

Using player abilities to predict football

Gavin Whitaker

The statistical modelling of sports has become a topic of increasing interest in recent times, as more data is collected on the sports we love, coupled with a heightened interest in the outcome of these sports, that is, the continuous rise of online betting. We consider the task of determining a football player's ability for a given event type, for example, scoring a goal.

We propose an interpretable Bayesian inference approach that centres on variational inference methods. We implement a Poisson model to capture occurrences of event types, from which we infer player abilities.

We then use these inferred player abilities to extend the Bayesian hierarchical model of Baio and Blangiardo (2010), which captures a team's scoring rate.

We apply the resulting scheme to the English Premier League, capturing player abilities over the 2013/2014 season, before using output from the hierarchical model to predict whether a certain number of goals will be scored in a future match or not (along with attempting to predict the winning margin for a team).

Investigating efficiency in football Asian Handicap markets using threshold regime-switching and empirical Bayes on dynamic regression models

David Suda, Lawrence Grech

We investigate efficiency of football betting markets by devising appropriate models which adapt to changes over time. For this purpose, we look at two football teams of different ability in the German Bundesliga: FC Bayern Munich and FSV Mainz 05 .

We use three seasons starting from August 2012 as our training set, and two seasons starting from August 2015 as our test set, and focus on the Asian Handicap market.

We implement a dynamic regression framework on goal differences which allows for the inclusion of past lags and exogenous input, with the possibility of a threshold regime-switching mechanism based on an exogenous or endogenous input (or a hybrid of both).

We also consider two parameter estimation approaches.

The first is standard ordinary least squares, which can be implemented within a dynamic regression context subject to certain assumptions on the data, and provided the normal distribution remains a reasonable approximation.

The second is an empirical Bayes approach which we specifically devise for this setting. The Bayesian aspect of regression is well-studied and the empirical Bayes setting could make sense in this context because it allows the model to adapt to recent changes. In our method we propose to optimize hyperparameters for the prior using information in a recent time window.

We finally compare outcomes of different models, to determine whether the inclusion of regime-switching dynamics and the implementation of the empirical Bayes approach improves forecasting performance.

We also test hypotheses related to predictability and profitability for the different modelling approaches and teams.

Bayesian Integration of Multisensory Information

Florian Reinbold

I want to integrate two sensory information (auditive and visuall stimuli) and calculate how the sensory integration changes with noise in the signals.

I think it would be interesting to use Bayesian Statistics, because Wolpert et al. showed that our CNS is working in a Bayesian way.

A more practical approach would be the advantage of grunting in tennis that helps to cover some information of the serving player.

Application of decision support systems to individualise training prescription to mitigate injury risk for performance in elite rugby union

Bikash Deb

Research Interests

1. Examine how current decision support systems are utilised by a multi-disciplinary team and combined with their experiences, clinical knowledge and intuition
2. Compare different methodology from simple to complex methods used in decision support systems in context of multiple trade-offs including complexity, accuracy, interpretability and application
3. Evaluate player performance using small sample sizes