

A cluster analysis and artificial neural network of identifying skateboarding talents based on bio-fitness indicators

Aina Munirah Ab Rasid^a, Muhammad Zuhaili Suhaimi^a, Anwar P. P. Abdul Majeed^b, Mohd Azraai Mohd Razman^c, Mohd Hasnun Arif Hassan^d, Nasree Najmi^e, Noor Azuan Abu Osman^f & Rabi Muazu Musa^a

^a Centre for Fundamental and Continuing Education, Universiti Malaysia Terengganu, Terengganu, Kuala Nerus, 21030, Malaysia

^b School of Robotics, XJTLU Entrepreneur College (Taicang), Xi'an Jiaotong-Liverpool University, Suzhou, 215123, China

^c Innovative Manufacturing, Mechatronics and Sports Laboratory, Universiti Malaysia Pahang, Pekan, Pahang Darul Makmur, 26600, Malaysia

^d Faculty of Mechanical and Automotive Engineering Technology, Universiti Malaysia Pahang, Kuantan, Malaysia

^e Terengganu State Sports Council, Jalan Lapangan Terbang, Terengganu, Kuala Terengganu, 21300, Malaysia

^f Faculty of Engineering, Department of Biomedical Engineering, Centre for Applied Biomechanics, University of Malaya, Kuala Lumpur, 50603, Malaysia

ABSTRACT

This research aims to identify talented skateboarding athletes with reference to their bio-fitness indicators. A total of 45 skateboarders (23.09 ± 5.41 years) who were playing for recreational purposes were recruited for the study. Standard assessment of their bio-fitness as well as their skateboarding performances was performed. The bio-fitness investigated consisted of stork balance, star excursion balance test, vertical jump, standing broad jump, single-leg wall sits, plank and sit-up while the related-skill performances consisted of the observation on skateboarding tricks execution, namely Ollie, Nollie, Frontside 180, Pop-Shuvit and Kickflip. To achieve the objective of the study, a hierarchical agglomerative cluster analysis (HACA) was performed to cluster the athletes into groups in reference to the level of their bio-fitness markers. The clusters identified two groups of performance named High-Potential Skaters (HPS) and Low-Potential Skaters (LPS) following their skateboarding performance scores. An Artificial Neural Network (ANN) was conducted to ascertain the classified athletes into the clusters (HPS and LPS) based on the bio-fitness indicators evaluated along with the skateboarding tricks performance scores. The result demonstrated that ANN accomplished a high classification accuracy of 91.7% indicating excellent performance from the classifier in classifying the skateboarding athletes. Similarly, the area under the curve of the classifier was found to be 0.988 signifying further the validity of the model developed. Overall, these results suggest that the proposed technique was able to classify the skateboarding athletes reasonably well which will in turn possibly assist coaches to identify talents in this sport through the bio-fitness indicators examined.

KEYWORDS

Bio-fitness; Hierarchical Agglomerative Clustering; Individual extreme sport; Machine learning; Skateboarding; Talent identification

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