

## Artificial Intelligence in Measurement and Evaluation for Athletes

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The sports industry, like all other industries, has been affected by the technology of artificial intelligence technology, and all scientific research has already begun to deploy AI-based tools in almost all major sports disciplines. artificial intelligence It is the simulation of human intelligence processes by computers and machines. Learning is obtaining information and the rules for using it uses rules to communicate approximate or specific conclusions Self-correction

Artificial Intelligence (AI) refers to multiple tools and technologies that can be combined in diverse ways to sense, cognize and perform with the ability to learn from experience and adapt over time

Artificial intelligence leverages computers and machines to mimic the problem-solving and decision-making capabilities of the human mind

### AI Measurement and Evaluation for Athletes

Player Data Analysis Artificial intelligence algorithms can analyze athletes' performance data to create plans tailored to their specific needs and

Goals Injury prevention by identifying potential injuries by analyzing athletes' movement patterns and predicting when they may be at risk of injury

Feedback Provide real-time feedback to athletes during training periods, helping them improve their performance.

Virtual coaching Athletes receive personal guidance and feedback from each other through digital platforms. This can be particularly beneficial for athletes who live in remote areas.

Data analysis by processing large amounts of data related to sports performance and providing insights into areas such as player and team performance and game strategy. This may help improve training programs.

Fitness monitoring to determine athletes' fitness levels and alert coaches if they need more rest or recovery time.

Helping people with disabilities, such as visual disabilities or movement problems, as technology that works with artificial intelligence can convert written instructions into audio, It enables athletes with disabilities to fully participate in sports training.

The contribution of artificial intelligence in sports

Robot coach An obscure club called FC Finchley from the English seventh division used artificial intelligence by creating an intelligent speaker who works as an assistant coach and gives advice on developing the team.

Player Tek Shirts Artificial intelligence in the field of sports training has not only helped people prepare their plans according to the data, but has exceeded all expectations, as the Australian company Catapult has created a device on the players' shirts that monitors the physical condition of the athletes more. It is called Player Tek, and it is a device that the player wears

through a short black shirt. It is characterized by its extreme lightness, which does not affect the performance of athletes during training and matches

RC-Computer Shoe Artificial intelligence has exceeded all expectations, as many studies have shown that sports shoes can reflect the performance of many athletes. Puma has designed a smart shoe that can store private data for 30 days, and it also charges the shoe's battery or drains data from them via USB. This shoe may be an alternative to other technical programs found in phones or smart watches that monitor our movements and record our data.

**Tools of Digital Transformation: :- Cloud technology - Artificial intelligence -Robotics = Big data. -IoT and 5G. - Augmented and virtual reality. - Digital twin.**

- *Cloud technology: Cloud technology refers to accessing computer system resources like data storage, servers, databases, networking, and even software over the internet. It's like having a virtual storage space and powerful computing abilities available online, instead of relying on your own physical device's hard drive or processing power.*
- *Artificial intelligence : is the field of computer science focused on creating intelligent machines that can mimic human cognitive functions. This includes learning, problem-solving, reasoning, and decision-making. AI systems are often trained on vast amounts of data, allowing them to identify patterns and make predictions without being explicitly programmed for every situation.*
- *Robotics : is the field that combines engineering and computer science to design, build, operate, and improve robots. These machines can sense their surroundings, make decisions, and perform tasks, often mimicking or replacing human actions. Robotics applications range from industrial robots performing repetitive tasks in manufacturing to surgical robots assisting doctors in complex procedures. The ultimate goal is to create intelligent machines that can efficiently and safely help humans in various endeavors.*
- *Big data: Big data refers to massive and complex datasets that grow rapidly. These datasets are too large and varied for traditional data processing tools to handle. They come in different formats, from structured data like spreadsheets to unstructured data like social media posts. The sheer volume, variety, and velocity (speed of arrival) of big data necessitate specialized techniques to analyze it and extract valuable insights that can inform better decision-making.*
- *IoT : Internet of Things (IoT) refers to everyday objects embedded with sensors and software that connect to the internet. These "things" collect and exchange data, allowing them to interact with the environment and be controlled remotely. This creates a network of connected devices that can automate tasks, gather insights, and improve efficiency.*
- *5G: is the latest generation of cellular network technology, offering significantly faster data speeds, lower latency (response time), and the ability to connect many more devices compared to previous generations. This paves the way for innovations like ultra-high-definition video streaming, virtual reality experiences, and the ever-*
- *Augmented reality: Augmented reality (AR) in sports overlays digital elements onto the real world, enhancing the experience for athletes, coaches, and fans. Imagine players seeing virtual opponents during training, fans getting 3D player stats mid-game, or*

*referees using AR tools for accurate calls. It's a revolutionary way to train, play, and watch sports.*

- *Virtual reality: Virtual reality (VR) in sports creates immersive training environments where athletes can practice in realistic scenarios without risk of injury. Imagine facing virtual opponents, practicing plays in different stadiums, or perfecting technique – all within a VR headset. This allows for focused training, strategic planning, and skill development in a safe and controlled space.*
- *Digital twin: In sports, a digital twin is a virtual replica of an athlete, team, or even a stadium. This digital model is linked to real-time data (like performance metrics or environmental sensors), allowing for analysis, simulation, and optimization. It's like having a virtual lab to test strategies, improve performance, and enhance the fan experience.*

**We are in era of Big Data with four Vs**    Volume – Velocity - Variety - Variability