Developing a strategy based on game style clustering: A netball case study

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Abstract

Introduction: Developing a strategy in sport is a complex task that needs to consider all factors that could influence performance. These factors might include a team's strengths and weaknesses, their opposition's strengths and weaknesses as well as the numerous performance indicators that contribute to these. Team performance can be described with increasingly large data sets thanks to modern computerised notational analysis systems and companies devoted collecting match data. The challenge of sorting through large multi-dimensional data to find important combinations of performance indicators to use in strategy development remains at the forefront of performance analysis.

Methods: In previous work we used self-organising maps (SOMs) as a tool for visualising rugby union match data (Croft, Lamb & Middlemas, 2015). In particular, the visualisation identified two game styles associated with winning and two styles associated with losing. The current paper reports the development of a SOM analysis aimed at clustering map regions to represent game styles. Training data consisted of discrete data from 250 matches, over four seasons of elite netball. Forty input variables, in the form of descriptive statistics, were chosen by the analyst and head coach as those most important to the team's performance. Map nodes were clustered using the k-means clustering algorithm to reveal seven game styles. Team specific analysis was then performed by comparing the matches of a specific team consistent with one cluster or game style to the corresponding game style of the opponent. For example, if Team A won ten and lost 5 matches that were represented by cluster 1, the opponent game styles responsible for beating Team A is those five losses, as well as the game styles that did not beat Team A are of great interest to the coach in strategy development. We present a case study to demonstrate the workflow from analysis to strategy development.

Results/Case Study: The reported approach was applied, prior to competition, on a single opposition team ("Team A"), with a strong visual relationship exiting between winning performances, in cluster 6 and the variables: Wing Attack-1st phase reception (WA1), Goal Attack – 1st phase reception (GA1) and Centre – 2nd phase reception (C2). These 3 variables also had inverse relationships in clusters 2 ad 3, which had high percentages of losses. As a result, a strategy was devised by the coach to prevent the GA1 and C2, by instructing 2 defenders to "mark" each of those players at the appropriate time. WA1 was allowed to occur by not "marking" this player. To track progress during the match Figure 1 was created to indicate if the team had successfully (dark green) or unsuccessfully (red) implemented the strategy. Figure 1 indicates the execution of this strategy was "board line" which interestingly coincided with a 1 goal win to the team.

Figure 1. Dashboard used to track three inter-related performance indicators live during a netball match.

References:

Croft, H., Lamb, P., & Middlemas, S. (2015). The application of self-organising maps to performance analysis data in rugby union. *International Journal of Performance Analysis in Sport, 15*: 1037-1046.