Talent identification of potential archers through fitness and motor ability performance variables by means of Artificial Neural Network

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Abstract. The utilisation of artificial intelligence for prediction and classification in the sport of archery is still in its infancy. The present study classified and predicted high and low potential archers from a set of fitness and motor ability variables trained on artificial neural network (ANN). 50 youth archers with the mean age and standard deviation of (17.00 ± 0.56) drawn from various archery programmes completed a one end archery shooting score test. Standard fitness and ability measurements of hand grip, vertical jump, standing broad jump, static balance, upper muscle strength and the core muscle were conducted. The cluster analysis was used to cluster the archers based on the performance variables tested to high performing archers (HPA) and low performing archers (LPA), respectively. ANN was used to train the measured performance variables. The five-fold cross-validation technique was utilised in the study. It was established that the ANN model is able to demonstrate a reasonably excellent classification on the evaluated indicators with a classification accuracy in classifying the HPA and the LPA.

Keywords: Archery, Machine Learning, Classification, Artificial Neural Network.

1   Introduction

Performance in archery is observed based on the amount of the scores of the arrows shot by an athlete that hit the board. Archery performance is influence by numerous elements comprising environmental conditions, fatigue, and the athlete's technique, in addition to the effects of the materials that determine the behaviour of the bow and the arrow [1]. Humaid described that arms muscle strength has a greater contribution to assisting an archer during the execution of archery technique [2]. An archer could deliver a correct archery technique when there is a sufficient arms strength to draw and hold the bow.