



TOKYO 2020



Robot Village

Japan is already a worldwide leader in robotics technology, so it's no surprise that the country plans to have a small army of robots ready to be at the beck and call of international visitors in time for the opening ceremony. In fact, there will be enough of them to **warrant** the construction of their own village, which will be **adjacent** to the Olympic Village in Tokyo's Odaiba neighborhood. The robots will be able to help guests with directions, transportation, and even translation. The country hopes the villages will showcase a future in which robots assist humans regardless of their age, nationality, or socioeconomic status.

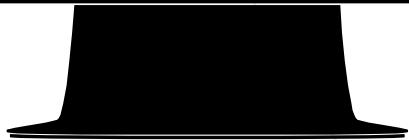
warrant /'wɔ:r.ənt/

verb. 保证；使有必要

noun 逮捕状；做事情的理由

adjacent /ə'dʒeɪsənt/

adj 丑行；丑闻；震惊；反感



It's a relatively simple task that really doesn't **warrant** a great deal of time being spent on it.

这是一个相对来说比较简单的任务，不必在上面花费大量的时间。

There's no **warrant** for that sort of behavior!

那种行为毫无任何根据！

They took a boat trip and toured the southern coastline and **adjacent** islands.

他们乘船游览了南部海岸线和邻近的岛屿

The bus station is **adjacent** to the railway station.

汽车站毗邻火车站。

8K TV Broadcast

Back in October, Japan-based Sharp Electronics was the first company in the world to release an 8K television. Unfortunately for most, the 85-inch beauty cost more than \$130,000. Despite the sticker shock(不小的打击), Japanese state television network NHK plans to air(播出) the Olympic Games in ultra-vivid(超生动) 8K -- that's 7,680 by 4,320 pixels, or 16 times more pixels than the vast majority of HD sets today. Still, Sharp and NHK both envision 8K-ready TVs in consumer homes by 2020. To prepare, the network plans to test its 8K broadcasting technology in Rio De Janeiro(里约热内卢) this summer.

Artificial Meteor Lights Shows



As for the opening ceremony, a Japanese astronomy startup called ALE is planning a manmade meteor shower(流星雨) to descend(降临) upon the city.

ALE is working with Japanese universities to design a cube-shaped microsatellite(微卫星) that will be launched into space, where it will shoot out tiny spheres made from special chemicals. Upon re-entry the spheres will burn and glow like a magnitude-3 star while racing at five miles per second. The show will mimic asteroid(小行星) shower patterns, and ALE is even looking to come up with glows of different colors. The estimated cost of show is \$4 million.

Postpone Summer Games to 2021

The 2020 Tokyo Olympics will have to wait. Japan and the International Olympic Committee agreed on Tuesday to push the games to 2021. The decision came after multiple conversations between Japan's Prime Minister Shinzo Abe and IOC president Thomas Bach. This marks only the fourth time in the history of the modern Olympics (which dates back to 1896), that the Games are being postponed. The three other times the games had to be pushed back were due to World War I and World War II.



1

Technology in Football

Video : The Hidden Technology of Football



Remember Frank Lampard's **scandalous** goal against Germany in the crucial knockout stages (淘汰赛) of the 2010 FIFA World Cup?



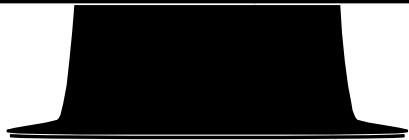
The goal that wasn't !

scandalous /'skændələs/

adj. 令人反感的；令人震惊的

scandal /'skænd(ə)l/

noun 丑行；丑闻；震惊；反感



It's **scandalous** that we do so little to prevent homelessness.

我们在解决流落街头问题上无所作为，这真丢脸。

Newspaper columns were full of **scandalous** tales.

报纸专栏上尽是与丑闻有关的故事。

a financial/political/sex **scandal**

财政 / 政治 / 性丑闻

If there is the slightest hint of **scandal**, the public will no longer trust us.

只要有哪怕一丝丑闻，公众就再也不会信任我们。



Video : Frank Lampard disallowed goal vs Germany - World Cup 2010

England ended up losing the match 4-1, but the controversy (争议) that followed changed soccer forever.

The English team was down 2-1 when midfielder Frank Lampard looked to have equalized in the 39th minute. However, Uruguayan official (乌拉圭裁判判) failed to spot that Lampard's long-range drive had bounced at least a foot over the goal line.

Goal-line Technology

FIFA was **compelled** to introduce goal-line technology for Brazil World Cup 2014, something it was resisting (抵抗) for years on grounds that use of too much technology slows down the beautiful game.



Goal-line technology or GLT is the use of technology to determine if the ball has crossed the goal line or not. This information is **transmitted** within a split second (在一瞬间) to a special watch worn by the referee to ensure immediate response and that there are no stoppages or other forms of **interference** in the game. Match officials are the only ones to receive a signal.

compel /kəm'pel/

verb 强迫, 逼迫, 迫使

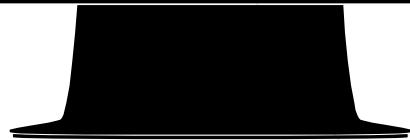
transmit /trænz'mit/

verb 播送, 发射, 传送(信号)

verb 传递; 传播

interference /ɪntə'fɪər(ə)ns/

noun 干涉, 干预



I feel **compelled** to write and tell you how much I enjoyed your book.

我觉得有必要写信告诉你我多么喜欢你的书。

The information is **transmitted** electronically to the central computer.

这些信息以电子化的方式传送到中央计算机。

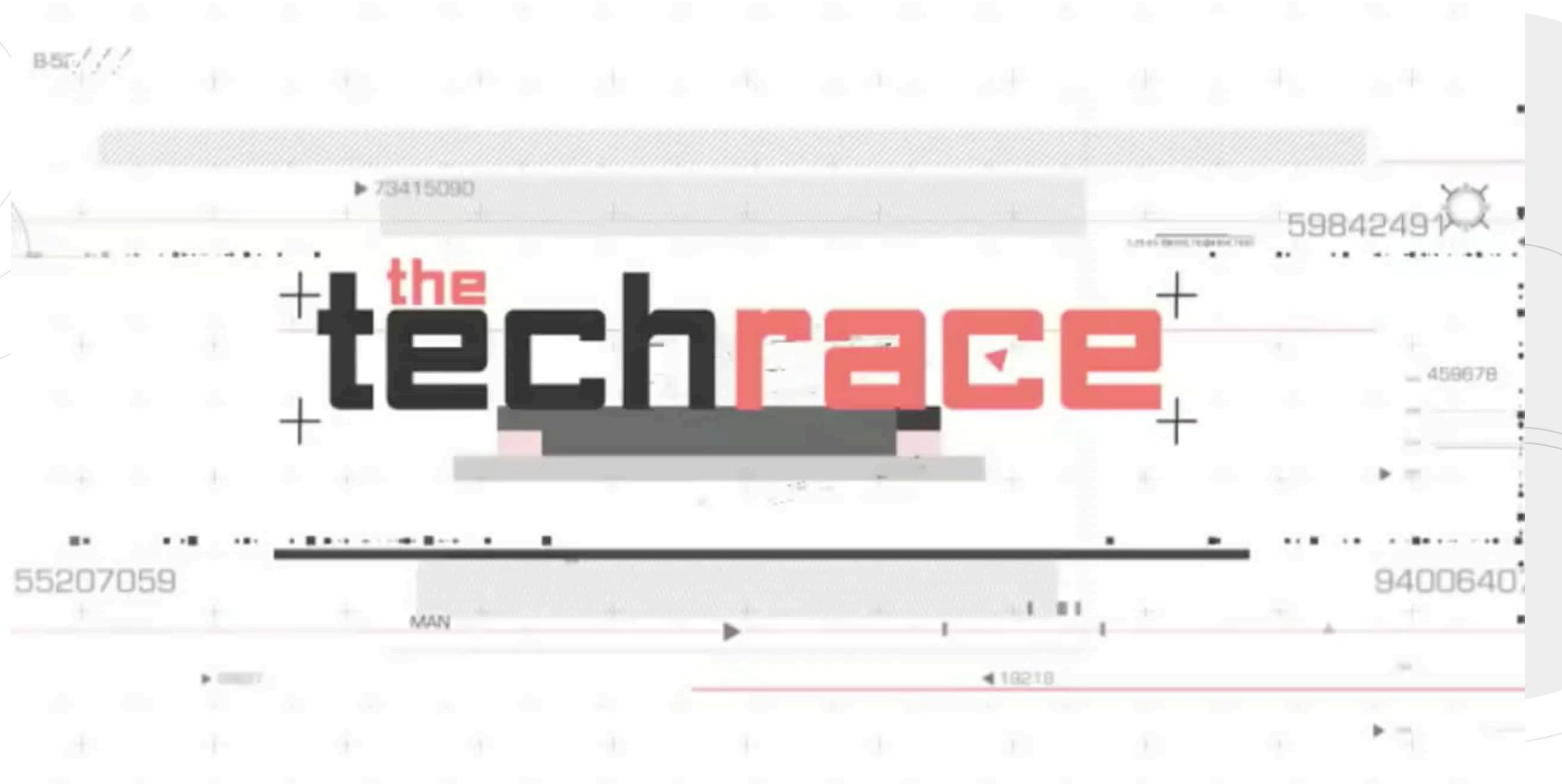
Somehow your panic and fear **transmits** itself to the horse that you're riding.

不知怎么的，你的恐惧会传染给你骑的马。

The government's **interference** in the strike has been widely criticized.

政府对罢工的干预措施受到了广泛的批评。

Video : Crossing the Line: How Goal line Technology Works



What are the technologies being used?

Camera-based: Camera technology has been widely used in other sports, especially cricket(板球) and tennis for more than a decade now, but it has taken off (开始) in soccer only recently.

FIFA currently uses the GoalControl-4D system for the World Cups. There are 14 high-speed cameras located around the **pitch**, with seven cameras focusing on each goal to detect the ball's exact location around that area. A software automatically analyzes all the **footages** to calculate the ball's position as X, Y and Z coordinates plus speed, making it 4D. If the ball fully crosses the goal-line, the computer automatically sends a signal to the referee's watch in less than one second.

pitch /'skændələs/

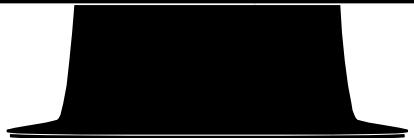
noun. 运动场地; (尤指)足球场

noun. 程度

verb. (使)突然移动; (尤指)投, 扔

footage /'fʊtɪdʒ/

noun 一段影片, 片段



Supporters invaded (= ran onto) the pitch.

球迷们跑进了球场。

By this time their disagreement had reached such a **pitch** that there was no hope of an amicable conclusion.

此时，他们的分歧已如此之大，不可能善罢甘休。

The ship **pitched** up and down/from side to side in the rough seas.

船在汹涌的海浪里上下 / 左右颠簸。

Woody Allen's movie "Zelig" contains early newsreel **footage**.

伍迪·艾伦的电影《变色龙》中有早期的新闻短片片断。

What are the technologies being used?

The computer uses triangulation method to calculate the ball's precise position. Triangulation is a **geometrical** method of calculating the position of an object by measuring a network of triangles. The process involves measuring the length of one side of each triangle and then deducing its angles and the length of the other two sides by observation from this baseline. The system software then creates a 3D image of the ball relative to the goal line by calculating the ball's location in each frame by identifying the pixels that correspond to the ball. Camera technology via triangulation produces highly reliable results even when player's bodies are **obstructing** the views of some cameras. Because only three cameras are required to implement triangulation, even if the view of a few cameras is hindered, the others can take over seamlessly(无缝地).

geometric /dʒɪ'metrik/

adj. 几何学的; [数] 几何学图形的

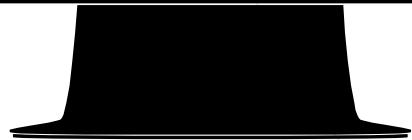
deduce /dɪ'dʒu:s/

verb 推断, 推论

obstruct /əb'strʌkt/

verb 阻塞, 堵塞, 阻挡(道路、入口等)

verb 阻碍; 阻止, 阻挠; 妨碍



Geometric designs were popular wall decorations in the 14th century.

几何图案是14世纪流行的墙面装饰。

We cannot **deduce** very much from these figures.

我们无法从这些数字中推断出太多东西。

After the earthquake many roads were **obstructed** by collapsed buildings.

地震过后，许多道路都被倒塌的建筑物堵住了。

He got five years in prison for withholding evidence and **obstructing** the course of justice.

他因隐藏证据、妨碍司法而被判入狱5年。

What are the technologies being used?

Magnetic fields(磁场): For magnetic field system, cables(电缆) are placed underground and around the goal. The ball also has electronic sensors in it. The interaction between the receptors in the ball and the magnetic fields created through the underground cables allow the software to calculate the exact position of the ball and determine when a goal has been scored.

However, FIFA or top soccer leagues are yet to use this technology widely since there have been doubts over its accuracy.



Video : VAR - The System Explained



When is VAR used?

Three main incidents (plus one administrative) have been identified as game-changing.

GOALS



PENALTY DECISIONS



DIRECT RED CARD INCIDENTS



MISTAKEN IDENTITY



The role of the VAR is to assist the referee to determine whether there was an **infringement** that means a goal should not be awarded. As the ball has crossed the line, play is interrupted so there is no direct impact on the game.

The role of the VAR is to ensure that no clearly wrong decisions are made in **conjunction** with the award or non-award of a penalty kick.

The role of the VAR is to ensure that no clearly wrong decisions are made in conjunction with sending off or not sending off a player.

The referee cautions or sends off the wrong player, or is unsure which player should be **sanctioned**. The VAR will inform the referee so that the correct player can be disciplined.

infringement /ɪn'frɪndʒ.mənt/

noun. 违反，违背(规定、法律等)

conjunction /kən'dʒʌŋ(k)ʃ(ə)n/

noun. 结合；联合；同时发生

sanction /əb'strʌkt/

noun. 制裁

verb 批准，认可，准许

Even minor **infringements** of the law will be severely punished.

即使是轻微的违法行为也将受到严厉的惩罚。

There is a team of writers working in **conjunction** with each other on the book.

有一个作家小组在合作撰写这部书。

Trade/economic **sanctions** will only be lifted when the aggressor nation withdraws its troops.

只有侵略国撤回其军队，贸易 / 经济制裁才会解除。

The government was reluctant to **sanction** intervention in the crisis.

政府不愿意批准对危机进行干预。

How does video assistant referee (VAR) work?

STEP 1

Incident occurs

The referee informs the VAR, or the VAR recommends to the referee that a decision/incident should be reviewed.



How does video assistant referee (VAR) work?

STEP 2

*Review and advice
by the VAR*

The video footage is reviewed by the VAR, who advises the referee via headset what the video shows.



How does video assistant referee (VAR) work?

STEP 3

*Decision or action
is taken*

The referee decides to review the video footage on the side of the field of play before taking the appropriate action/decision, or the referee accepts the information from the VAR and takes the appropriate action/decision.





VAR at the 2018 FIFA World Cup



THE VAR TEAM

The team consists of the video assistant referee (VAR) and his three assistant video assistant referees (AVAR1, AVAR2 and AVAR3). All video assistant referee team members are top FIFA match officials. Four replay operators select and provide the best camera angles.



VAR at the 2018 FIFA World Cup

The video assistant referee team supports the referee from a **centralized** video operation room (VOR), located in the International Broadcast Centre (IBC) in Moscow. All relevant camera feeds from the 12 stadiums are provided to the VOR through a fibre **optic** (光纤) network. The referee on the field at each stadium talks to the VAR team via a **sophisticated** fibre-linked radio system.



THE VIDEO OPERATION ROOM (VOR)

centralize /'sen.tre.laɪz/

verb. 使集中；实行中央集权制

optic /'ɒp.tɪk/

adj. 光学的；眼睛的；视觉的

sophisticated /sə'fɪs.tɪ.kə.tɪd/

adj. 老练的；见多识广的；很有品位的

adj. 精密的，复杂的；高级的

The king is trying to **centralize** all power in his own hands.

这位国王想把一切权力集中于自己的手里。

The **optic** nerve is a part of the brain.

视觉神经是大脑的一部分。

I don't think I have any books that would suit your **sophisticated** tastes.

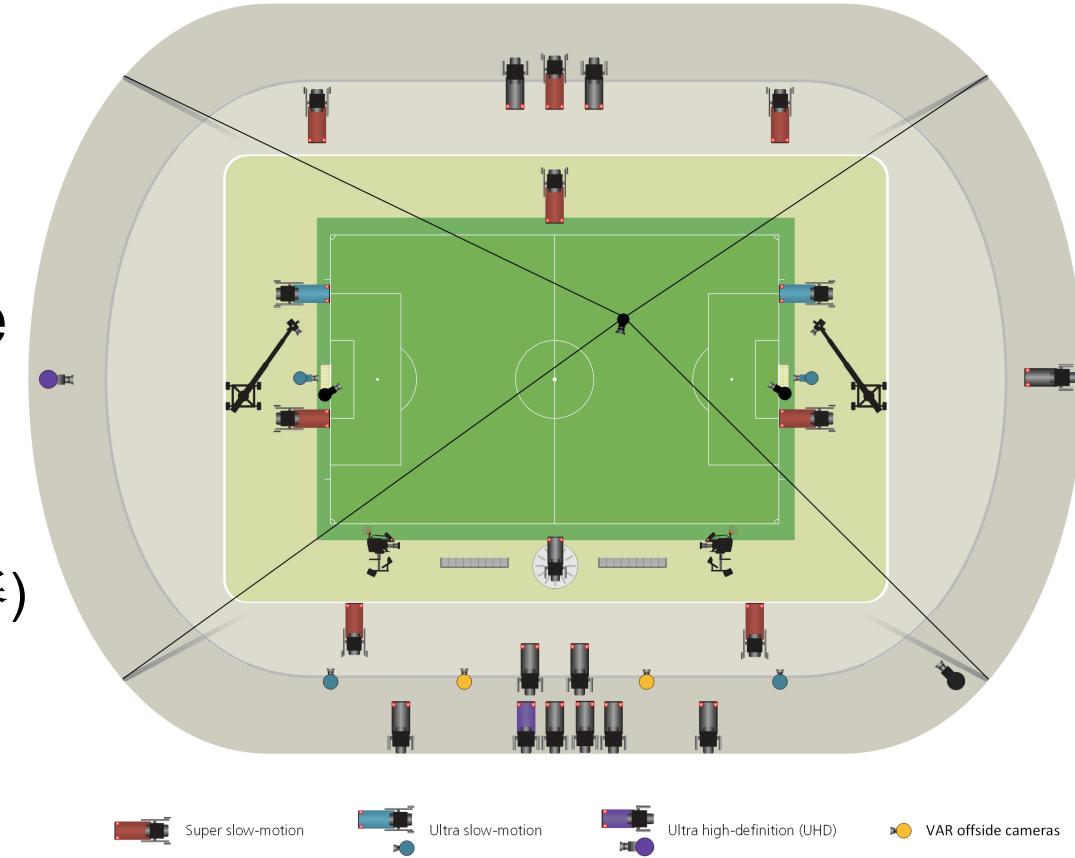
我认为我没有什么书能满足你那高雅的品位。

These are among the most **sophisticated** weapons in the world.

这些属于世界上最尖端的武器。

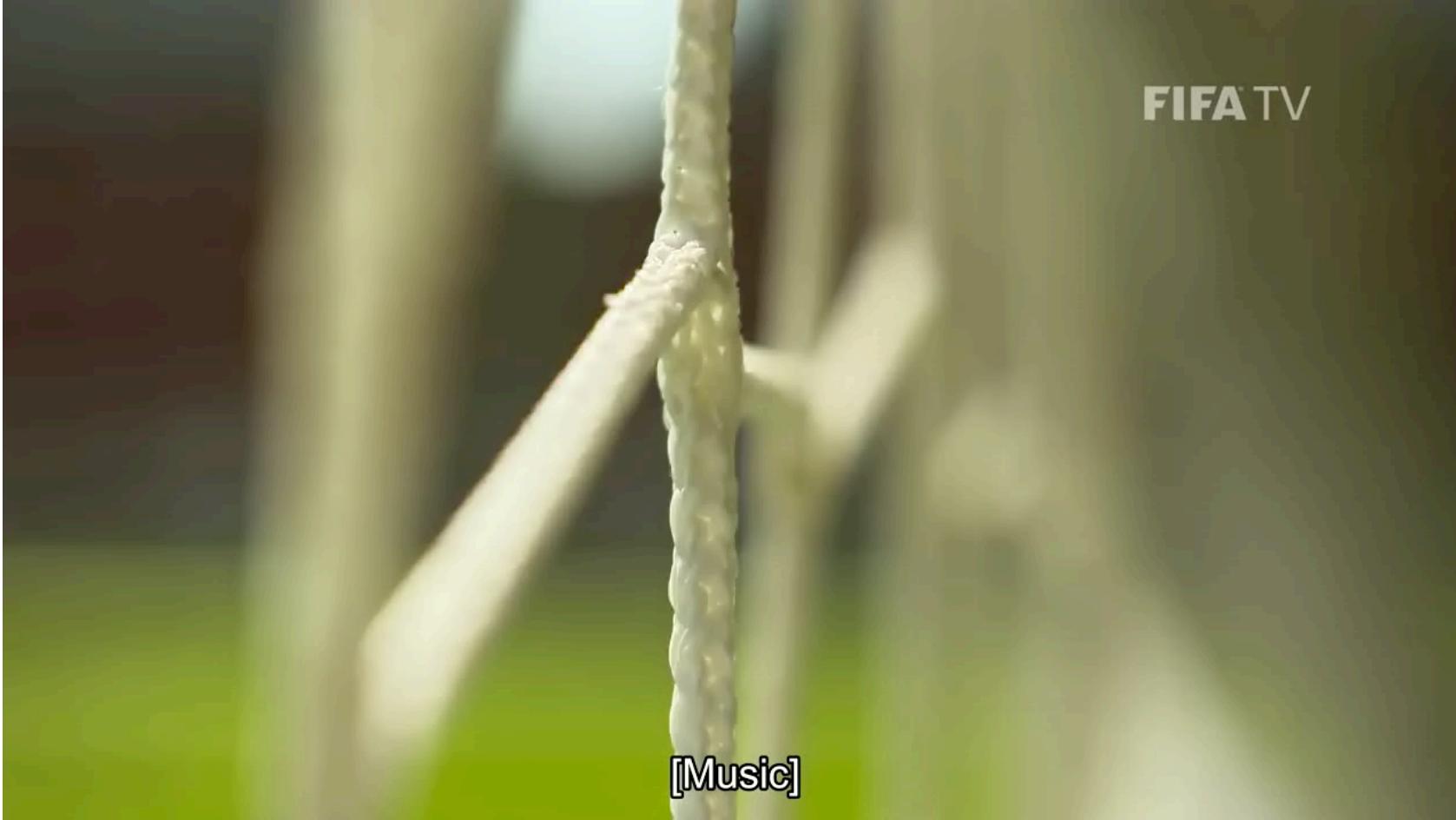
VAR at the 2018 FIFA World Cup

The video assistant referee team has access to 33 broadcast cameras, eight of which are super slow-motion and four of which are ultra(极) slow-motion cameras. In addition, they have access to two offside cameras (越位摄像机). These two cameras are only available to the video assistant referee team. For the knockout phase(淘汰赛) two additional ultra slow-motion cameras will be installed one behind each goal that will also be available to the VAR team.





VAR at the 2018 FIFA World Cup



Video: The Virtual Offside Line



VAR at the 2018 FIFA World Cup

Virtual offside lines are computer-generated lines **projected** onto the broadcast image of the field of play to help the VAR determine **whether** an **offside offense has occurred**. The offside lines used are the best possible and most accurate lines that can be generated with existing technology due to calibration(校准) using multiple synchronized (同步的) camera angles. Virtual offside lines are superimposed(叠加) on the broadcast image by computer software. Angle of view, lens distortion(光学变形), field curvature(场曲率) and many other factors are considered when calculating the true position of the these lines. The lines will be calibrated before each match by the technology provider to take into account the exact pitch dimensions and conditions on the day.

Video : Fifa's hi-tech World Cup 'performance tracker'





Electronic Performance & Tracking Systems

Electronic performance and Tracking Systems (EPTS), which include camera-based and wearable technologies, are used to control and improve player and team performance. EPTS primarily track player (and ball) positions but can also be used in combination with microelectromechanical devices(微机电设备，例如陀螺仪、加速度计等) and heart-rate monitors as well as other devices to measure load or physiological parameters.



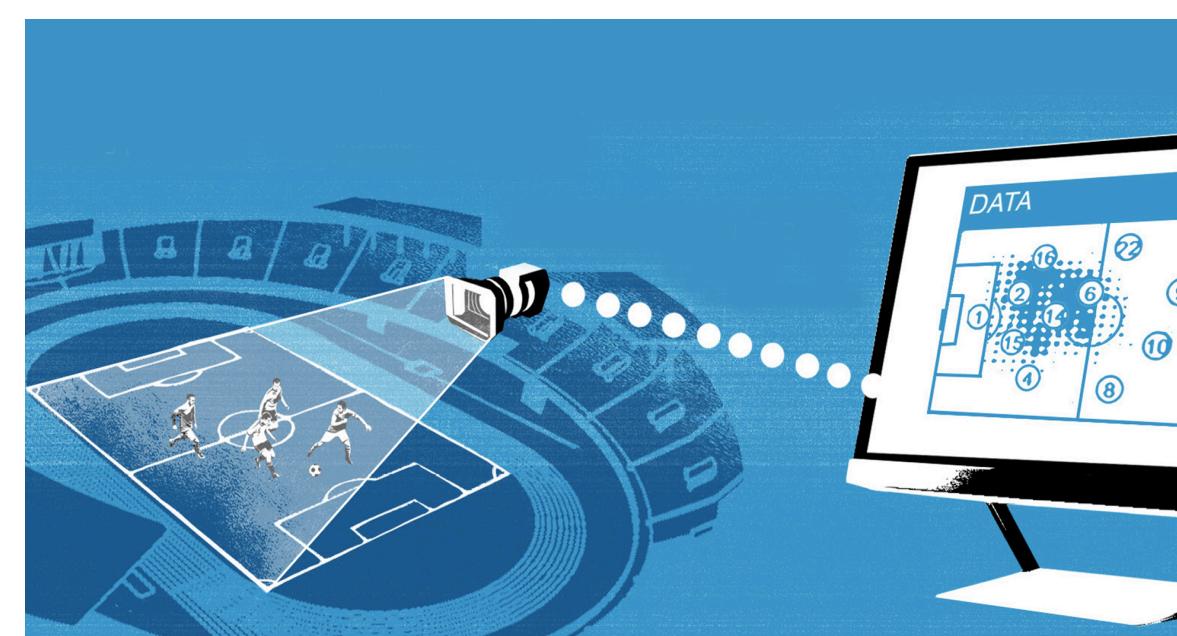


Electronic Performance & Tracking Systems

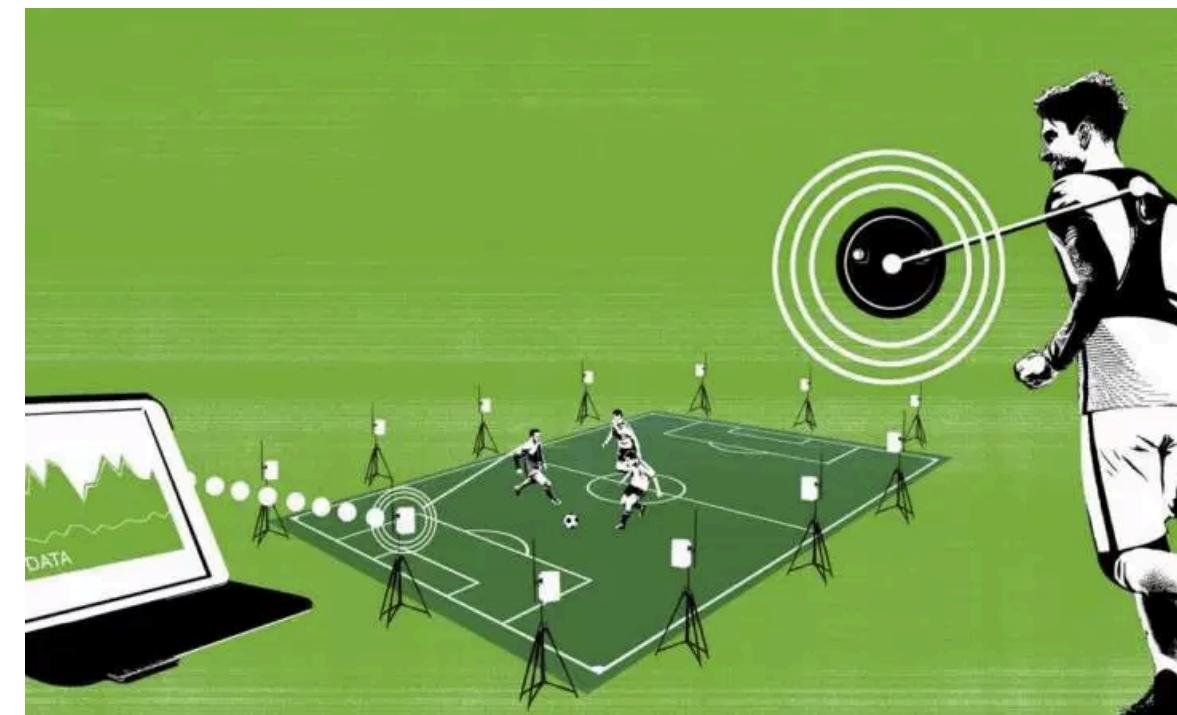
It offers the potential to govern far more of each match than VAR and to have a huge influence on key coaching decisions. For the first time, FIFA has permitted EPTS to be used during World Cup games. Each national team competing at the World Cup received two tablets from FIFA—one for an analyst sitting high in the stadium, the other for a coach on the touchline. These devices allow teams to access player tracking data and communicate via voice, text messages, still images, and tactical drawings.

“There is quite a synced(同步) relationship between the technical staff and the analysis department already, and I think this just allows that instant feedback to the coaching staff,” said U.S. Soccer high performance director James Bunce.





1. Optical-based camera systems
2. Local positioning systems (LPS)
3. GPS/GNSS systems





Electronic Performance & Tracking Systems

“There’s a lot of algorithm and software and engine power to really give a very simplified message to a coach, which is ‘we should change the formation because the data is telling us this,’” Hogan said. “**Overlaying** the video with the data becomes much more visual for a coach. For them to interact with the data, you have to really, really simplify it because they’ve got to make some decisions really quickly.”

Presuming the in-game EPTS program continues, the quick-thinking analyst will grow in stature. Offensive and defensive **coordinators** in American football are prized jobs. They have long **resided** in overhead booths during games.

“It’s going to create an elevated position for sport science within soccer globally,” Hogan said.

overlay /'əʊ.və'læɪ/

verb. 在…上铺（或盖、涂）

coordinate /kəʊ'ɔː.dɪ.neɪt/

verb. 协调 *noun.* 坐标

reside /rɪ'zaɪd/

verb. 居住；存在

Her new novel is **overlaid** with political concerns.

她的新小说包含着对政治的关注。

A number of charities are **coordinating** their efforts to distribute food to the region.

几家慈善机构通力协作为该地区分发食品。

Happiness does not **reside** in strength or money.

幸福不存在于力量或金钱之中。

The family now **resides** in southern France.

这家人现居住在法国南部。

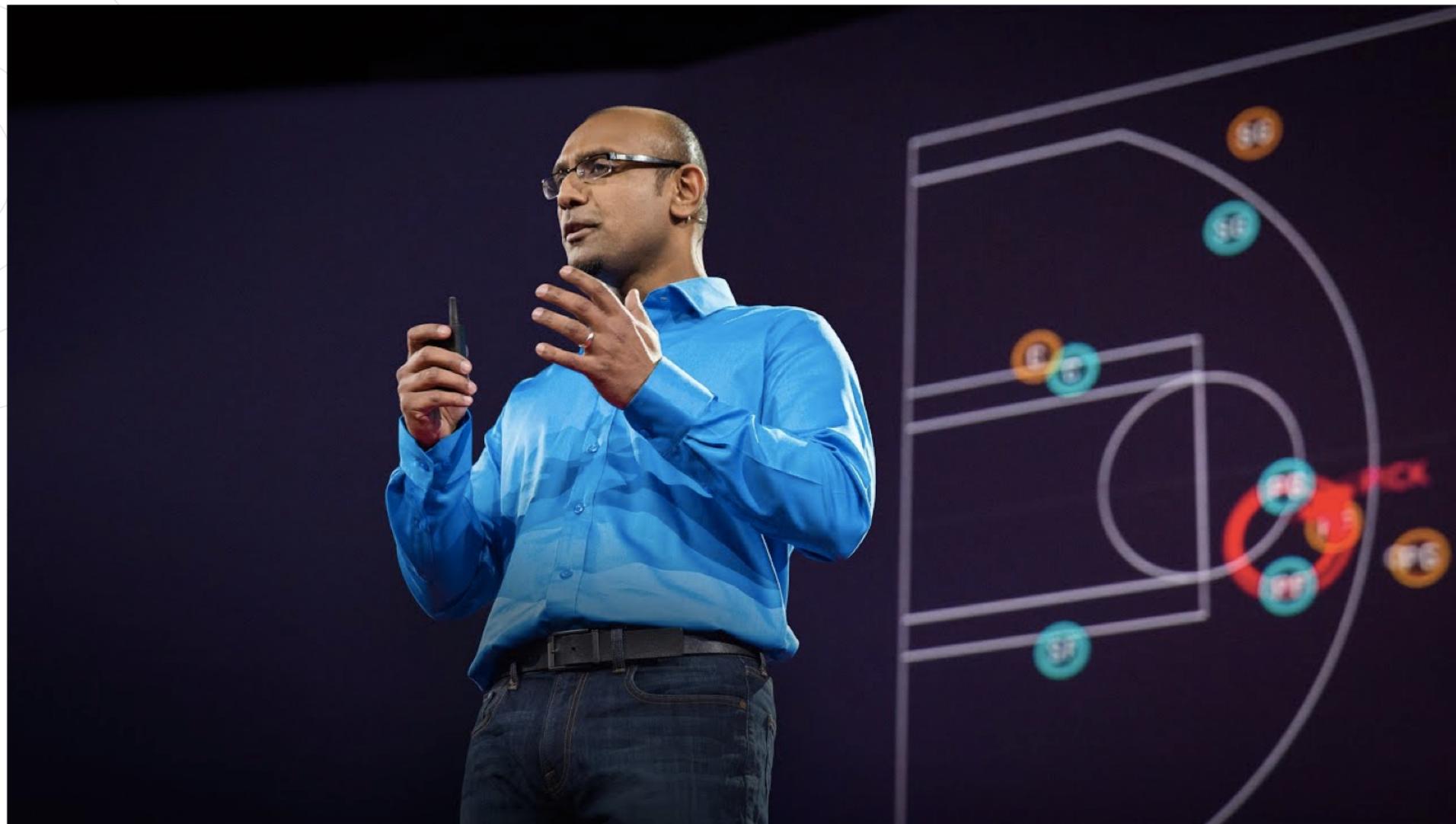
2

Second Spectrum : Redesign NBA

The Science of Moving Dots

When most people think of basketball, they picture the tall players, the fast-paced plays, and the seemingly impossible shooting skills. However, spatiotemporal pattern recognition does not come to most people's minds when discussing the game. In his Ted Talk titled *The Math Behind Basketball's Wildest Moves*, Rajiv Maheswaran (马什瓦兰) discusses the use of spatiotemporal pattern recognition in analyzing the players' movements and using this analysis to help coaches and players create effective game strategies. This up-and-coming (新兴的) science aims to understand and to find patterns, meaning, and insight in all of the movement in our world today.

Video : The Math Behind Basketball's Wildest Moves



The Science of Moving Dots

What is spatiotemporal pattern recognition? In layman(门外汉) terms, it is the analyzation of “moving dots.” For those more interested in the technical aspects behind this pattern recognition, the University of North Carolina released an analysis of a number of papers that are good examples of spatial-temporal modeling, a source which is readily available online. This very new kind of data is becoming more and more popular, especially with the popularization of devices such as cellphones and GPS. Because of its newness, data scientists have the challenge of finding patterns within the data. In an interview with writer Ben Lorica, Maheswaran explained these difficulties, “There’s no language of moving dots, at least not that computers understand... There’s no computational language of moving dots that are interacting. We wanted to build that up.”

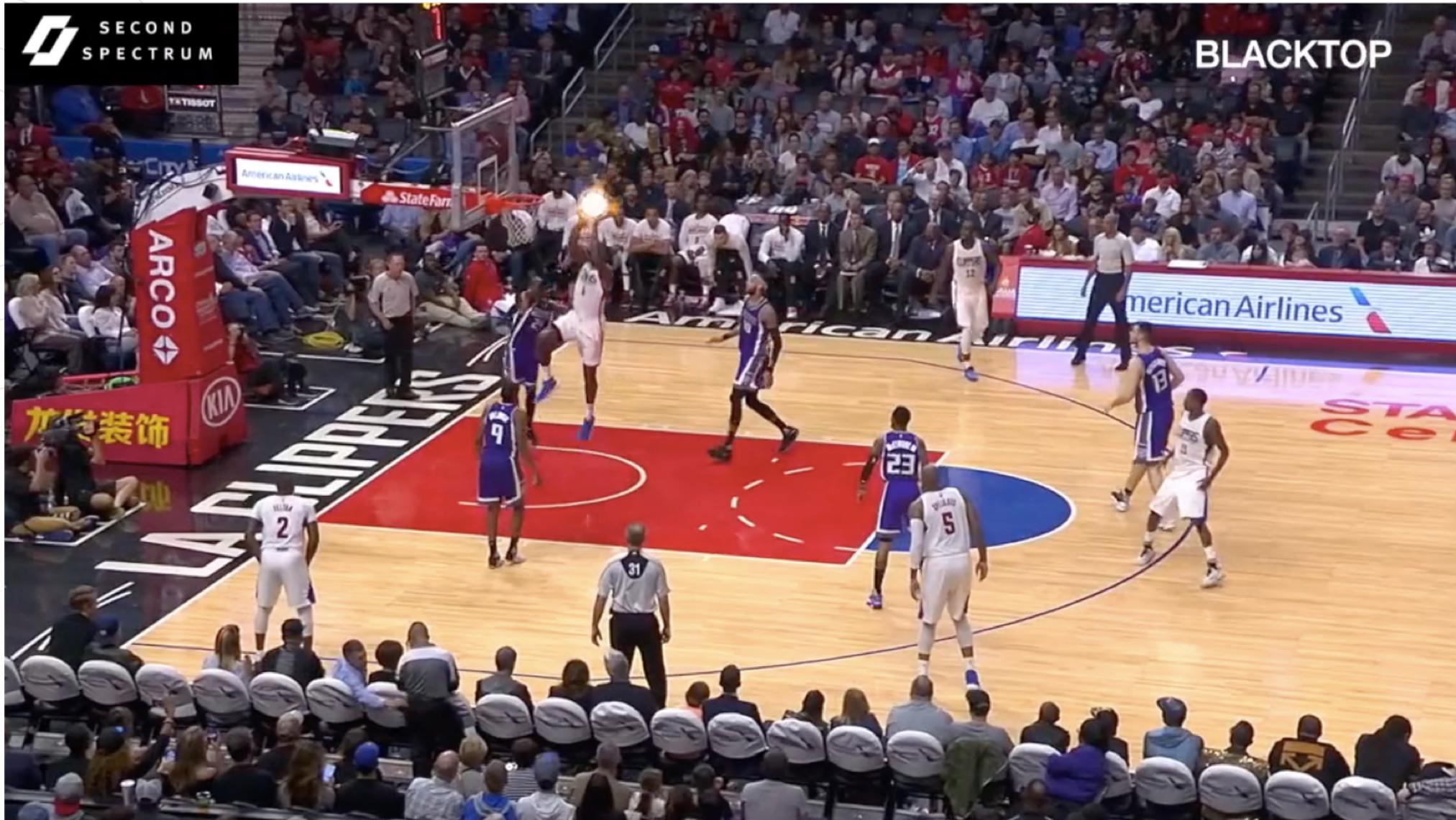
The Science of Moving Dots

What does this new science have to do with sports such as basketball? Maheswaran explained to Lorica that sports is one of the areas in which there is really great data available. Maheswaran said that “in sports in the last year, there have been tracking technologies placed in all major sports where they’re tracking all the players and the ball at a very, very high frame rate.” This availability of data as well as the large amount of people interested in finding patterns in this data, such as coaches, makes sports one of the best places to start building this science.

The Science of Moving Dots

An important tool in developing this science is the use of machine learning, which allows scientists to go beyond their own ability to describe the things that they know. By giving the machine specific examples of movement and specific examples of non-movement, these scientists can teach the machine to see the game through the eyes of a coach. The machine is able to find features that enable it to separate particular movements and to discover the relationships between these movements. With this new information, new game strategies are being formed that are helping teams win games. In the near future, Maheswaran believes that real-time data will not only become a game changer, but also will help us to move better, move smarter, and move forward.

2018 : Second Spectrum - Basketball

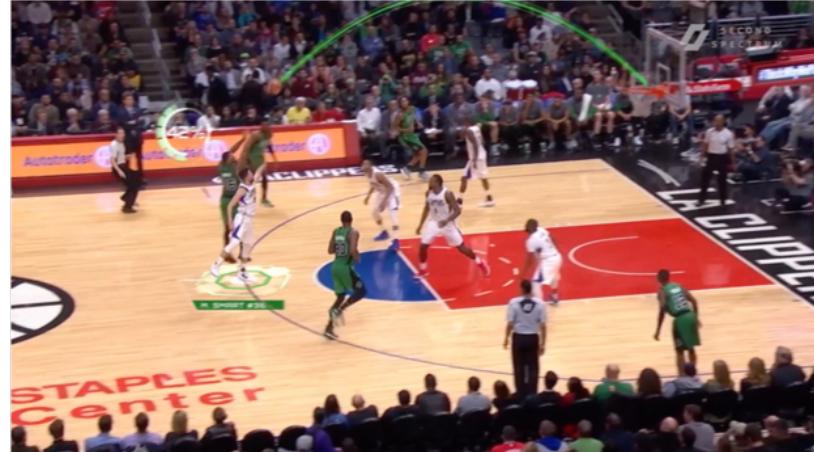


Second Spectrum: Redesigning NBA

They're already in the working stages of several entertainment and media platforms that could change the landscape. Some, such as derived statistics like qSQ (Quantified Shot Quality) and qSI (Quantified Shooter Impact), are actively being incorporated into ESPN broadcasts and written analysis.

From a fan perspective, everything we've discussed up to this point is just a tasty appetizer(开胃菜). Second Spectrum holds the potential to completely revolutionize the field of basketball entertainment, from the way you consume broadcasts to how you help your teenage aspiring (有抱负的) NBA player refine his game in the back yard.

Second Spectrum: Augmented Video + Interactive Applications



video: Branding



video : 2018 NBA Finals



video: Clippers CourtVision Intro



video: Basketball Augmented sponsorship

3

Presentation



Thanks!

- Any question?