

Optimisation of list management in the Australian Football League using deterministic methods

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Abstract: List management plays an important role in developing a successful sporting team. Choosing and investing in the right players and drafting well is the important off-field work that teams must succeed in before their team even reaches the field. But teams must balance the squad with a mix of player types. In salary capped leagues, teams must choose where to focus their money with the desire to win the competition. In leagues with a rookie draft used to allocate first-year players to teams in a way that attempts to increase equality across the competition, teams generally must also manage the cycle of performance to peak in some years and bottom-out in others to regenerate the list and acquire the best first-year players that will give their team the best chance to perform at the highest levels again. This article examines the list management decision making process applied to the Australian Football League (AFL) to determine optimal team construction given an initial list and customised team objectives over a long-term time horizon.

AFL player ratings and the projected ratings model developed by McIntosh et al (2019), allow for the relative performance of different players to be summarised in a single metric. While actual team evaluation would include a range of factors, and the model validated using just one, the model could be adjusted to account for the variables a team finds to be important in their process. This would complement the existing work of scouts and player evaluators, while providing teams with the opportunity to model their team list over a multi-year horizon to explore how their decisions today can affect their performance and decisions in later seasons.

Constraints include total player salary, number of players and positional requirements to ensure the list can deliver the required player mix for a team for every game. These positional constraints can be adjusted depending on the list requirements of a coach. Available players in the draft and free agency are based on expected availabilities in previous seasons, with high quality free agents associated with a high salary cost to limit their usage.

The optimisation equations used vary to cover a range of situations depending on what the goals of a team may be. This can include maximising performance in a single season to consistency of performance across a period or maximising output from a single positional group or forcing a lower score in a couple of seasons to increase the maximum performance in later seasons. This shows the versatility of the model to account for the demands of a team organisation. The research extends on existing literature that is limited to new teams entering a league for the first time (Smith and Bickel, 2023). This model provides the groundwork to extend and use stochastic modelling that more closely approximates real scenarios, particularly around player availability and performance from season-to-season. It provides useful team constructions in a multi-year model for a long-term team outlook.

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Keywords: *Team performance, decision making, draft, free agency*