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Time-motion analysis of olympic wrestlers

DRIDER, A., VITEL, V., SCHORTGEN, A., MOUSSA, I., LEROY, P., SAULIERE, G., GOYALLON, T., FRUCHARD, B., VAZEILLES, P., REVERET, L., TOUSSAINT, J.

IRMES - INSEP - Université de Paris-Cité , INRIA - LJK - LOKI - ZENITH, Fédération Française de Lutte

INTRODUCTION:
Training scheduling cannot be separated from what happens in competition. Understanding the demands of competition allows training content to be better adapted and individualised [1]. In this sense, computer is a great tool to achieve this. It allows us to collect information as faithfully as possible while being non-intrusive [2]. The objective of this work is to determine the tactical demands by weight category and then to model the duration of the fight according to the style of wrestling.
METHODS:
Computer vision has made it possible to build the dataset made up of 5280 fights since 2019 automatically annotated with the point score, the associated time as well as the name, the competition round, the weight category and the wrestling style. The non-parametric Kaplan-Meier estimator was applied to estimate the time remaining before the end of the bout. The Cox proportional hazards model estimates the duration of the fight by taking into account independent covariates.
RESULTS:
The log-rank test confirms a significant difference between the duration of the fights of women (women wrestling) and men (freestyle (32.74 ; p$<$0.005) and greco-roman wrestling (26.49 ; p$<$0.005)). On the other hand, the Cox proportional hazards model gives us the information that the duration of the fight increases as the competition progresses with a significant difference between the preliminary and final rounds for each style (GR : 87.11, FS : 39.42, WW : 8.62 ; p$<$0.005).
CONCLUSION:
These preliminary results make it possible to lay the foundations of competitive expectations in Olympic wrestling. They can provide benchmarks for coaches to use during training or for athletes to achieve. Further work will focus on adding qualitative variables to improve the various results.

[1] N. F. Devine, E. J. Hegedus, A.-D. Nguyen, K. R. Ford, et J. B. Taylor, « External Match Load in Women's Collegiate Lacrosse », The Journal of Strength & Conditioning Research, vol. 36, no 2, p. 503, févr. 2022, doi: 10.1519/JSC.0000000000003451.

[2] M. Hopkinson et al., « A video analysis framework for the rugby league tackle », Sci Med Footb, vol. 6, no 1, p. 15 28, févr. 2022, doi: 10.1080/24733938.2021.1898667.

Topic: Training and Testing

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