

# The Application of Support Vector Machine in Classifying Potential Archers Using Bio-mechanical Indicators

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**Abstract.** This study classifies potential archers from a set of bio-mechanical indicators trained via different Support Vector Machine (SVM) models. 50 youth archers drawn from a number of archery programmes completed a one end archery shooting score test. Bio-mechanical evaluation of postural sway, bow movement, muscles activation of flexor and extensor as well as static balance were recorded. *k*-means clustering technique was used to cluster the archers based on the indicators tested. Fine, medium and coarse radial basis function kernel-based SVM models were trained based on the measured indicators. The five-fold cross-validation technique was utilised in the present investigation. It was shown from the present study, that the employment of SVM is able to assist coaches in identifying potential athletes in the sport of archery.

**Keywords:** Bio-mechanical Indicators, Artificial Intelligence, Classification, Support Vector Machine.

## 1 Introduction

Archery is considered as an individual and closed skill-based sport which requires the archer to focus and consider the collaborations of both the physiological and mechanical factors which either straightforwardly or by implication decide the result of performance in the game. It has been shown by the past researchers that the capacity of the archer to control his or her postural sway, bow movement, as well as the activations of the pertinent muscles, brought about shooting consistency and thus lead to higher archery shooting scores[1–5].

One of the essential subcomponent in keeping up shooting precision is aiming consistency. Accomplishing a greater state of postural stability is shown to improve shooting consistency [6]. Postural stability is often portrayed as the focal element of achieving shooting accuracy because it helps to ensure constant flight bearing to the target [7]. In another perspective, other researchers explained that during archery