After Possession Loss

Predicting and Exploring Defensive Transitions



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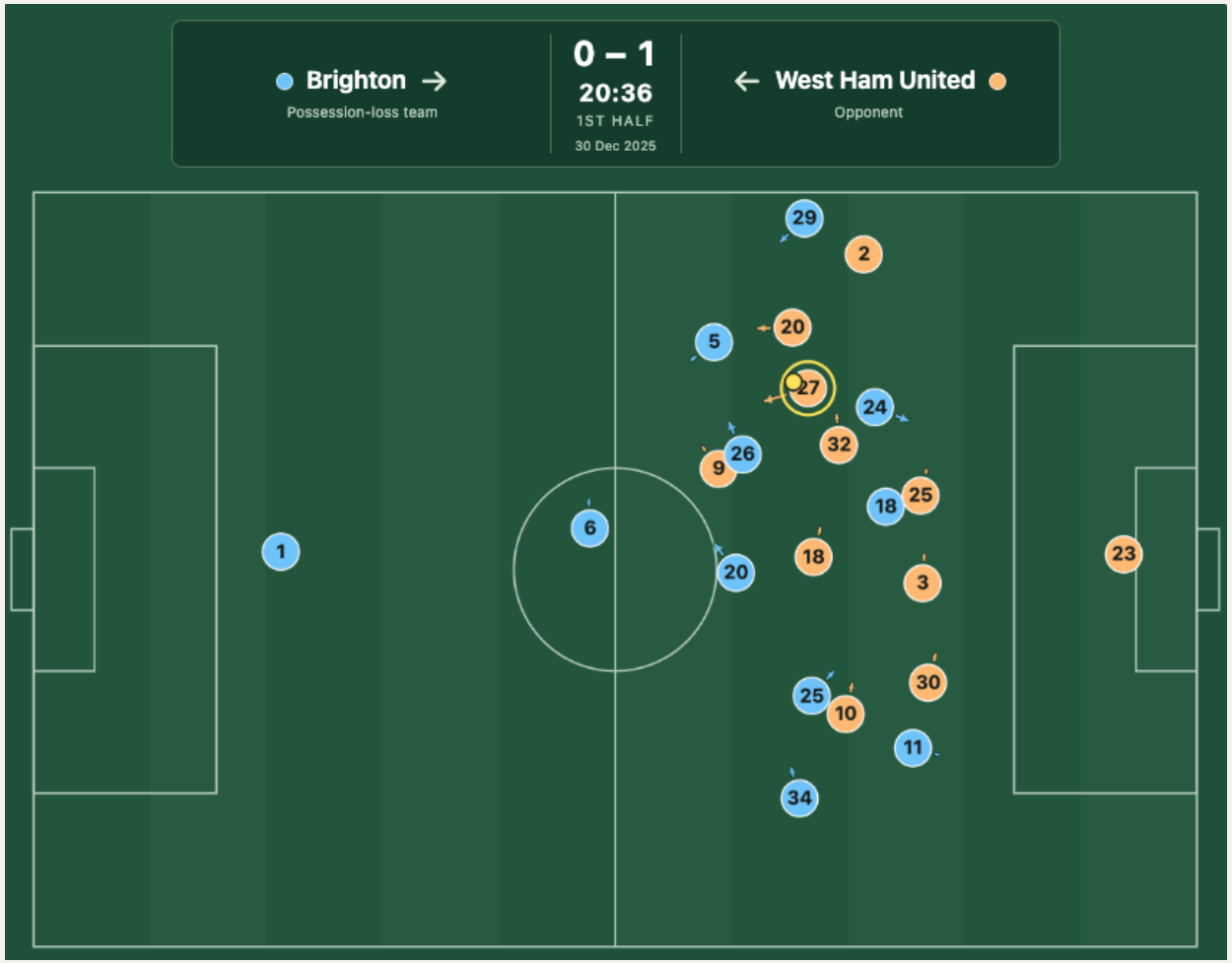
Possession lost. What happens next?

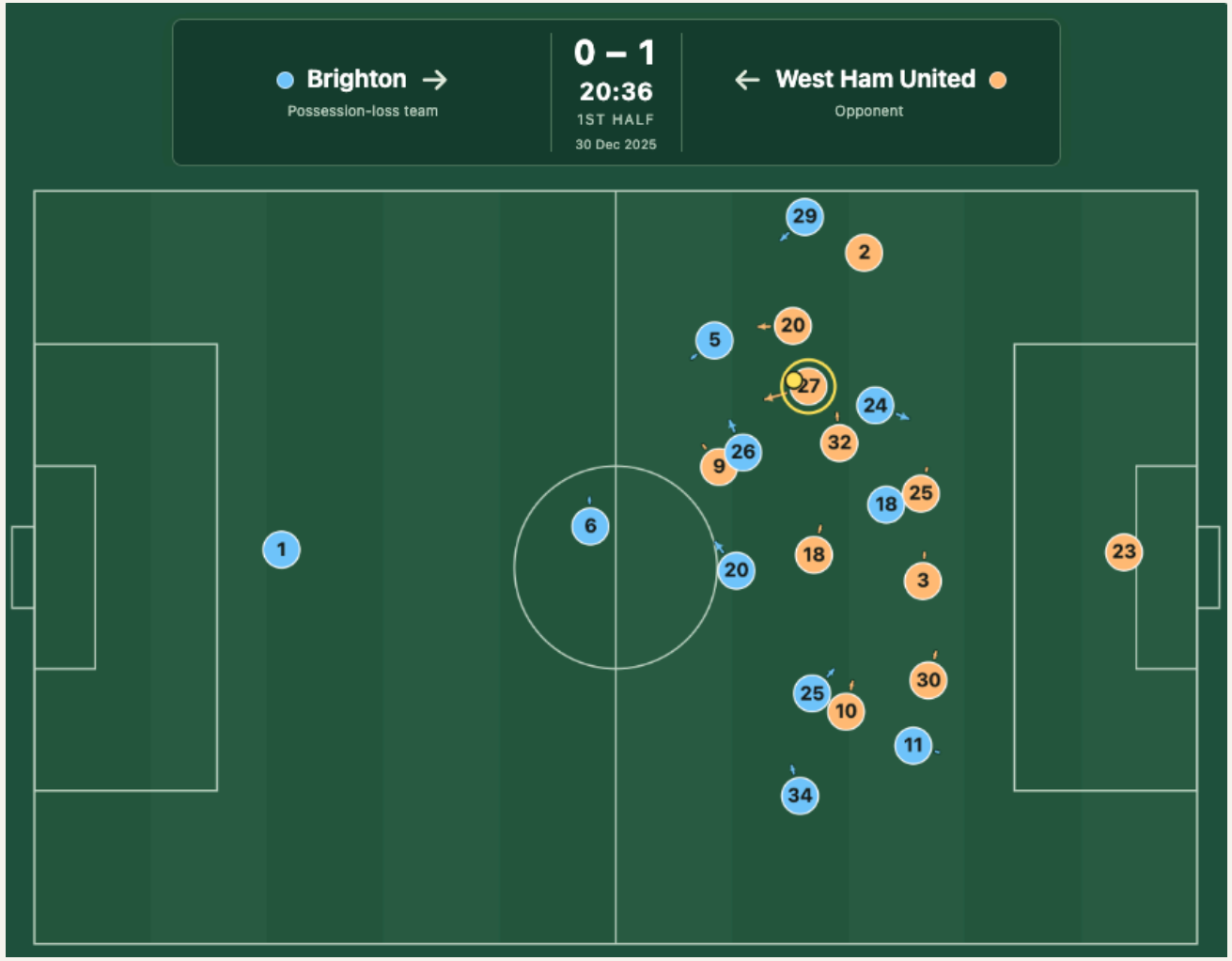
Brighton vs West Ham United · Premier League



Video playback in presentation · still at first opponent control (t_0)

One moment. Three questions.

Brighton vs West Ham United · Premier League



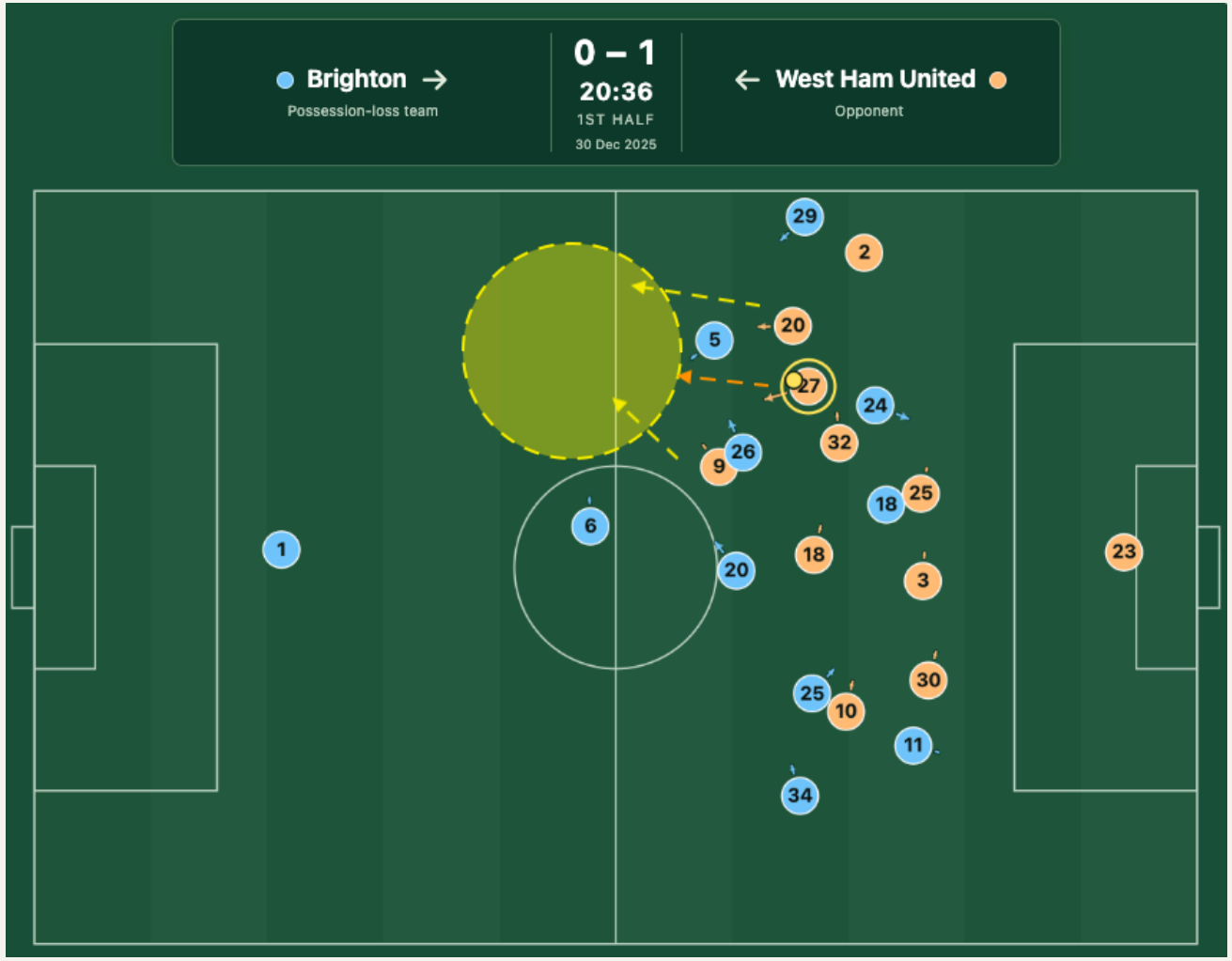
01 · PREDICT

What happens next?

Regain possession · Progression · Neither

One moment. Three questions.

Brighton vs West Ham United · Premier League



01 · PREDICT

What happens next?

Regain possession · Progression · Neither

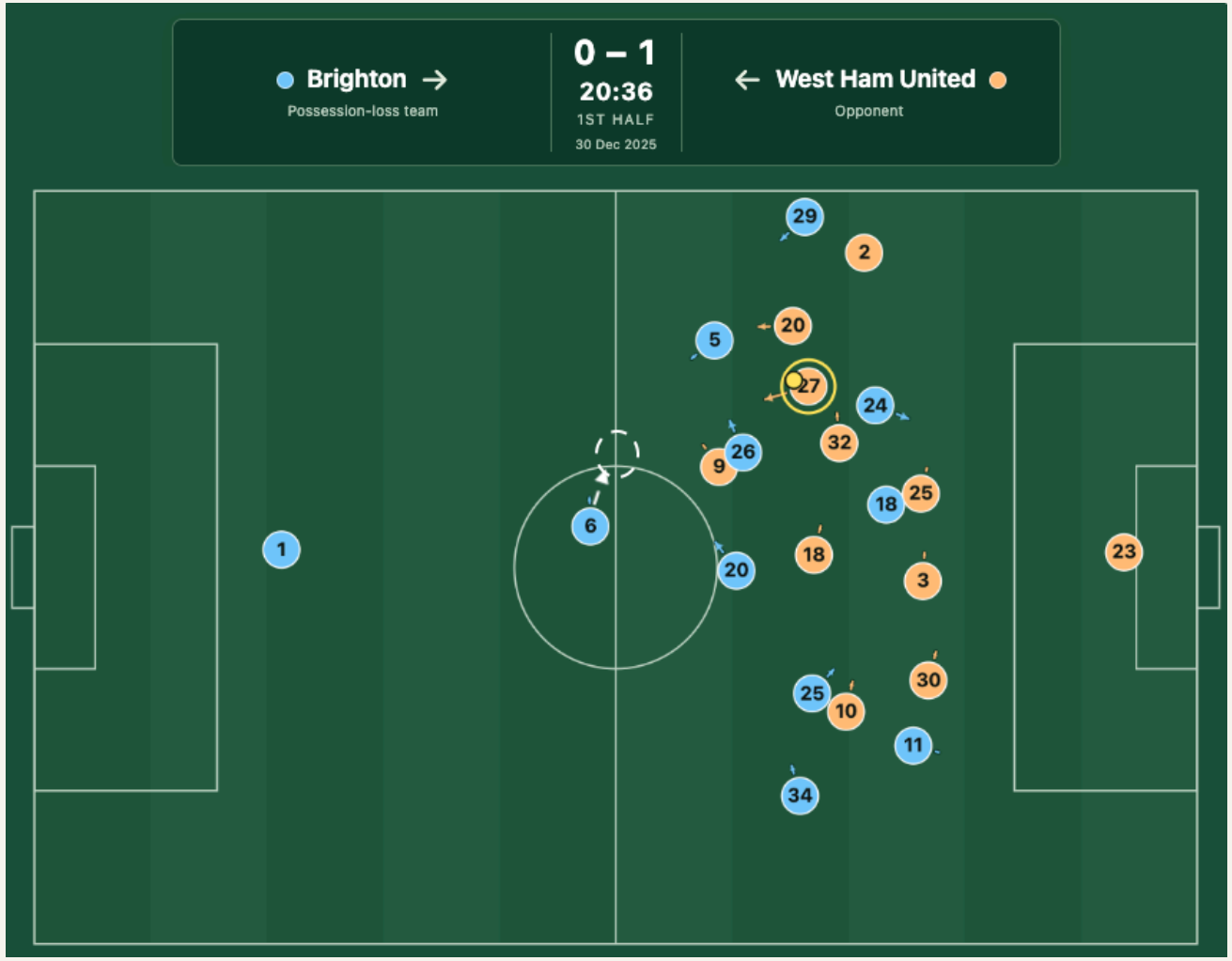
02 · ANALYZE

What might the outcome miss?

Could the outcome hide defensive vulnerability?

One moment. Three questions.

Brighton vs West Ham United · Premier League



01 · PREDICT

What happens next?

Regain possession · Progression · Neither

02 · ANALYZE

What might the outcome miss?

Could the outcome hide defensive vulnerability?

03 · EXPLORE

Could Brighton have defended differently?

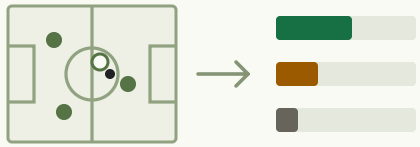
Could better positioning reduce progression risk?

Project overview

Three connected capabilities

Interactive application

01

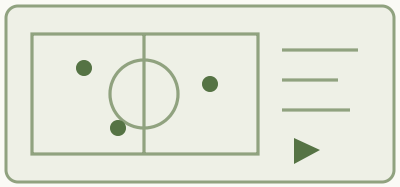


Predict

Predictive modeling

What happens next
after possession loss?

02

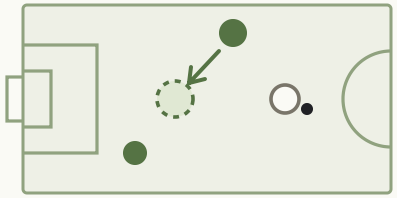


Analyze

Defensive transition analysis

Explore patterns.
Review individual situations.

03



Explore defensive what-ifs

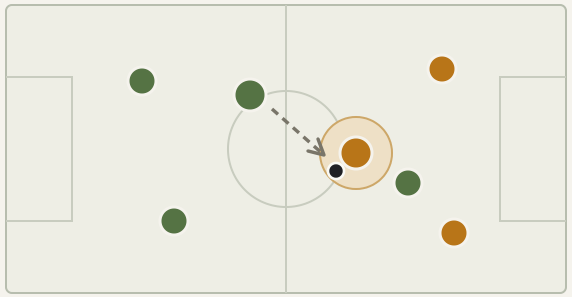
Defensive positioning explorer

Test positioning changes.
Compare model predictions.
Get tactical insights from Agentic AI.

Prediction task

What happens next after possession loss?

First opponent control after possession loss



Possession-loss team Opponent

Prediction model

Three probabilities

First qualifying event within 8 seconds

Possession Regain

The possession-loss team regains controlled possession first.

Opponent Progression

Opponent controls the ball ≥15m closer to the possession-loss team's goal.

Neither

Neither event qualifies within the window.

The data

SkillCorner tracking + Dynamic Events

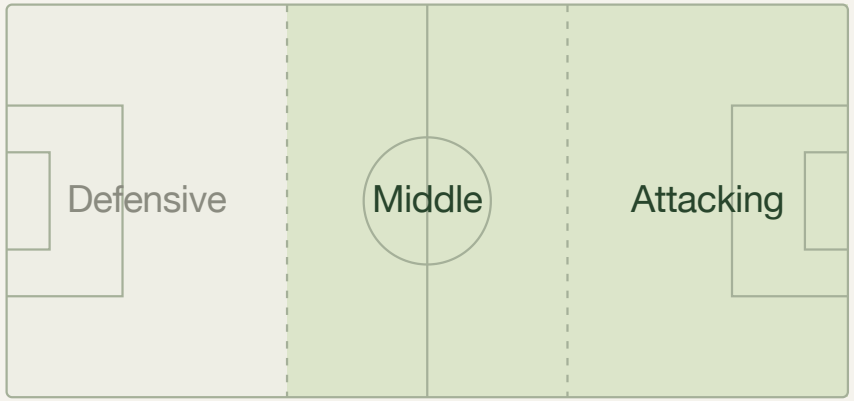
637.5 million
tracking rows · player / ball observations

3.08 million
Dynamic Events rows

648 Premier League matches
2024/25 · 2025/26

Open-play possession losses

Middle and attacking thirds at first opponent control



Possession-loss team's attacking direction →

54,963 samples

Each eligible possession loss = one sample

Outcome	Samples	Share
Possession Regain	18,174	33.1%
Opponent Progression	14,331	26.1%
Neither	22,458	40.9%

How do we model these situations?

Two ways to represent the same football situation

Tracking + Dynamic Events

Available at first opponent control

Spatial
Positions, proximity,
local numbers and team shape

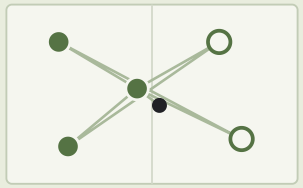
Motion
Speed, direction
and closing rates

Context
Game state: score, match time
and home / away

XGBoost

Engineered summary features → Boosted trees → Three probabilities

GATv2 Graph attention network



22 players + ball → **2 attention layers** Learns how player relationships inform predictions → **Pool + context** Three probabilities

Nodes · position, team / role, movement
Edges · relative position, distance, closing speed

Model performance

8,952 test samples · 99 Premier League matches · 2025/26

Match split: 454 training · 95 validation · 99 test

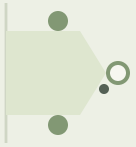
Model	Probability error Brier ↓	Regain ranking Average precision ↑	Progression ranking Average precision ↑	Classification Macro-F1 ↑
Equal-probability baseline	0.6667	0.3487	0.2594	0.3360
Location-only XGBoost	0.6517	0.3995	0.2811	0.3054
XGBoost · no motion	0.5933	0.5373	0.4138	0.4819
XGBoost · motion	0.5810	0.5437	0.4495	0.4990
GATv2 · no motion	0.5750	0.5613	0.4508	0.5109
GATv2 · motion	**0.5651**	**0.5736**	**0.4807**	**0.5220**

Motion GATv2 leads across all four metrics.

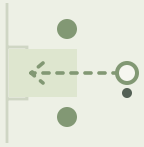
Graphs retain individual relationships that tree summaries compress.

From predictions to analysis

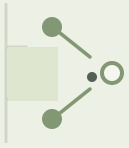
Using predicted probabilities to uncover defensive vulnerability and unexpected outcomes.



Which possession losses looked most vulnerable?



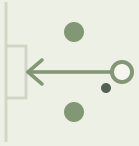
Where might defensive exposure have gone unpunished?



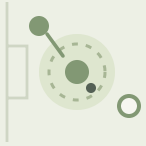
When did we regain possession despite the risk?



When did an expected possession regain fail to happen?



When did opponents escape a promising possession regain situation?

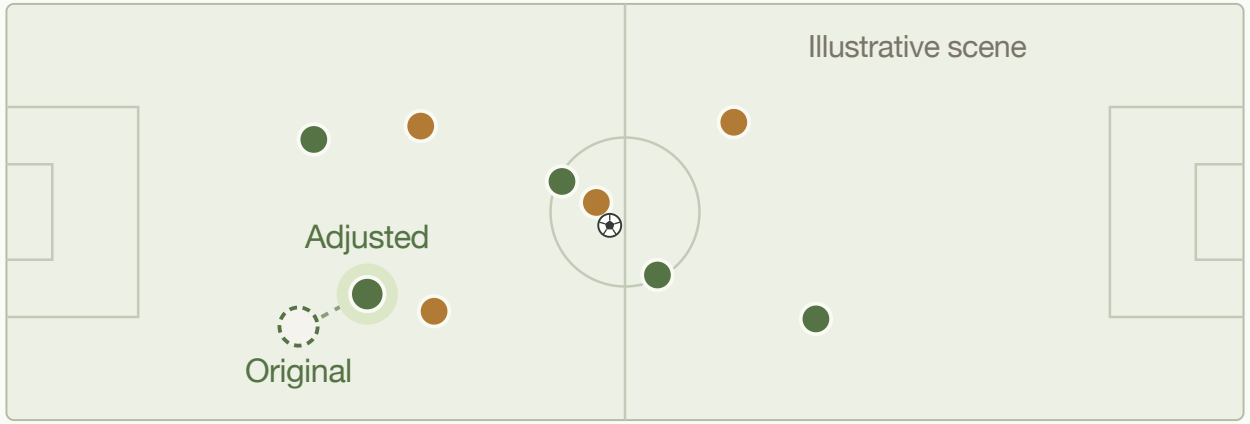


What distinguishes successful recoveries in high-risk situations?

Explore defensive what-ifs

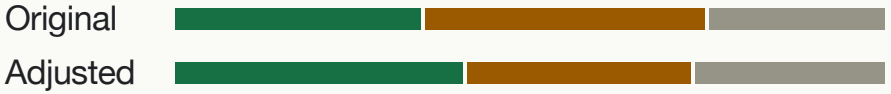
Adjust the situation. Compare predictions. Explore tactical ideas.

Test positioning changes



Adjust positions & movement →

Generate predictions



Regain Progression Neither

Illustrative probabilities

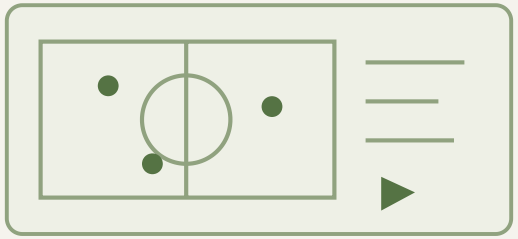
Tactical agent

Scene image + tracking data
+ tactical context

- Explain this situation
- Where is the defensive exposure?
- Suggest alternative positioning

← Ideas to test

Investigate tactical hypotheses through model predictions, not proof of better defending.



Live demo

Thank you

Let's connect



Ryan Inghilterra

LinkedIn ↗

Open to research partnerships and consulting with football clubs and companies. ⚽

Questions?

Discussion, feedback and ideas welcome.

Technical appendix: model inputs

XGBoost: 34 inputs without motion · 58 with motion | GATv2: individual player–ball graphs

Spatial

30 tree inputs

Ball geography 5
Ball x/y (%), goal distance, goal angle and distance to the nearest touchline.

Ball proximity 6
Nearest three outfield-player distances to the ball, for each team.

Local numbers 5
Each team's counts within 5 m and 10 m of the ball; the difference at 10 m.

Goal-side cover 4
Each team's goal-side count; their difference; possession-loss players in the ball–goalpost triangle.

Team shape 8
Centre x/y offsets from the ball, depth and width, for each outfield team.

Goalkeeper 2
Possession-loss keeper's distance to the ball and own goal.

Motion

24 tree inputs

Ball + carrier 4 + 4
x/y velocity, speed and goalward speed for each: movement before control.

Three defenders nearest the ball 9
Each player's speed, goalward speed and closing speed toward the carrier.

Team movement 6
Mean x/y velocity and mean individual speed, for each outfield team.

Team convergence 1
Closing speed between the two team centres.

Match context

4 shared inputs

Score difference · period · seconds elapsed in the period · possession-loss team home/away.

GATv2

node + edge inputs

23 nodes: 22 players + ball.
All directed pairs + self-loops: 529 edges.

Spatial nodes 12 per node
x/y position; x/y offsets to ball and goal; goal distance; ball / possession-loss / gaining-team indicators; goalkeeper and carrier indicators.

Spatial edges 3 per edge
Relative x/y position and distance.

Motion nodes +4 per node
x/y velocity, speed and goalward speed for every player and the ball.

Motion edges +3 per edge
Relative x/y velocity and closing speed.

Global context 4 per graph
The same match context, added once after pooling the nodes.

Positions at first opponent control; motion from the preceding 0.5 s. Goalward = toward the possession-loss team's goal.
Tree team counts / shape / movement exclude keepers. GATv2 retains every player's inputs, including both keepers.