

# **Net-Based Game Analysis by Means of the Software Tool *SOC CER***

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## **Abstract**

Game analysis has become much easier by automatic position recording. However, the problem remains how to transfer the astronomic amount of available data to a selection of useful information. Our approach is based on two ideas: Data reduction and pattern recognition. In the first step, by means of *SOC CER*, the position data of the players of a team are reduced to those of tactical groups like offense or defence, followed by normalization, where the players' constellations on the playground are reduced to their geometric formations relative to their centroids – i.e. the playground-independent position patterns. In the second step, those patterns are learned by the self-organizing neural network *DyCoN*, resulting in a collection of formation clusters, each containing a variety of shapes of the corresponding formation type. Based on that information, game analysis with *DyCoN* and *SOC CER* works as follows: Along the time-axis, position data of interacting tactical groups are fed to the net, which recognizes the time-dependent corresponding formation types. A first quantitative analysis then results in frequency distributions of formation types. Recombination with the playground position information leads to a playground specific frequency distribution. And adding the time information finally allows for process and interaction oriented analyses. Moreover, *SOC CER* not only offers quantitative results but also qualitative ones like game animation and tactical analyses by use of additional semantic action valuation.

**KEYWORDS:** PATTERN ANALYSIS, FORMATION, STATISTICS, TRAJECTORY