

“Fujitsu is a company that can turn the incredible into reality. Indeed, I believe this type of approach is vital for companies to grow and prosper. It is truly a pleasure to engage with a company focused on achieving a dream, rather than being preoccupied with short-term profits.”

Morinari Watanabe, President
The International Gymnastics Federation

Changing the world of sports with a judging support system that uses AI technology and 3D sensing.

At a glance

Country: Switzerland

Industry: Sport

Founded: 1881

Website: www.gymnastics.sport

Challenge

It is extremely difficult to provide accurate scores during gymnastics competitions, which involve rapid movements and complex skills. But the sporting world wants technology to help realize fair competitions by eliminating inaccurate scores, while also increasing enjoyment for viewers and bringing innovation to the area of athlete training.

Solution

Fujitsu's AI and 3D laser-based solution enables the accurate scoring of gymnastics without the need for sensors attached to athletes.

Benefits

- Gymnasts are protected from inaccurate decisions made by judges having to respond to events while performances are in progress

Customer

The International Gymnastics Federation is the governing body for Gymnastics worldwide. It is the oldest established international federation of an Olympic sport and has participated in the Olympic Games since their revival in 1896.

Products and Services

- FUJITSU AI
- FUJITSU 3D Laser Sensors



Developing a judging support system, for use in gymnastics competitions, a practical reality for 2020

In October 2017, the International Gymnastics Federation (FIG) announced that it would partner with Fujitsu to develop a practical judging support system for gymnastics competitions. The trigger for this new initiative was a golf swing diagnostic tool created by Fujitsu. Morinari Watanabe, former Secretary General of the Japan Gymnastics Association and current president of FIG, recalls, "When I first saw the golf swing tool, I immediately felt that it could be used for scoring in gymnastics competitions."

The difficulty of determining scores in gymnastics competitions gave impetus to this idea. As gymnasts are constantly creating new and sophisticated techniques, it is not easy for judges to accurately assess their skills. The conventional method requires judges to write on scoring sheets by hand while performances are in progress. When inaccurate scores are made, the game may be extended and it also frustrates competitors and fans, therefore fair score is necessary. Watanabe continues, "Athletes must come first, and we have always sought to guard gymnasts against wrong decisions. Moreover, fair scores will increase confidence in gymnastics competitions and governance is also important for us as a sporting organization." This sense of urgency led to Watanabe's idea of using digital technology to support scoring.

Fujitsu's unique 3D laser sensors turn dreams into reality

Gymnastics is purely about the physical movements of the gymnasts, therefore it is not feasible to attach sensors to the gymnasts. Using motion-capture technologies, where markers are attached to the body was an idea; however, gymnasts felt uncomfortable with the markers attached, because it affected their performance or the marker may come off by the strenuous movement, so it was not realistic to use in competitions.

Meanwhile, Fujitsu has developed its own technology – based on 3D laser sensors – that captures gymnastics movements from a distance. This makes it possible to digitalize movements during performances in real time without imposing a burden on the athletes. Now, highly sensitive lasers that are capable of tracking around 2 million points per second are projected onto the athlete. The exact position and posture of the athlete's body can be tracked to the split second.

These sensors, used in combination with "skeleton recognition software," a technology developed for medical rehabilitation, makes it possible to estimate the position of the human body in real time, as well as monitor the position of the limbs, the degree to which the joints are flexing, the number of twists, and other factors. Artificial Intelligence (AI) is then applied to match the performance results with a skills data dictionary that has been built using machine learning, allowing the athlete's techniques to be evaluated accurately.

The new 3D sensing technology does not require markers or any other peripheral materials. The FIG and Fujitsu launched this co-creation project with the aim of creating a system that would allow the athlete to perform as usual and then, as soon as the performance was finished, the system instantly displays the name of the elements, degree of difficulty, performance points, and other variables on a monitor.

Watanabe holds high expectations, "If this system is perfected, inaccurate scores will become a thing of the past, and a longstanding dream of the sports world will come true."

Using digital technology to spark a sports-driven industrial revolution and bring happiness to people

It is anticipated that the technology will be applied to other fields beyond sport. According to Watanabe, "The next target sector after sports is healthcare. The basic aim of sports is to enable people to become healthy, and technology can be used to support this process." The same techniques used for making sports more effective can also help to extend a person's healthy life expectancy – a major challenge in our aging society.

Watanabe says enthusiastically that "technology should be used to not only improve convenience but also bring happiness to people by enriching their lives and minds. By combining technology and sports, we can also contribute more broadly to humankind around the world. That would be a real sports-driven industrial revolution."

The journey to overcome a big challenge is never easy. "Many obstacles will appear down the road, and sometimes it is better to detour around an obstacle rather than attempt to climb over it. If we fail, it will be my responsibility, but if we succeed it will be attributable to the Fujitsu team. I want everyone to boldly forge ahead, unafraid of failure" says Watanabe, speaking passionately. "And I believe Fujitsu has the team to get the job done."

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