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SUPERVISED LEARNING TECHNIQUES AND THEIR ABILITY TO CLASSIFY A CHANGE OF DIRECTION TASK STRATEGY USING KINEMATIC AND KINETIC FEATURES

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Abstract

This study examines the ability of commonly used supervised learning techniques to classify the execution of a maximum effort change of direction task into predefined movement pattern as well as the influence of fuzzy executions and the impact of selected features (e.g. peak knee flexion) towards classification accuracy. The experiment utilized kinematic and kinetic data from 323 male subjects with chronic athletic groin pain. All subjects undertook a biomechanical assessment and had been divided previously into 3 different movement strategies in an earlier paper. Examined supervised learning techniques were: a decision tree, an ensemble of decision trees, a discriminant analysis model, a naive Bayes classifier, a k-nearest-neighbour model, a multi-class model for support vector machines, a stepwise forward regression model, a neural network and a correlation approach. Performance (measured by comparing the predefined and classified movement pattern) was highest for the correlation approach (82 % - CI 81 to 83 %) and support vector machine (80 % - CI 79 to 80 %). The percentage of fuzzy observations within the data was between 15 and 25 %. The most informative features for classification were: hip flexion

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