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Robotics Marches Toward Real Business World

By LI Linxu

The world records set by humans in sports events are being broken one after another — and the remaining ones seem to be on the verge of being overtaken as well. And the record breakers are a new species — humanoid robots.

A Chinese humanoid robot ran 100 meters in 9.39 seconds in a preliminary heat at the second World Humanoid Robot Games in Beijing on August 22, beating the men's world record of 9.58 seconds set by Jamaican sprinting great Usain Bolt in 2009.

Then only three days later, the robot broke its own record, clocking 8.86 seconds at the semifinal. And this record too was shattered at the event's final on August 26, with a new benchmark of 8.64 seconds.

Besides the 100-meter sprint, Chinese humanoid robots have also broken human world records in events such as the 400-meter and 1,500-meter races, and the high jump.

These record-breaking performances were one of the main attractions at this year's World Humanoid Robot Games, where more than 2,000 robots from 666 teams across 16 countries competed in 51 events including football, dancing, boxing, and industrial-task contests.

In August, another major event in the robotics industry — the 2026 World Robot Conference (WRC) — also attracted global attention.

For years, major tech expos displayed robots doing backflips or waving at crowds. The WRC 2026 marked an industrial pivot toward commercial viability. Over 300 exhibitors showcased more than 3,000 robotic products, including more than 300 debuts, where the spotlight shone on applications automating onerous manual tasks.

These events serve as a critical barometer for the robotics industry. The most striking trend observed at the events is a fundamental change in evaluation metrics. The era of robots merely showcasing flashy tech is yielding to a rigorous assessment of functional stability, signaling a profound shift from laboratory novelty to pragmatic, real-world applications.

Of particular note is that the number of scenario-based competitions in this year's World Humanoid Robot Games has increased from six to 21, covering nine major real-world scenarios, including households, hotels, industrial settings, and emergency rescue operations. *See page 2*

New Graphic

IN THE FIRST HALF OF 2026

Revenue of China's
robotics sector reached

165.5 billion
RMB
▲24.5% y-o-y

Source: Ministry of Industry and Information Technology
Designed by SONG Ziyao / Science and Technology Daily



Robot "Zhuifeng Zaizai" (R), robot of Jinghong Dynamics Team (C) and robot of Honor Shuangchi Team compete during the Large Group 400m race of the 2nd World Humanoid Robot Games in Beijing on August 23. (PHOTO: XINHUA)

STI Frontier

When Sand Wears 'Nano Raincoat'

By LU Zijian & WANG Yuhan

In the exhibition hall of Xi'an Meinan Biotechnology Co., Ltd. (Maenam High-Tech), an experiment catches visitors' eye: Water is poured onto ordinary sand and it quickly seeps through. But when poured onto water-resistant sand, the droplets roll across the surface of the grains without penetrating at all.

This independently developed micro- and nano-scale coating technology enables sand grains to prevent water loss while retaining and storing water, effectively giving each grain a "nano raincoat."

Tackling coating barriers

Lu Wei, founder and chairman of Maenam High-Tech, first encountered the challenge of preventing water leakage while working on tunnel construction projects early in his career.

Organic waterproof membranes are prone to rapid aging and leakage at joints, so Lu thought about developing a kind of waterproof material that is durable and environmentally friendly. The rainy engineering environment in Thailand reinforced this idea.

The R&D began in 2021. The biggest challenge was forming a dense, stable waterproof coating on the rough surfaces of sand grains — one that was robust and heat-resistant enough to withstand abrasion from windblown sand.

The team tried dozens of solutions, but in vain. The breakthrough came from optimizing the material formulation.

They mixed dozens of ore bodies in a certain proportion and achieved coordination effects by micro- and nano-scale grinding technology. Rather than adopting the conventional spraying methods,

the team chose the physical, high-temperature and high-pressure technology to make sure that the waterproof coating adheres evenly to the surface of the sand grains.

By the end of 2022, the team managed to build a stable micro- and nano-scale coating structure on sand grains, and the key performance indicators, including water resistance, adhesion and durability, all met the required standards.

Exploring diverse application scenarios

The hydrated water-retaining agent developed by Maenam High-Tech can absorb more than 1,200 times its own weight in water. The innovative "waterproof sand + water-retaining agent" mode can firmly hold rainwater or irrigation water at the roots of plants, greatly reducing evaporation.

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Reusable Rocket: More than One Technical Path

By LU Zijian & FU Yifei

The Zhuque-3, a reusable launch vehicle developed by Chinese commercial aerospace company LandSpace Technology Co., Ltd., was launched from the Dongfeng commercial space innovation pilot zone in northwest China on August 19, and its first stage successfully landed at the designated location in the recovery area.

This mission marks China's first successful on-land recovery of a launch vehicle's first stage and first recovery using landing legs, representing a major breakthrough in reusable rocket technology.

There are different choices over the body materials and recovery solutions of reusable rockets. What are the

advantages and shortcomings?

Stainless steel or aluminum alloy?

The rocket body structure primarily consists of fuel tanks, casing sections and other components, and the materials to build the structure affect the rocket's payload capacity, cost and manufacturing.

The mainstream choice for expendable rocket structure is aluminum alloy, which is also used in many reusable rockets such as SpaceX's Falcon 9 and China Aerospace Science and Technology Corporation's Long March 10B.

Stainless steel has become another popular option for commercial rockets in recent years. Both the Zhuque-3 and SpaceX's Super Heavy used this material.

Aluminum alloy has high intensity, which helps reduce the rocket's weight

and increase its payload capacity, whereas stainless steel has large density. Limited by welding techniques, stainless steel has to be constructed to a certain thickness, which makes the rocket heavier.

This, however, changes with the rocket size. Calculations show that using aluminum alloy can significantly reduce weight and improve efficiency when the rocket body diameter is no more than five meters. As the diameter increases, the designed thickness of the rocket body gets closer to the thickness determined by welding techniques, and stainless steel's impact on payload capacity decreases. For heavy rockets whose diameters reach 10 meters, stainless steel materials can enhance their comprehensive competitiveness. *See page 4*

International Cooperation

Chinese-built Solar Project Energizes Northern Laos

Edited by WANG Xiaoxia

A 1,000-megawatt solar farm spread across 2,100 hectares of mountainous terrain in northern Laos began commercial operation in April, marking a major step in the country's push to become a regional clean energy hub.

The project, developed by China General Nuclear Power Corporation (CGN), is the largest single-phase solar installation in Southeast Asia and the first utility-scale photovoltaic plant built on mountain slopes in Laos. It serves as the anchor power source for the 500-kilovolt China-Laos transmission interconnection, which went live alongside the plant.

On clear days during the dry season, the facility generates more than five million kilowatt-hours daily, according to Wang Yang, operations manager at CGN Laos. The annual output is projected at 1.65 billion kilowatt-hours, tantamount to preventing roughly 1.3 million tonnes of carbon emissions each year, he said.

The electricity is collected at an on-site substation and transmitted through northern Laos' grid to southern China via the cross-border high-voltage line. Lao officials say the project has significantly eased power shortages in the north and reduced the country's dependence on imported electricity.

The project has driven local green transformation and economic and social development, and at the same time enhanced power interconnection between northern Laos and southern China, said Thongphath Inthavong, former deputy minister of energy and mines of Laos.

In March, Laos and China jointly established a clean energy power standards research institute in Vientiane. The institute is working to align technical and operational standards between the two countries, a move officials say will smooth future regional grid integration.

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WEEKLY REVIEW

Reconfigurable Optical Arithmetic Logic Unit Chip Developed

A research team from Lanzhou University in northwest China has developed a reconfigurable optical arithmetic logic unit chip that integrates various logical and arithmetic operations onto a single hardware platform. This work provides a new implementation path for building high-density, low-power, reconfigurable photonic arithmetic logic processing chips.

AI Model Detects Liver Cancer from Earlier Missed Tumors

Alibaba's DAMO Academy and its collaborators developed DAMO LiON, an AI model for diagnosing liver cancer that can identify microscopic cancerous lesions in the liver using CT scans. During a two-month real-world prospective clinical trial, the AI model detected 15 previously missed malignant tumors, enabling patients to receive timely surgical or drug treatment.

Microcomb Developed to Empower 6G Networks

Researchers have developed a microchip that produces a stable, high-quality microcomb, which can be converted into multiple precisely spaced millimeter-wave frequencies at the same time. The technology could increase the speed and capacity of future 6G networks, while its high precision may also benefit quantum timing, navigation, radar and space applications.

APOE4 May Alter Brain Years Before Alzheimer's Symptoms

Scientists discovered a possible reason for APOE4, a major Alzheimer's risk gene, to change brain activity long before the symptoms show up. In mice, APOE4 led to the increase of a protein called Nell2, causing neurons to shrink and become abnormally active. This hyperactivity in younger times predicted worse memory later in life. Lowering Nell2 levels in adult mice reversed the abnormalities, pointing to a potential strategy for intervening before Alzheimer's disease advances.

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