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AI at the Olympics

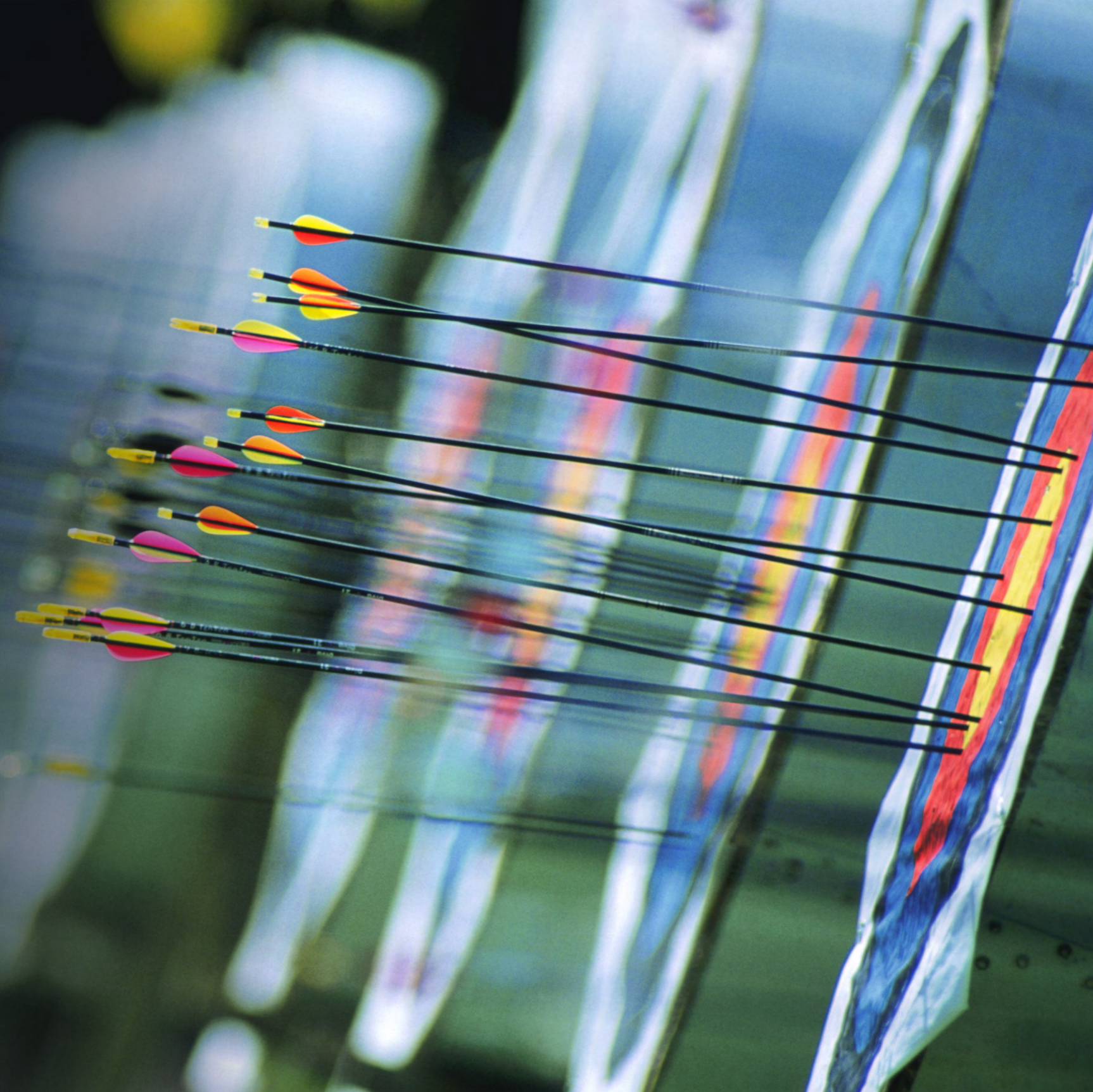
On the front lines
and from the side lines



About the Deloitte AI Institute

The Deloitte AI Institute helps organizations connect all the different dimensions of the robust, highly dynamic and rapidly evolving AI ecosystem. The AI Institute leads conversations on applied AI innovation across industries, with cutting-edge insights, to promote human-machine collaboration in the “Age of With”. Deloitte AI Institute aims to promote a dialogue and development of artificial intelligence, stimulate innovation, and examine challenges to AI implementation and ways to address them. The AI Institute collaborates with an ecosystem composed of academic research groups, start-ups, entrepreneurs, innovators, mature AI product leaders, and AI visionaries, to explore key areas of artificial intelligence including risks, policies, ethics, future of work and talent, and applied AI use cases. Combined with Deloitte's deep knowledge and experience in artificial intelligence applications, the Institute helps make sense of this complex ecosystem, and as a result, deliver impactful perspectives to help organizations succeed by making informed AI decisions.

No matter what stage of the AI journey you're in; whether you're a board member or a C-Suite leader driving strategy for your organization, or a hands on data scientist, bringing an AI strategy to life, the Deloitte AI institute can help you learn more about how enterprises across the world are leveraging AI for a competitive advantage. Visit us at the Deloitte AI Institute for a full body of our work, subscribe to our podcasts and newsletter, and join us at our meet ups and live events. Let's explore the future of AI together.





Data

The world of sports and the world of data are often inextricably intertwined, and this year's Olympics were no exception. From the athletes, coaches and referees on the front lines to the broadcasters, advertisers and of course the fans on the sidelines, the infusion of AI technologies in Tokyo forever changed how we play, consume, manage and monetize the games.

The 2020 summer Olympic Games arrived in Tokyo a year later than originally scheduled due to the COVID-19 pandemic. More than 11,000 athletes from 200 nations competed in 41 sports at 42 competition venues. Aside from the delayed schedule and lack of spectators due to pandemic restrictions, the Tokyo Olympics was differentiated from previous games by the pervasive use of artificial intelligence (AI) technologies including robots, wearable sensors, machine learning and the sheer amount of available data to be analyzed and processed for everyone's benefit.

On the field, in the stands or behind the scenes, there are numerous ways AI made an impact at the Olympic games. There are also new risks AI could bring to the games that can be pre-empted with a governance strategy that can't be ignored.

Sports

2020 Tokyo Olympics

11,000 athletes



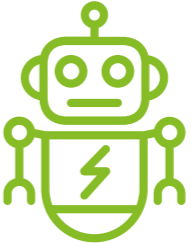
41 sports

200 nations



42 competition venues

Use of AI



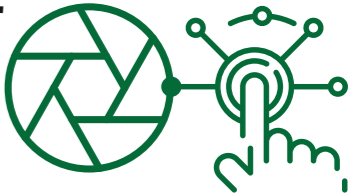
Robots



Wearable Sensors



Machine Learning



Computer Vision Powered Cameras



Sports Analytics



AI helped create the theme song for Tokyo Olympics ^[iii]



The complex geometric shapes created high above Tokyo's Olympic stadium in the opening ceremony used 1800 LED equipped drones with real-time kinematic GPS ^[iv]

According to Deloitte's research, the sports analytics industry is expected to reach nearly **\$4 billion by 2023** as stakeholders harness data to improve athletes' performance and connect with fans. ^[i]

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How It's
Played



2

How It's
Consumed



The 4 Impact Areas of AI at Olympics

How It's
Monetized

4



3

How It's
Managed



Enhancing Athlete Performance

Player training, performance, health, fitness and safety all provide opportunities for Olympic teams to use AI technologies. Wearables like smart insoles and sensors and equipment with built-in chips can track player data during the match, helping the coaching staff to decide on their next play or predict that of the other team.^[iv] AI technologies are also shaping the way that sports physicians, physical therapists, and team doctors can reduce injuries and help players heal faster.^[v]

As athletes prepared for the Tokyo Olympics, sensors, wearables and cameras collected athletes' performance data as they trained. Sensors in things like shoes or bike pedals provided a continuous stream of data to assist athletes and coaches in making adjustments to improve competitiveness.^[vi] AI could provide them valuable information and insights that wasn't previously available to them.

But it wasn't just speed they could measure.

AI used data points from sensors and smart wearables to measure heart rate, lung capacity and movement, among other things, to create a tailored solution for training, rest and nutrition.

Male and female Olympic athletes from the U.S., Great Britain, and Ireland—in eight different sports, from running to skateboarding—received personalized training strategies from AI tools.^[vii]



How It's Played



Among those benefiting from wearable AI-powered tech were:

The Kenyan women's volleyball team used **GPS devices** to feed data on each player's strength, heart rate and other vitals to coaches, who used the information to tailor each individual's training regimen.

A Danish sports technology company developed **radar technology** for its device that helped the Japanese baseball team analyze hits and pitches.

Through its **3D digital twinning technology**, one tech giant created a virtual replica of stadiums to help athletes prepare for races. Ultra-fast, 5G cellular networks allowed access to the models.^[viii]

In addition, AI has enabled physical tests of athletes to detect early signs of fatigue or stress-induced injuries, a predictive tool that sports organizations and Olympic teams could use to keep athletes safe from future injuries.^[ix]

But is all this AI technology creating an unfair advantage for those countries wealthy enough to afford it and will it ultimately result in inequalities that force developing countries out?^[x] Olympic organizers should find a framework to govern the technology, just as they did with performance-enhancing steroids. AI needs to be trustworthy and fair for athletes and fans alike.

Engaging fans for a WOW experience

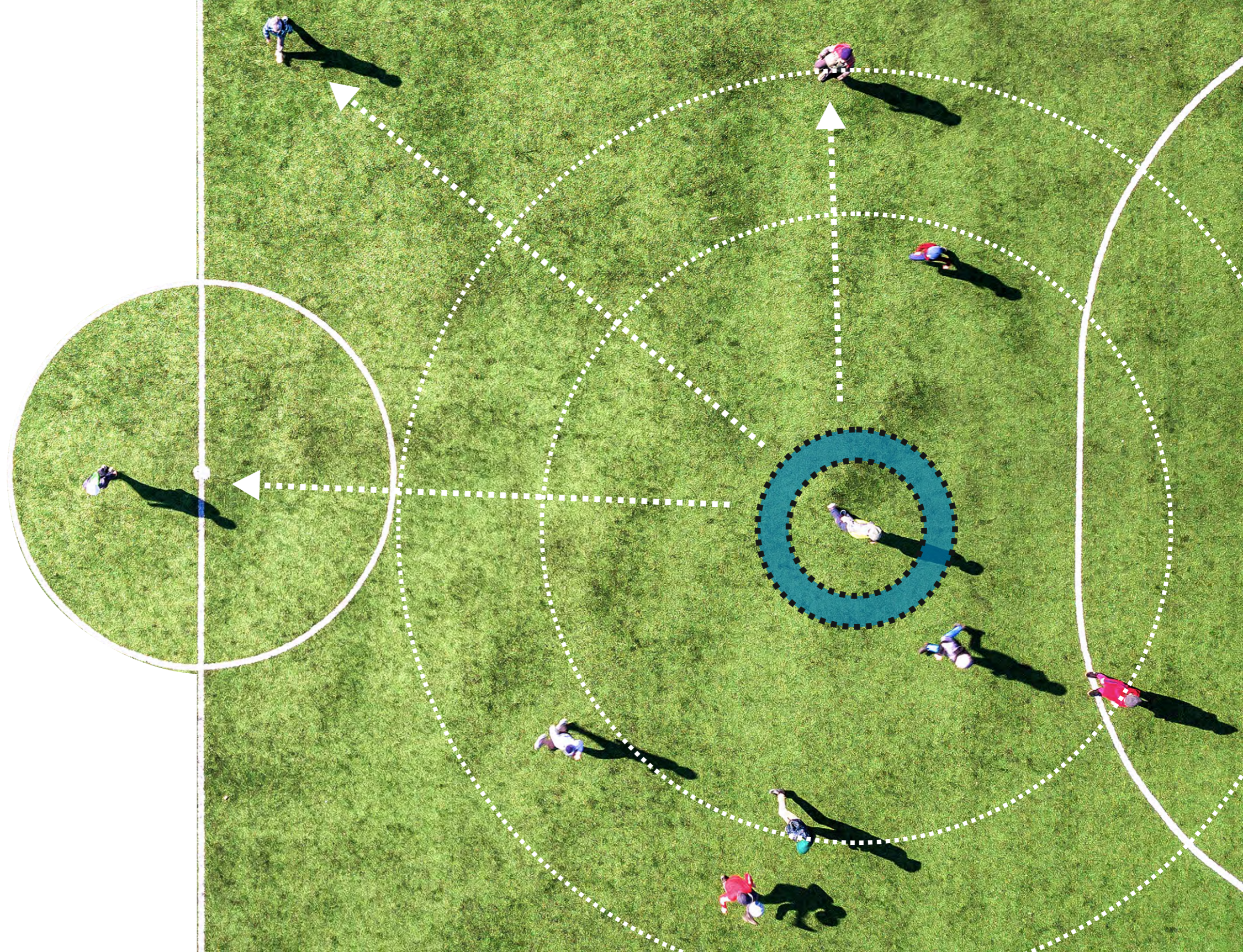
The Olympics is a huge global business with a huge global audience. The 2016 Summer Olympics in Rio de Janeiro drew an audience of **3.6 billion viewers**.^[xi] This year, NBCUniversal broadcasted **7,000 hours of coverage** across two broadcast networks, six cable networks, and multiple digital platforms.^[xii]

Sports is one of the few remaining types of content that fans will go out of their way to watch live. This passion equates to a big opportunity for sports teams, advertisers, and over-the-top (OTT) streaming and broadcast media companies. The future of sports broadcasting includes new ways to keep fans engaged and capture their attention with compelling, authentic experiences—and at the Tokyo Olympics that's happening, thanks to AI.



How It's Consumed

For example, if you're a track and field fan, you're getting a very different viewing experience than you may be used to, courtesy of the **AI-powered 3D Athlete Tracking (3DAT)**^[xiii]. This new technology, which debuted at the U.S. Track and Field trials, will also be used in the next Paralympics that follows the Olympics. It uses cameras with artificial intelligence and computer vision to show fans near real-time data during a race. It will provide biomechanical analysis of things like athlete speed, who is in the lead, and distance traveled/distance remaining. This will be displayed on screen during the race and during replays using overlays.^[xiv]



How It's Consumed



SOCCER CHAMPIONSHIP		
MATCH FACTS		
3	90:00	0
↑	MATCH FACTS	↓
7	Shots	0
6	Shots on Target	0
58	Possession %	42
7	Tackles	14
1	Fouls	3
0	Corners	1
87	Shot Accuracy %	0
92	Pass Accuracy %	81



In addition,

AI tools such as computer-vision cameras helped the games' global audience receive near real-time stats about athletes' performance.

For example, after four years of R&D, one tech company was able to provide detailed live data about beach volleyball athletes. This feat involved positioning and motion technology as well as training AI to recognize shot types and the ball's flight path.

The data was measured, processed and transmitted during events so it matched what viewers were seeing on their screens. Broadcasters also received the data to assist in their commentaries and on-screen graphics. The company estimated its beach volleyball system was **99% accurate**.^[xv]

Other innovations around timekeeping, scoring, motion sensors and positioning systems are being developed with the 2028 Los Angeles games in mind.^[xvi]



How It's **Managed**

Enabling operations behind the scenes

The use of AI can enhance performance and engages the fans without doubt, but its powers do not stop there. Behind the scenes of the Olympic Games, time- and money-saving efficiency, security and monetization are but a few areas that also use AI to improve performance.

From an efficiency perspective, athletes, staff, coaches and broadcasters were greeted at the airport upon arrival in Tokyo by AI-driven robots that assisted with language translation, provided directions and helped with luggage.^[xvii]

AI-powered autonomous vehicles shuttled athletes and officials to venues and were deployed for field support in large competition venues to deliver equipment to athletes.^[xviii]



How It's Managed



Regarding security, AI at the Olympics included facial recognition for athletes, volunteers, media and other staff entering venues and accommodations to reduce the risk of fraud and long ID check-in lines.

In the future, when fans are allowed back into stadiums, crowd management and smart ticketing will likely become commonplace at sports venues.

Future stadiums will be “technological fortresses and data templates.”^[xix]

How It's **Monetized**

Supercharging advertising

In terms of monetization, advertisers also used AI tools to help boost viewership of the Tokyo Olympics and they paid dearly for their spots, to the tune of over **\$1.2 billion**.^[xx]

NBCUniversal helped advertisers target their messages to maximize impact. NBC advertising researchers applied machine learning to an archive of **671 ads** that aired during 2018 and 2016 to advise advertisers on which creative elements were crucial. The findings indicated the combination of a famous face with a comedic tone was likely to make viewers more aware of things like brands and logos.^[xxi]

Natural language processing devices leveraged speech and text recognition to gather insights regarding audience sentiments.

Machine and deep learning systems processed this information to create forecast models and automate processes related to the fan experience and broadcasting.^[xxii]



Expecting The Fans Back

By the time the next Olympics comes around, everyone is hoping for the return of the live fan experience. In anticipation, organizers should consider using AI technology to facilitate fan trust and safety, enhance security of both stadiums and personal information, and create touchless and connected venues.



Let's face it, COVID restrictions or not, most of us will be enjoying the AI-enabled home viewing experiences to consume the 2022 Winter Olympics including better camera angles, augmented and virtual reality, and multiplatform, multimedia experiences. But, for those fans lucky enough to attend the next Olympics live, they will expect to be safe and secure. **Facial recognition, digital tickets, and camera-enabled temperature checks** will get you safely in the door. **Digital wallets, contactless food ordering** and pick up capabilities, even scheduling a ride back to your hotel, can ensure your comfort and convenience once inside the games, along with all the AI-enabled stats and analytics you got through your TV this year. All of these AI-enabled capabilities can allow fans to trust that their emotional, physical, ethical and financial concerns are being met while engaging with the Olympics, one of the most memorable sporting events in the world. ^{[xxiii][xxiv]}





Endnotes

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