

A futuristic lunar stadium with a large, illuminated, curved roof is situated on the moon's surface. The stadium is surrounded by various lunar rovers and equipment. In the background, a large, cratered moon dominates the sky, and a smaller celestial body is visible in the distance. The scene is lit with a mix of natural moonlight and artificial lights from the stadium and rovers.

The Future of Play

Professional Sports in the NFL

Alvaro, Dan, Elizabeth, Ofir, Scott, Tahia, Victoria

**How will Professional Sports
Change in 10 to 15 Years
Given Wearable
Technology's Explosion?**

Key NFL Metrics

**Yearly Spend on
their Body**



Up to \$1M

**Safety Innovation
Technology Cost**



\$60M

**Yearly Injury
Costs**



Over \$800M

**Number of
Injuries**



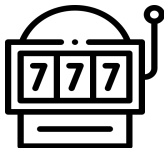
3.08 Per Game

**Avg Career
Length**



3.3 Years

**Sport Gambling
Market Size**



\$83.65

**Sport Gambling
Market Growth**



10.3% CAGR

**Number of
Plays**



153 Per Game

Wearables in Professional Sports Today vs. 15-years from Now

Current State

Tracking Performance: Track performance metrics such as speed, distance, heart rate, muscle activity

Preventing Injuries: Limited functionality to prevent overtraining, track impact levels and out of ordinary metrics

Improving Recovery Time: Range of motion tracking, rest period suggestions, variable recovery

Future State

Smarter Wearables: More advanced sensors and AI will provide more personalized insights

Real-time Data Sharing: Players performance, injury prevention and recovery data will now be accessed not only by wearable owner but a multiple groups of people and organizations

New Wearables Devices: Eye movement trackers, routes visor for football, range predictors for golf club swings, MRI shoes, and other advancements will be available to professional sports teams

Scenarios Intro

We have chosen two topics that are top of mind in the fast moving and ever changing world of sports. Wearables have the potential to unlock some very interesting futures for these two scenarios:

Sports Gambling Explodes

Imagine a world where you can bet on the maximum heart rate that Tom Brady can hit during the Super Bowl or the top speed that Messi can shoot a soccer ball during the World Cup. As more sports data is tracked and available to the public, it is impossible to think that gambling will not change forever.

Officiating Becomes Digital

Imagine a world where fans can no longer blame referees for their team's shortcomings, calls are made without biases, and the playing field is fairer. As more data is available in real-time, officiating games will look utterly different from what we are used to.

SUNDAY, OCT 11, 2009			COLLEGE FOOTBALL		
N.F.L. WEEK #5			SATURDAY, OCT 10,		
1 VIKINGS	-10	-600313	E. MICH.		
2 RAMS	41	+400314	CENT MICH	-23	
3 COWBOYS	-8	-400315	DUKE		
CHIEFS	42.5	+300316	N C STATE	-16.5	
REDSKINS	37.5	+165317	MARYLAND		
PANTHERS	-3.5	-185318	WK FOREST	-12.5	
BUCCANEER			319 INDIANA		
EAGLES	-14.5		320 VIRGINIA	-7	
RAIDERS			321 PURDUE		
GIANTS	-15		322 MINN.	-3	
BROWNS	41	+220323	U CONN	46	
COLTS	-6	-300324	PITT.	-6.	

Scenario #1:

**Sports
Gambling
Explodes**



Blitzed by Data: The New Game of High-Tech Football Betting

In the age of hyper-information, the National Football League has morphed into a realm where the pulse of technology beats as the hearts of its athletes. A world woven by streams of data, invisible yet potent, has changed the landscape of professional football forever.

In this world, the athletes are akin to gladiators, not just in their physical prowess but also in the digital shadow they cast—a silhouette of numbers, charts, and predictions. Each player dons wearable technology more advanced than the gadgets gracing the pages of science fiction novels. These devices measure every breath, step, and heartbeat; they predict a muscle strain before the muscle even whispered a complaint.





Regulators have been hesitant to wade into the rushing river of data collection, their hands tied by concerns of privacy and the labyrinthine regulations such as the GDPR. Nevertheless, they impose strict boundaries on the public dissemination of medical information, though they can not prevent the tide of data from flowing into the hands of those who had the athletes' consent.

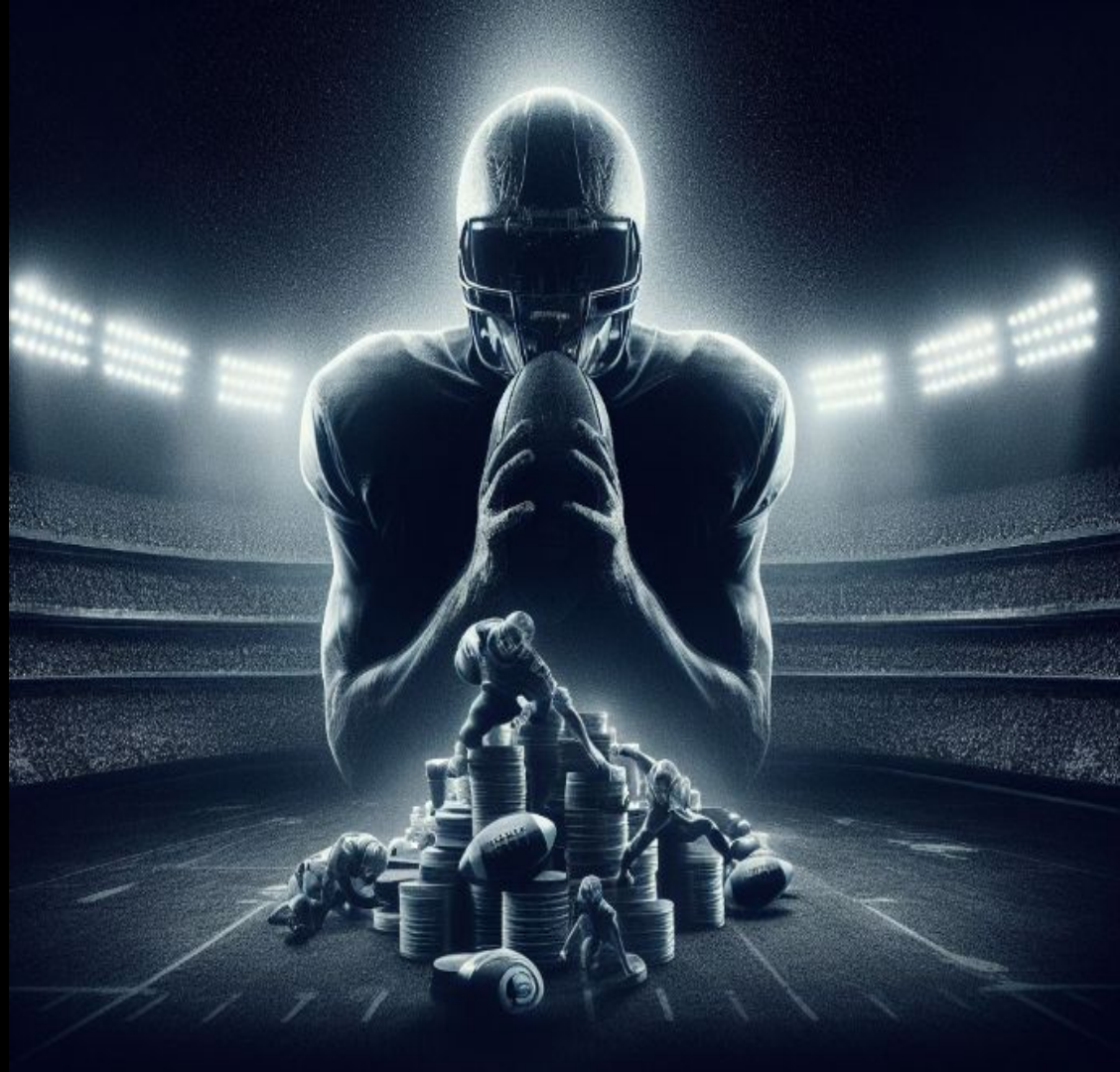
Athletes themselves have become entities of immense admiration, their every move watched by millions, their health and well-being the subject of public speculation and private betting pools. The expansion of legalized gambling has seen to that, seeping into the mainstream until the act of betting is as routine as the games themselves.





Gambling is no longer just the pastime of the hopeful and the daring; it has been raised to an art, a science, and, perhaps most significantly, a corporate strategy. Entities like FanDuel have evolved beyond mere betting platforms—they have become investment institutions, their portfolios tied not to stocks or bonds, but to the very players and games that captured the nation's attention.

Securitized sports—where the performance of a player, the outcome of a game, can be packaged and traded like commodities—have made the stakes higher than ever. The pressure on players is monumental. The integrity of the game teeters precariously, as the incentive for manipulation lurks in the shadows cast by the dazzling lights of the stadiums.





The architects of this future are the tech giants who have proliferated wearable technology and the gambling conglomerates that have built empires on the probabilities of human capabilities. The data transmitted at breakneck speeds, thanks to the omnipresent 5G and 6G networks, is the lifeblood of this new era.

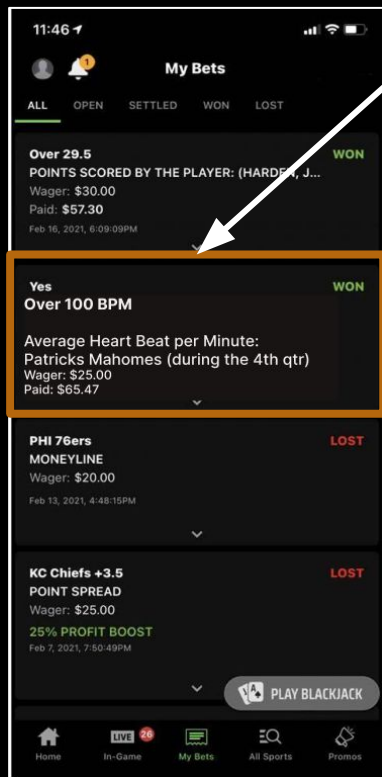


In the NFL, every coach, every strategist, and every medic is plugged into the grid of information. The players have become open books, their innermost biological secrets laid bare for the sake of the game—and for the sake of profit.

Amidst this high-stakes tableau, there lingers the ever-present question: can the spirit of the game survive the siege of data? With bodies and futures wagered in real-time, the sanctity of sport is constantly at risk. The line between player and asset, between human and commodity, is blurring. And as the floodgates of data open wider, it remains to be seen whether the foundation of football will hold firm or be altered entirely forever.



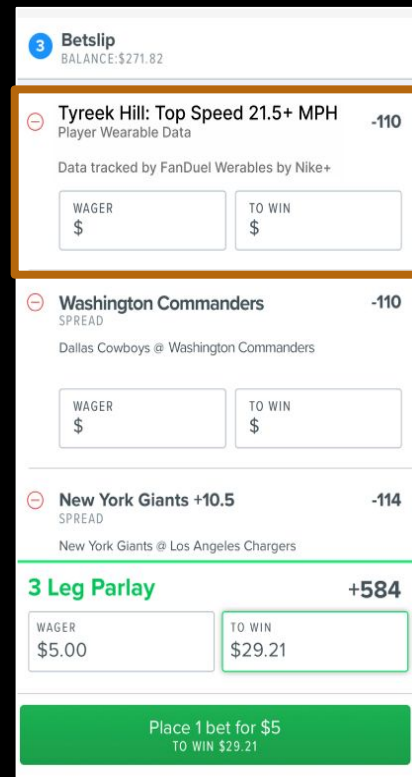
What Might Gambling and Wearables Look Like?



As Athlete data becomes commoditized and access to online sports gambling becomes the norm, bettors will place bets on Athletes health metrics such as Heart Rate.



Advancements in wearable technology such as this Nike Smart Running + Shoe will allow online sports books such as FanDuel and DraftKings to promote wagers on Athlete metrics such as top speed.



Scenario #2:

Officiating Becomes Entirely Digital





Driven by technology and social changes, officiating becomes completely digital

In the fast-paced world of professional sports, officiating is reshaped by the digital age. Technological strides and societal demands for fairness hasten a move towards precision and transparency, aiming to sideline human error. This shift resonates with the expectations of fans and athletes for steadfast and consistent decision-making in sports officiating.

As the social sphere champions inclusivity and diversity, the sports world shifts towards data-driven engagement. Fans and athletes rally behind fair, unbiased officiating, enhancing the sport's thrill and promoting unity. Eco-friendly stadiums rise in response to environmental mindfulness, while regulations set a global standard for officiating technology, ensuring a level playing field for all.



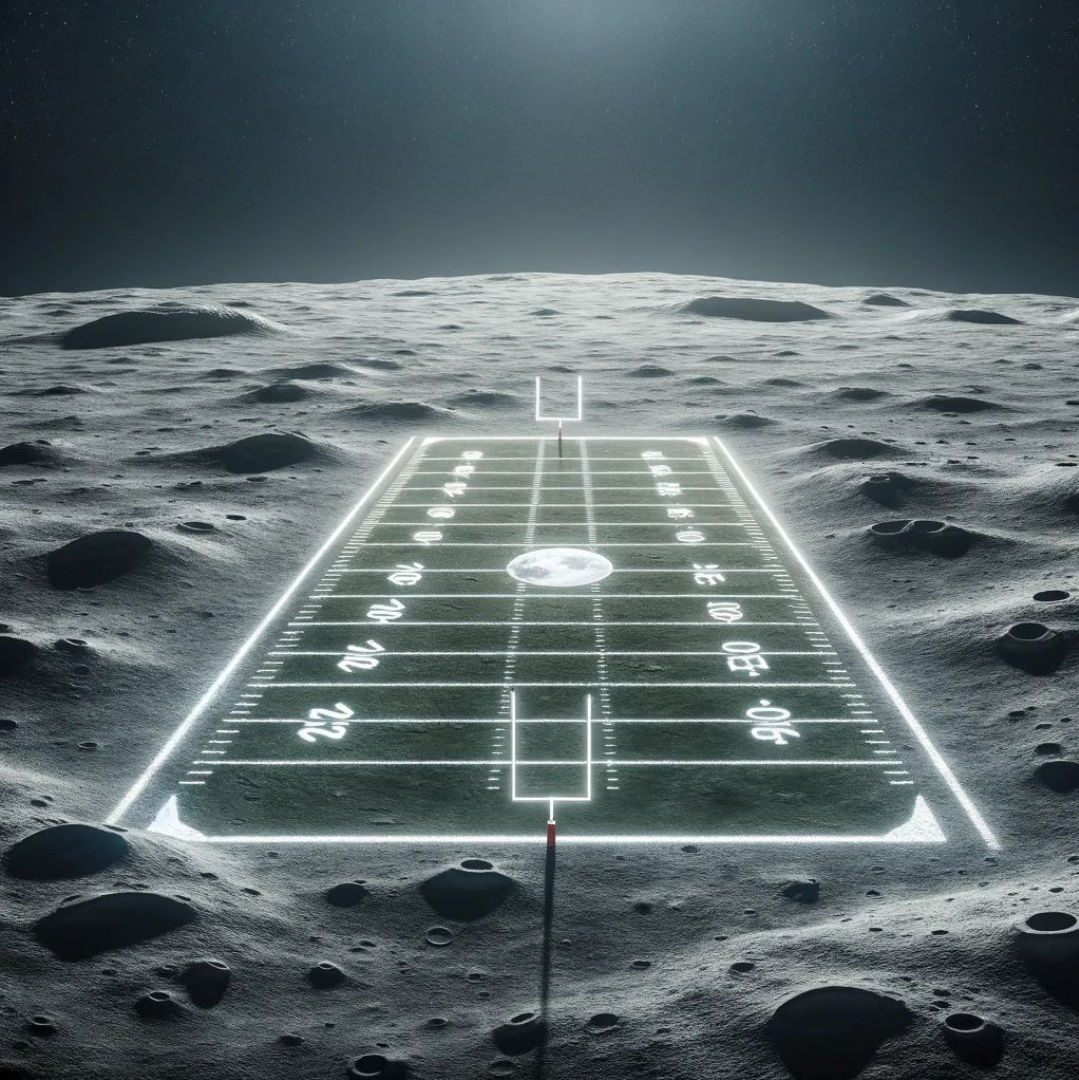


The Tech that Makes it Possible

In the heart of sports' grand transformation, AI emerges as the sage, wielding the power of real-time analysis to eliminate human errors in officiating. Alongside, computer vision technology captures every player's move, every arc of the ball, for a truer view of the game's unfolding drama. And in the wings, data analytics works its magic, sifting through the game's vast array of numbers to reveal deeper truths about performance and fair play, ensuring that transparency and fairness become the cornerstones of the spectacle.

AI stands as the omniscient oracle, drawing in a symphony of sights, sounds, and statistics from the arena's every corner. Athletes, adorned with sensors woven into their uniforms, move as living beacons, casting streams of data—from their position to their pulse. The field itself bristles with silent sentinels, from the ball to the boundary pylons, all providing secrets of the game to the ever-listening AI, crafting a narrative of precision and insight.





Players alone command the field – their every move judged by the invisible, swift hand of technology. Real-time rulings emerge without delay, bypassing the need for human replay. Sensors, vigilant in their watch, and the precision of geolocation speak in certainties, banishing indecision. Where doubt once lingered over first downs, now only clarity reigns, written in the unerring language of data.

As the game's rules tighten under the watch of machines, the need for human interpretation fades. Redundant rules fall away, rendered pointless by the precision of technology. Machines call plays with a wealth of data, immune to the imperfect views and tension that once swayed human officials. Mistakes are rare, but when they happen, they're set in stone, with no human to reverse them. Yet, each error is a lesson, a step toward a future where AI officiating is flawless.





The NFL is embracing a new era of fairness, powered by advanced technology. Past frustrations over officiating errors that swayed championships and upset fans are giving way to a game where equity is paramount. This shift is driven by fan demands for a fair game, and technology is the key to delivering accurate, unbiased outcomes, ensuring that skill and strategy determine victory, not human error.

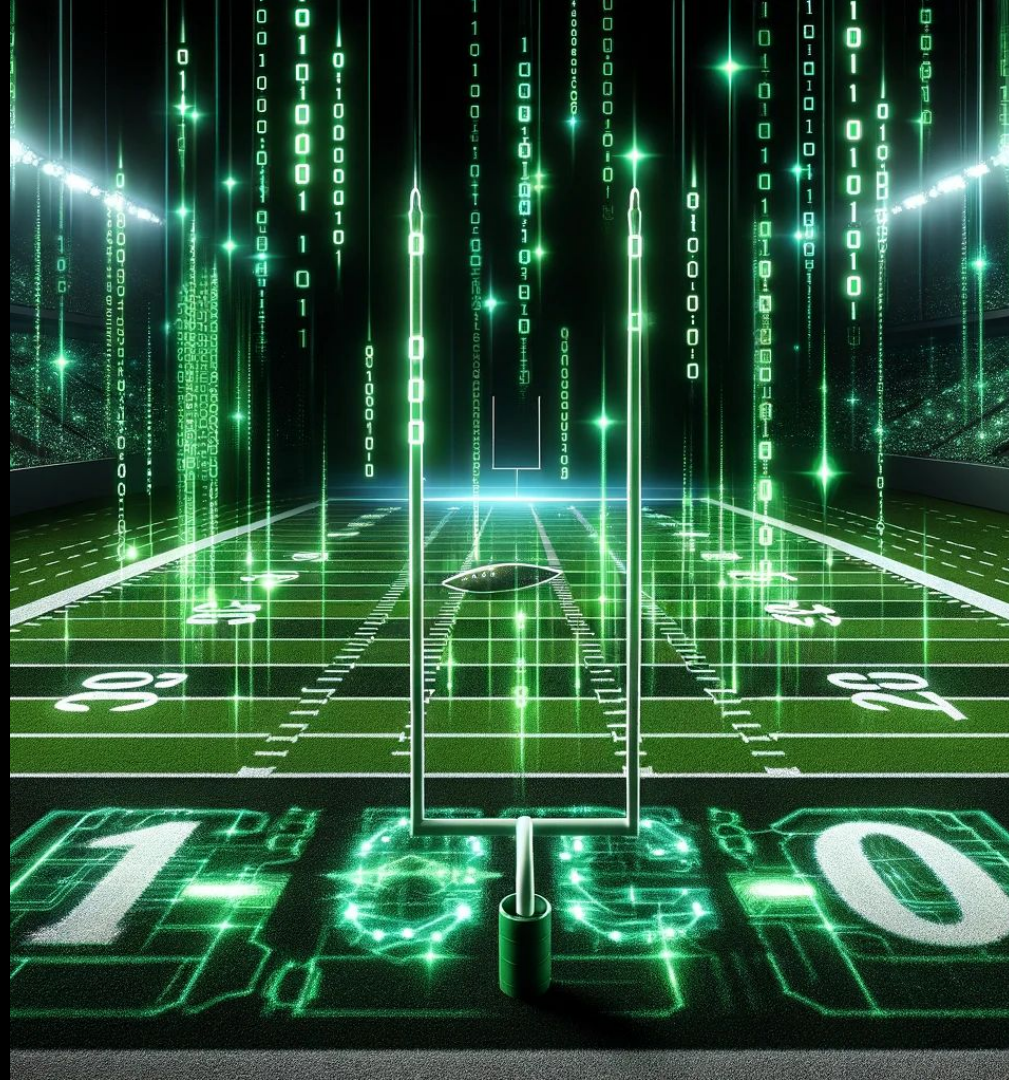
Additionally, as the NFL turns the page to technology-infused oversight, the old ways of cheating are outmaneuvered. Scandals like “deflate-gate” become relics of a bygone era, nearly impossible in this new vigilant landscape. But with this evolution, a different breed of challenge emerges: safeguarding the integrity of wearables and guarding against cyber threats. Now, pre-game rituals extend beyond physical gear checks to include meticulous scans of the sensors and vigilant monitoring throughout the game, fortifying the sport against the new age of digital deception.





The reliance on wearables and digital officiating in the NFL introduces a new concern: technological malfunctions. When devices fail, it will undoubtedly disrupt the game. While no technology can claim perfect reliability, the success rates of these systems significantly beat out the current human-tech hybrid, which often slows the pace and allows for errors. The shift to fully digital oversight is a calculated trade-off, accepting the rare tech glitch for a generally faster, more accurate game.

As such, referees transform into tech overseers. Their new role pivots from making calls on the field to ensuring that the wearable technology functions seamlessly. Their presence at games is essential but not to enforce the rules in the traditional sense. Rather, they will guarantee that the technological arbiters are operating correctly, thereby safeguarding the integrity of the game's digital system.





What might this future look like?

New-age referees oversee a game from the sidelines monitoring the sensors on the field and the gear that players wear while they play.



Sources

- <https://www.cnn.com/2022/01/18/sport/wearable-tech-form-smart-swim-goggles-sports-spc-intl/index.html>
- <https://www.theverge.com/2023/10/24/23930669/humane-ai-pin-trust-light-camera>
- <https://apnews.com/article/gallaudet-deaf-sports-technology-5dc15c0f452442d325700ea4a0708e3a>
- <https://www.pbs.org/newshour/economy/americans-bet-220-billion-on-sports-in-5-years-since-legalization>
- <https://newatlas.com/telecommunications/6g-data-transmission-distance-record-500m/>
- <https://www.grandviewresearch.com/industry-analysis/sports-betting-market-report#:~:text=The%20sports%20betting%20market%20was,USD%20182.12%20billion%20by%202030.>
- <https://www.topendsports.com/world/lists/popular-sport/fans.htm>

OUTTAKES AND OTHER IDEAS

Look how far we've come!

IDEA GRAVEYARD/ BLOOPER REEL

- **Scott can take Aaron's achilles tear**
- **They got a concussion? You get a concussion! You get a concussion! You get a concussion! (Oprah meme)**
- **Moonchester United**
- **Superbowl decides the elections**
- **Climate change gets so bad that stadiums have to be disaster proof and there's an extinction except for pro athletes**

Wearable Technology and Youth Athletics

- **Wearable technology becomes adopted in youth athletics**
- **Wearable technology health data is used by College sports teams and coaches to identify the next great athlete**
- **Wearable technology used to identify genetic makeup of professional and college athletes.**
- **Trends identified in which health statistics make the best athletes**
- **Children are recruited to play college athletics based on health statistics**
- **With sports gambling people can bet on likelihood of someone becoming a professional athlete**



Injury Prevention and Player Health Data

- **Advancements in wearable technology allow athlete health data to be tracked and visualized in real time.**
- **Team doctors and data scientists use data to predict injuries in real time during games/practice.**
- **More injuries are prevented before they occur prolonging the careers of pro athletes.**
- **Doctors become more technical / fluent in data science.**
- **Biased health data for athletes (male soccer players)**
- **AI is used to predict injuries and prescribe player specific treatments.**
- **Tom Brady never retires - specialized medical treatment prolong athlete careers**
- **Pro sports harder to get into, more college athletes for money**



Wearable Technology and Sports Gambling

- **Player health data is made available via wearable technology in real time**
- **Health data from player wearables routed to Sports Betting platforms via API's in real time**
- **Gamblers can use player health data to pick winners and losers and build player props**
- **Gamblers could bet on the likelihood of an injury for a specific player**
- **Leads to foul play and targeting**
- **High frequency trading gambling based on health and injury data in real time**



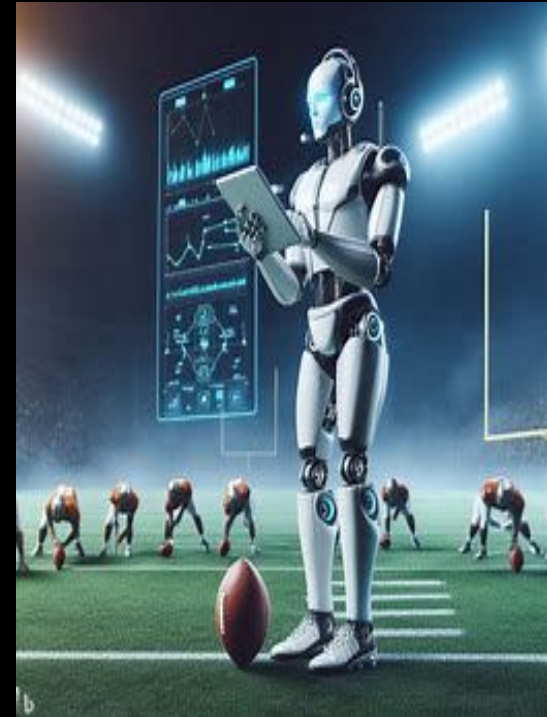
Wearable Technology and the Future of Officiating

- **Athlete data is captured in real time by wearable technology**
- **Via IOT and Edge Computing in stadiums the data is routed to AI / ML Models which make officiating decisions in real time**
- **Officiating becomes fully automated**
- **No more missed calls or games decided by error prone referees**



Wearable Technology and the Future of Coaching

- **Athlete data is captured in real time by wearable technology**
- **Via IOT and Edge Computing in stadiums the data is routed to AI / ML Models which make coaching decisions in real time**
- **Coaching becomes fully automated**
- **Over the last 20 years we have seen analytics in sports explode, and the final evolution is a full-scale automation of the coaching profession**



Officiating Becomes Completely Digital

Professional sports officiating has undergone a revolutionary digital transformation driven by a blend of technological advancements and societal demands. This shift was accelerated by a global desire for greater transparency and fairness in sports, along with the imperative to eliminate human errors from officiating decisions. Cutting-edge technologies, including artificial intelligence, computer vision, and data analytics, now play a central role in officiating, allowing wearables to provide real-time tracking of players, ball or puck trajectories, and rule adherence. This shift meets the heightened expectations of fans and athletes for precision and consistency in officiating.

The social landscape of the time contributed to this transformation as well, emphasizing inclusivity, diversity, and data-driven fan engagement. Fans and athletes embraced the transition to objective, data-driven officiating, which reduced the potential for human biases, enhancing the quality of sports entertainment while fostering societal unity. The macroeconomic and socioeconomic factors were also influential, with the digital officiating systems creating new job opportunities, impacting wealth distribution and education. Environmental concerns led to more sustainable stadium development, while the regulatory and geopolitical environments adapted to standardize officiating technology on a global scale, ensuring equitable competition.

The scenario of a groundbreaking digital transformation in professional sports officiating by 2035 is propelled by several key technology factors. Central to this transformation is the use of Artificial Intelligence (AI), which aids real-time analysis and decision-making during games, significantly reducing human errors and providing precise officiating. Complementing AI is computer vision technology, which tracks player movements and ball trajectories, offering a comprehensive view of the game for accurate officiating. Advanced data analytics further supports these technologies by making sense of the extensive data generated during sports events, offering insights into player performance, strategies, and rule compliance to enhance transparency and fairness.

Wearable technology, including sensor-equipped jerseys and wristbands worn by players, plays a crucial role in providing real-time tracking of player movements and vital statistics, increasing transparency and fairness. Seamless data integration ensures that information from various sources, like wearables, cameras, and stadium sensors, can be accessed in real-time, promoting precision and consistency in officiating decisions. The Internet of Things (IoT) devices and sensors within stadiums and on players facilitate real-time data collection and transmission. Technology also fosters transparency and fan engagement through platforms offering real-time statistics, instant replays, and commentary, enhancing fan understanding and involvement. The role of communication technology, including high-speed internet and 5G networks, is pivotal in enabling efficient data transmission to support real-time officiating and fan engagement. Training and education are necessary for officials, athletes, and support staff to ensure the effective use of these technologies, while ethical and privacy considerations are critical to protect player data and maintain ethical standards.

The Wearable-Powered, Human-Free Officiating Era

In the future, AI can intake visual, audio, and data information from multiple sources in real-time. Players wear numerous sensors embedded in their gear and all over the field, sensors that capture everything from location data to health metrics. Sensors are even placed in the ball and the end zone pylons.

The only humans present on the field are the players. Decisions are made in real time, with no need for replays or reviews by humans. Impact sensors and ultra-accurate geolocation data can replace cameras in the decision-making process. Previous uncertainties like potential first downs are no longer questionable.

Rules will change as room for interpretation is smaller due to needing humans to officiate the game. Rules that may currently be considered pointless could become obsolete. Machines will make decisions based on more information than is now available, without the pressure of having bad camera angles or the nerves of a big game negatively affecting decision-making.

Nevertheless, even though fewer mistakes occur, the ones that do occur are irreversible because of the all-AI officiating. These mistakes will help improve the system, hopefully leading to a mistake free future.