

Beyond Expected Goals: A Probabilistic Framework for Shot Occurrences in Soccer

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What Are Expected Goals (xG)?

- Expected Goals (xG) is a metric that estimates the probability that a shot is scored
- Depends on factors like distance from goal, angle to goal, shot type, and player positions
- Estimated by XGBoost models trained on historical shot data
- Often used to measure the quality of a chance
- Aggregated over a match or season to measure team performance

Limitations of xG

- Models are only trained on **observed** shots, inducing significant selection bias
- Skilled attackers who take more shots are over-represented
- Threatening attacks with no recorded shots are omitted
- Repeated shots on a single possession are added independently

Visual Examples

Video: Player has clear chance but passes instead of shooting

Video: Multiple shots from same attacking sequence

Methods

- Statistical approach
- Data processing steps
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- Model specifications

Results

- Key findings
- Statistical significance
- Practical implications

Conclusions

- Summary of main points
- Future work
- Questions and discussion

Thank You

Questions?