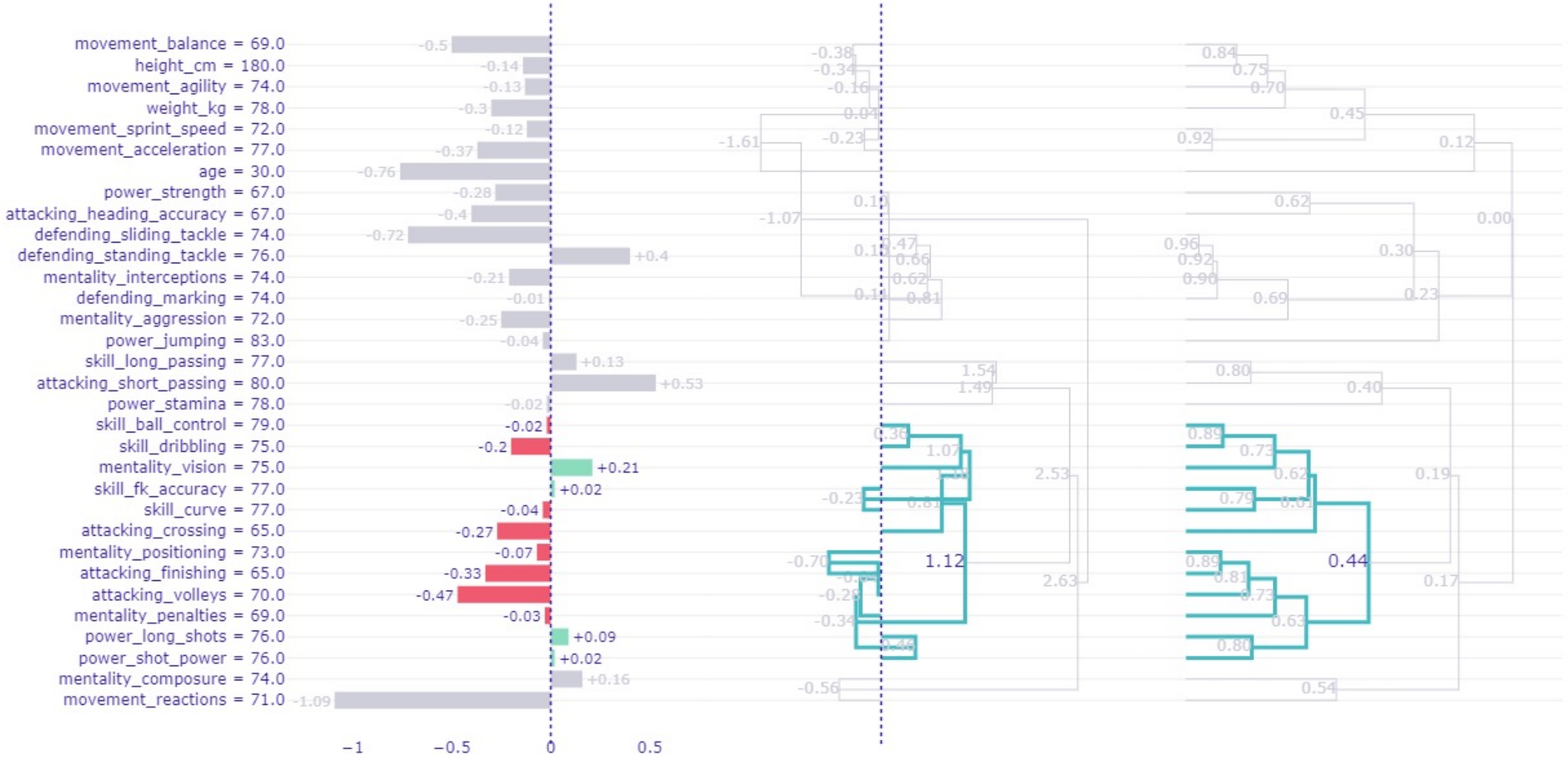
Predict Triplot



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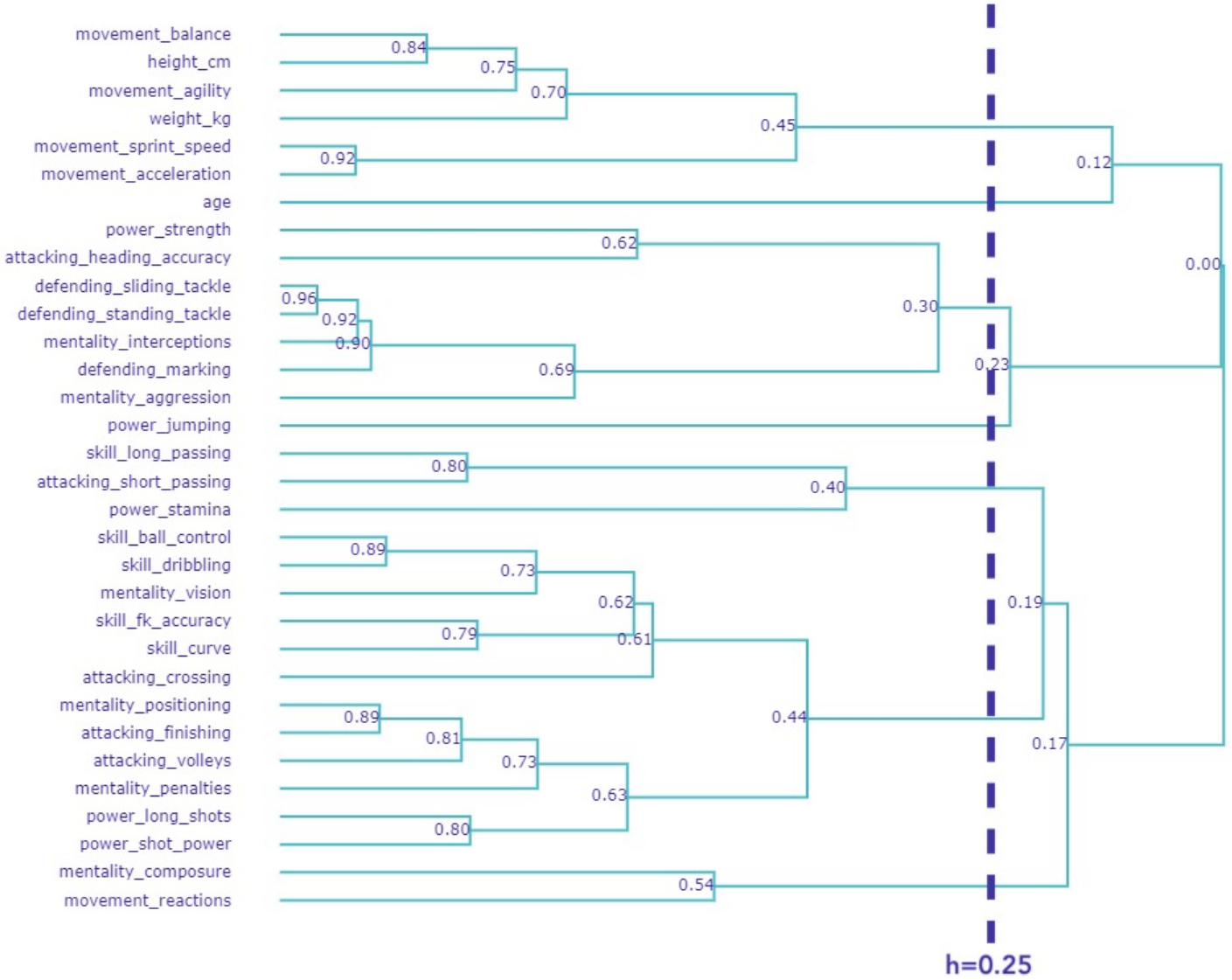
Grouping features



aspect_1	movement_reactions, mentality_composure
aspect_2	attacking_crossing, attacking_finishing, attacking_volleys, skill_dribbling, skill_curve, skill_fk_accuracy, skill_ball_control, power_shot_power, power_long_shots, mentality_positioning, mentality_vision, mentality_penalties
aspect_3	attacking_short_passing, skill_long_passing, power_stamina
aspect_4	attacking_heading_accuracy, power_strength, mentality_aggression, mentality_interceptions, defending_marking, defending_standing_tackle, defending_sliding_tackle
aspect_5	power_jumping
aspect_6	height_cm, weight_kg, movement_acceleration, movement_sprint_speed, movement_agility, movement_balance
aspect_7	age

Creating groups based on the chosen correlation cutoff level

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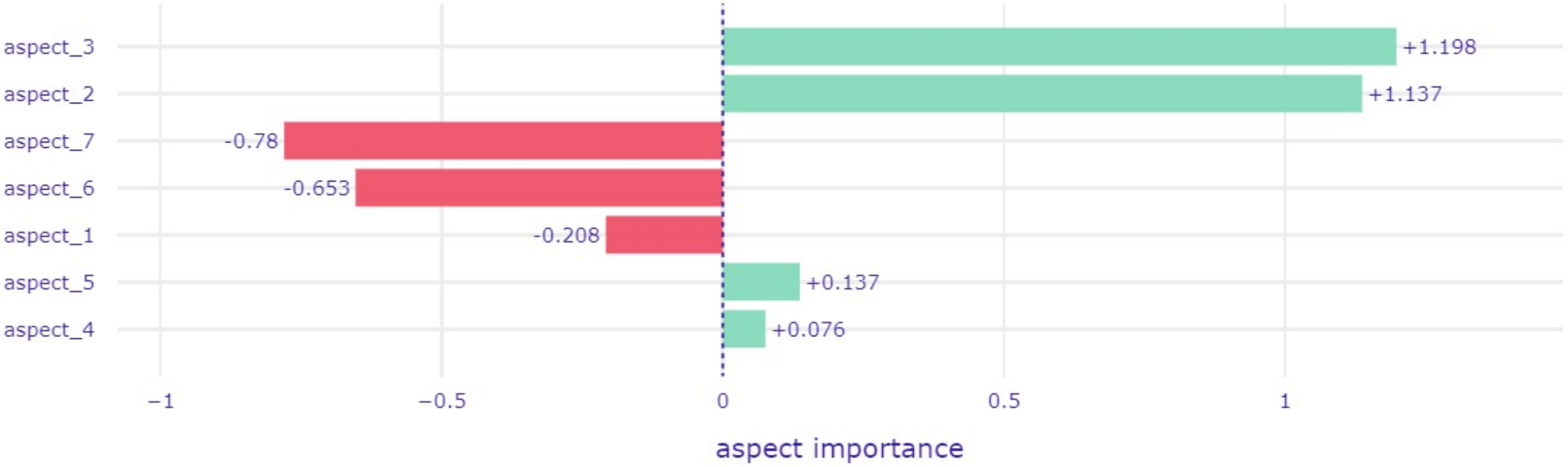
Local Aspect Importance



Explaining predictions for created groups

aspect_3	attacking_short_passing, skill_long_passing, power_stamina

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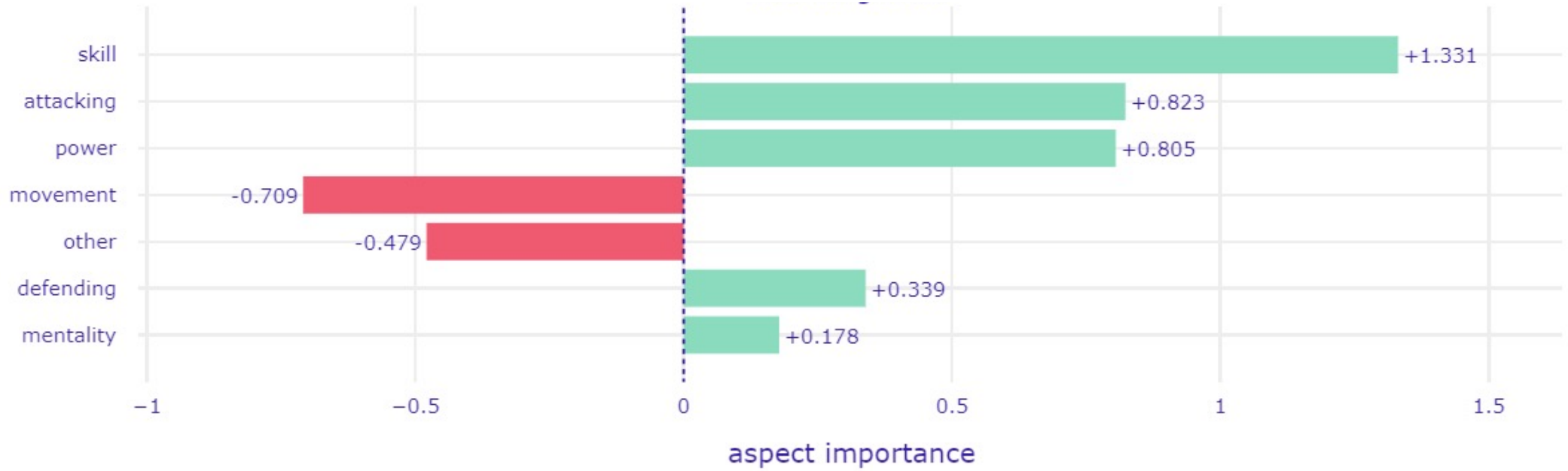
Local Aspect Importance



Explaining predictions for groups created on the basis of domain knowledge

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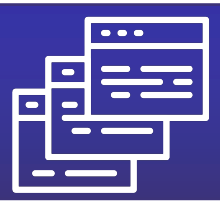
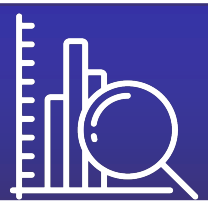
Summary

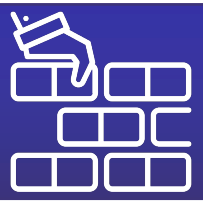


global and local, model-agnostic methods

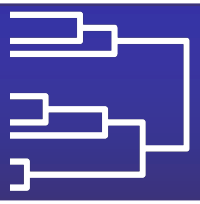
avoiding misleading results of explanations



deeper understanding of the influence of dependencies between the features on the model prediction



providing a background for further model exploration



finding an appropriate approach to grouping features

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