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Peer Review

Review of: "Accuracy Without Profit: A Statistical Evaluation of Machine Learning Profitability in the English Premier League"

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This is a well-written paper with credible, useful messages for people working with or interested in machine learning. Perhaps first among those messages is that it is exceedingly difficult (arguably futile?) to forecast the outcomes of sports matches sufficiently better than the market/bookmakers to be profitable (i.e., to overcome the large profit margins of the bookmakers).

There are a few things I would suggest to improve future iterations of the paper:

- The figures have not rendered very well on the website. They are too small to read, but this is probably partly a problem with the website itself.
- Section 4.2 was not sufficiently clear. The words ‘variance’, ‘significant’, and ‘value’ have technical and non-technical meanings, and it is not completely clear how the author wants to use them.
- In Section 4.4, I think the author starts to refer to the (specific) XGBoost model as the (generic) 'AI'. I'm not sure this is a good idea.
- The nature of the simulation exercise in Section 4.5 wasn't clear to me. Were the match statistics simulated from a model? Was this the same model used to predict the matches?

I think the central message, that it is critically important to have well-calibrated probabilistic forecasts when you are being scored according to a form of log-scoring rule, is sound and worth communicating. If the authors wanted to expand on this point, I would suggest looking at the 1987 paper by Murphy and Winkler in which the role of calibration in various probability scores is considered. From a machine learning perspective, the authors might also want to write more about overfitting, which I think their

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models′ overconfidence is a symptom of. This topic could reference some recent, provocative work on benign overfitting by Bartlett, for example.

Declarations

Potential competing interests: No potential competing interests to declare.