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Digital Future of Artistic Gymnastics

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TREO Talk Paper

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Abstract

The transition from human-based judging systems to electronic judging systems is a recent innovation in different sports. Electronic judging systems aim to increase such indicators of judgment as to the accuracy, fairness, validity, reliability, and the quality of competitions (Houser 2018). However, the introduction of electronic judging systems in different sports can have positive and negative consequences (Mercier et al. 2017). In our case study, we discuss the capabilities and challenges of a new AI-based Support Judging System that was recently introduced by Fujitsu in Artistic gymnastics. Motivated by the research interest towards explainable AI, we ask: "How does a new judging system respond to the challenges of a human-based system?" To be able to respond to the research question, we collaborated and conducted interviews with the representatives of the International Gymnastics Federation (FIG), Finnish Gymnastics Association, Fujitsu as well as with gymnasts, judges, and coaches from 13 countries. In our qualitative study, we identified the main challenges of a current human judgment process, the ways of resolving these challenges with the capabilities of a new electronic judging system, and possible negative consequences of its use. Our findings show that the main challenges of an existing human-based judging system are Biases and Subjectivity, Human error and Lack of Accuracy, and Lack of Explanation. Biases and Subjectivity of the judges arise due to such human factors as emotionality, personal preferences, initial expectations, familiarity with the routine or athlete, prejudice toward some particular country, or informal guidelines in an existing judgment process. Human error and the lack of accuracy can appear in the judgment process due to human fatigue, the limit of human physical capabilities, high level of approximation in judging, and the lack of judging education. The lack of explanation is justified by the technical and time limitations at the competitions. All our respondents expect that due to its technical capabilities, a new Electronic Judging Support System is able to resolve these challenges via its high level of Accuracy, Impartiality, and Objectivity and provide the needed Explanation and Clarification of the results as well as the decision-making process of the system. However, according to the opinion of our respondents, there are also the corresponding challenges of a new electronic system that are the "flip side" of its advantages and may have a potentially negative influence on the judging process in artistic gymnastics. These disadvantages of the system are a high level of exactness, lack of human interaction and inability to evaluate the artistry. According to the opinion of some respondents, a high level of accuracy of the e-system may turn into too much exactness in judging. In case of implementing a new judging system, gymnasts will not be able to provide a high enough level of accuracy in their performance in order to satisfy the system's requirements. Additionally, our respondents assume that such important components as the artistry and the human interaction will be totally eliminated from the artistic gymnastics. They state that the greetings of the judges by the athletes before starting the exercise, a nod of approval after completion of a routine, or a smile from a judge are an integral part of the competition and make the athletes feel more confident. The biggest concern of the respondents is the inability of the system to evaluate the artistic part of the athletes' performance. They doubt that AI technology is able to evaluate such artistic features as the visual representation, athlete's emotions, and internal artistic energy, the right selection of the music, and a costume.

References

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