Navigating the Realm of Artificial Intelligence in Sport Performance

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Editorial

The concept of artificial intelligence (AI) has been around since the 1950s with Alan Turing posing the question, "Can machines think?" [1]. In more recent years, the field of AI has rapidly developed to analyze vast amounts of data to expedite decision making. From a performance enhancement standpoint, AI can be a useful tool for training, assisting with coaching decisions, and injury prevention. However, using AI for these purposes also comes with some challenges and ethical concerns. Therefore, the purpose of this editorial is to highlight the potential benefits, challenges, and ethical considerations for the use of AI in the realms of performance enhancement and sport science.

Performance Insights

One major application of AI in the sport science community is analyzing performance. AI has the ability to process a vast array of data from a variety of different sources, including video, wearable technologies, and performance metrics. This data can provide sport scientists and coaches with valuable insights to improve technique and optimize training. Using computer vision techniques, kinematic analysis of movement can be performed to optimize technique. With the assistance of open-source programs such as OpenCap, markerless motion capture can be accomplished outside of a controlled laboratory environment with the use of one or more smartphones, thus significantly reducing the cost to analyze movement. This would also be advantageous for analyzing movement in patients with sensory processing disorders who cannot tolerate the marker motion capture technique. Using machine learning, AI can be leveraged to help identify important key performance indicators to help sport scientists and coaches make decisions regarding which athletes to put on the field in games against specific teams or to assist with decisions regarding recruitment.

Challenges and Ethical Concerns

AI often requires using large data sets to train the machine to develop specific algorithms to obtain the necessary objective. One potential challenge with maintaining these data sets is security. Private health information could be used in determining risk of injury when considering whether a particular athlete may compete in an upcoming game as well as determining the probability of success. Ensuring that these large data sets are secure when training the AI engine to create specific algorithms as well as analyzing the data is essential to protecting the athlete's private health information. Related to this concept is the destruction of an athlete's data when the athlete transfers, retires, or otherwise moves away from the current organization.

In addition, these large data sets will continue to grow as a team continues to collect future information (health information, performance statistics, etc.) on individual athletes. Thus, having the necessary storage capacity is also essential to avoid data corruption and/or data being overwritten. While the majority of data breaches are the result of external hackers, human error is also a contributing factor to many data breaches. Therefore, institutions and private companies need to have a robust data protection plan in place to minimize the catastrophic effects of human error-related data breaches.

Another issue of concern is transparency in terms how the collected data is used. While the immediate benefit of these large data sets collected from various sources, including video, wearable technologies, and injury reports, could be used to enhance athlete performance or expedite return to play, there could be some unintended implications from the athlete's perspective. In professional sports, these data could be used in contract negotiations. In order to obtain the required data from an athlete to enhance performance there needs to be 'buy-in' from the athlete. One way to help facilitate this consent from the athlete is transparency in how the data will be used.

Conclusion

The use of AI and the large data sets needed to train and use them can provide great insight into performance enhancement, injury prevention, and coaching decisions. Ethical concerns surrounding the use of this data need to be considered to maintain confidentiality of private health information and performance data. Policies and procedures should be implemented to ensure data security to reduce the risk of data breaches. In addition, institutions should plan ahead when making decisions regarding the necessary storage capacity requirements. Lastly, transparency in how the data will be used is needed to ensure athlete participation in the data collection.

References

1. Turing AM (1950) Computing machinery and intelligence. Mind 49: 433-460.

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