Game Intelligence Analysis by Means of a Combination of Variance-Analysis and Neural Networks

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Abstract

In order to evaluate performance data from games, normally qualitative and quantitative methods are used separately. The aim of this contribution is to demonstrate that the combination of net-based qualitative analyses and stochastic quantitative analyses can improve the information output significantly. The stochastic approach reduces the total of recorded data to only a few statistical quantities, which are not necessarily data-specific. In contrast, neuronal networks – considering data to be high-dimensional points that correspond to neurones – can (e.g.) be used to extract specific striking features on the original data (see Schöllhorn & Perl, 2002).
This approach will exemplarily be demonstrated using data from a BISp-sponsored project that was run by Roth and Memmert (2003). In this field-study, sport-specific training concepts were compared with non-specific ones, dealing (e.g.) with the game intelligence of about 150 children from two measuring points (MZP). The convergent reference numbers were determined by means of concept-oriented expert ratings (3 evaluators) using three game-test-situations with two rotations each (see Memmert & Roth, 2003).
Using dynamical adaptive neural networks ("DyCoN"; Perl, 2000) allows for simultaneous processing of 12-dimensional attribute vectors (2 MZP x 3 evaluator x 2 rotations) instead of 2-dimensional aggregated vectors – avoiding reduction of semantic structures and information.

This way, by means of

- visual evaluation of data distribution projected to the net structure
- analysis of inter- and intra-individual correspondences

useful information become available which can hardly or not be obtained from variance-analyses.

The existing evaluations suggest that DyCoN, similar to the case of convergent performance attributes, will also be successful in the divergent case.

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