A New Model to Forecast the Results of Matches Based on Hybrid Neural Networks in the Soccer Rating System

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Abstract

The objective of this paper is to build a result prediction model for the rating system in soccer games. A rating system which plays a crucial role in world sports field yields predictions for the probability that one contestant beats another. The result prediction model is the core technique in the rating system. The robustness and accuracy of the model is a very important feature because people will trust the rating system only if it can give the exact prediction of the game results. This paper employs a coarse-to-fine training technique based on hybrid Neural Network. Very few people have ever attempted the method based on Neural Network before in this field. First a match is classified into three categories with a LVQ net to determine the strength contrast between two contestants. Then the elaborately designed data will go through the specific BP nets according to the classifying result. The model is trained and tested on volumes of actual soccer match results from Italian series A. Finally the results of the model are compared to other prediction models based on statistics. The outcome shows that the new model is more accurate and provides better performance evaluation of all teams.

1. Introduction

Sports games have gained more and more favor from all over the world. Within the last few decades, statisticians focused on the work of quantitative representation for strength contrast between players or teams based on sound stochastic and modeling principles, which is called rating system. A rating system yields predictions either for the probability that one contestant beats another, or for the expected score [1]. Sports games, especially of paired fashion e.g. tennis, chess, soccer etc., need proper rating systems for ranking, selecting players for national team trials, assessing player performance and tracking player improvement.

The essential components of a rating system are:

1. Machinery for assigning ratings for each team based on match results
2. A function which can be used to deduce approximate probabilities for results of games between any two rated teams [2]

There are numerous rating systems in use in various games and sports. Perhaps the best known is the Elo rating system developed for chess [3] which is based on the Bradley-Terry, or logistic model. Elo system was adopt by International Chess Federation (FIDE) in late 1970s and made profound impact to prevailing rating system nowadays.

1.1. Previous work

Three authoritative forecasting models are introduced here. They have been broadly used in the result prediction for the soccer matches. Almost all the gaming companies give their initial ratios relying on the models of these three forecasting models. They are Elo's model, goal ratio compare model and the latest 6 match results compare model.

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Carvalho,Vaclav Snášel,2009-05-01 Foundations of Computational Intelligence Volume 6 Data Mining Theoretical Foundations and Applications Finding information hidden in data is as theoretically difficult as it is practically important With the objective of discovering unknown patterns from data the methodologies of data mining were derived from statistics machine learning and artificial intelligence and are being used successfully in application areas such as bioinformatics business health care banking retail and many others Advanced representation schemes and computational intelligence techniques such as rough sets neural networks decision trees fuzzy logic evolutionary algorithms arti cial immune systems swarm intelligence reinforcement learning association rule mining Web intelligence paradigms etc have proved valuable when they are plied to Data Mining problems Computational tools or solutions based on intel gent systems are being used with great success in Data Mining applications It is also observed that strong scientific advances have been made when issues from different research areas are integrated This Volume comprises of 15 chapters including an overview chapter providing an up to date and state of the research on the applications of Computational Int ligence techniques for Data Mining The book is divided into 3 parts Part I Data Click Streams and Temporal Data Mining Part II Text and Rule Mining Part III Applications Part I on Data Click Streams and Temporal Data Mining contains four chapters that describe several approaches in Data Click Streams and Temporal Data Mining **Foundations of Computational Intelligence Volume 3** Ajith Abraham,Aboul-Ella Hassanien,Patrick Siarry,Andries Engelbrecht,2009-04-27 Global optimization is a branch of applied mathematics and numerical analysis that deals with the task of finding the absolutely best set of admissible conditions to satisfy certain criteria objective function s formulated in mathematical terms Global optimization includes nonlinear stochastic and combinatorial programming multiobjective programming control games geometry approximation algorithms for parallel architectures and so on Due to its wide usage and applications it has gained the attention of researchers and practitioners from a plethora of scientific domains Typical practical examples of global optimization applications include Traveling salesman problem and electrical circuit design minimize the path length safety engineering building and mechanical structures mathematical problems Kepler conjecture Protein structure prediction minimize the energy function etc Global Optimization algorithms may be categorized into several types Deterministic example branch and bound methods Stochastic optimization example simulated annealing Heuristics and meta heuristics example evolutionary algorithms etc Recently there has been a growing interest in combining global and local search strategies to solve more complicated optimization problems This edited volume comprises 17 chapters including several overview Chapters which provides an up to date and state of the art research covering the theory and algorithms of global optimization Besides research articles and expository papers on theory and algorithms of global optimization papers on numerical experiments and on real world applications were also encouraged The book is divided into 2 main parts **Advances in Artificial Intelligence and Soft Computing** Grigori Sidorov,Sofía N. Galicia-Haro,2015-11-19 The two volume set LNAI 9413 LNAI 9414 constitutes the

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