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Editorial

Special Issue on 'Computer Science in Sport'

Christian Dawson

Department of Computer Science, Loughborough University, Loughborough LE11 3TU, UK; c.w.dawson1@lboro.ac.uk

Computer Science in Sport is a cross-disciplinary topic that brings together the problem-solving capabilities of Computer Science to various theoretical and practical aspects of all sports and physical activities. Applications cover a diverse range, including the analysis of individuals and teams in competition and training; equipment design and assessment (which can include playing surfaces and clothing); biomechanics; physiological analysis; injury prediction and prevention; and tactical analysis and modelling. Areas of Computer Science that have been utilized include image processing, data mining, artificial intelligence, deep learning neural networks, virtual reality, wearable devices, ubiquitous computing, and sensor technologies, to name a few.

This topical collection aims to bring together the latest research and ideas in this cross-disciplinary area. Its focus is on the capturing of individual and team performance during training and competition and using these data to enhance performance in the future.

A total of eight papers are published in this Special Issue across a wide spectrum of sports and applications. Sarcevic et al. [1] introduced dynamical modelling into sports match models to improve predictions on sporting outcomes. These dynamical models are based on conditional probability and empirical Bayes estimation which are combined in a Monte Carlo simulation approach. The results are confirmed through the analysis of data from volleyball matches. Sen Sarma et al. [2] applied deep learning neural networks to classify videos of five traditional Bangaldeshi sports—Boli Khela, Kabaddi, Lathi Khela, Kho Kho, and Nouka Baich. The combined approach of a convolution Neural Network and Long Short-Term Memory in the proposed model showed considerable accuracy in predicting particular sports. Khasanshin [3] also used neural networks—in this case to automate the measurement of punches made by fighters in boxing matches. This application, which uses inertial measurement units attached to the fighter, improves the efficiency of the process of punch characterisation—which in turn leads to improved performance evaluation and training. Deep learning neural networks were also used by Baclig et al. [4] in the tracking of players in squash matches—using only broadcast video (so without the need for an expensive camera set up). This is a particularly challenging problem due to the speed of the game. The resultant model is useful for coaching elite athletes in court placement and movement. Khaustov and Mozgovoy [5] used rule-based algorithms to tag event information (such as passes, fouls, etc.) automatically from datasets of soccer matches. The algorithm speeds up the process of tagging such events and can be applied in other sporting contexts. Heilmeier et al. [6] used neural networks to assist decision-making for race strategies in motorsport—termed Virtual Strategy Engineer. The model assists decision-making in determining the optimum time for pit stops, which can have a significant impact on the outcome of a race. They also used in [7] a Monte Carlo method to consider and evaluate probabilistic influences in motorsport simulations. Such simulations, that can emulate real races accurately, are useful in determining race strategies in the future. In another paper, which emphasises the diverse contributions in this field, Wunderlich and Memmert [8] applied a lexicon-based tool to analyse sports communications via Twitter to undertake sentiment analysis. Their analyses were based on soccer tweets and proved accurate to 95% in the sentimental analysis.

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