



Science and Technology Daily

VOL.1-NO.17

THURSDAY, OCTOBER 28, 2021

WEEKLY EDITION

Innovation Underpinning 2022 Winter Olympics

By Staff Reporters

Science and technology innovation will play a vital role in the Beijing 2022 Olympic and Paralympic Winter Games, according to Wang Zhigang, Chinese minister of science and technology, who inspected the training centers and sports venues for the Games on October 10 and 11.

At the National Ice and Snow Sports Training and Research Base in Beijing on October 10, Wang tried out China's independently developed snowmobile, and checked the effect of wind tunnel training facilities and systems.

He then visited Shougang Park, one of 2022 Winter Olympics venues in Beijing, to inspect the operation of the ski jumping platform and smart technologies in the park, such as self-driving buses and the intelligent vehicle network, hailing the progress made in sci-tech in-

novation during the preparation.

On October 11, Wang toured four winter Olympics venues in Chongli, Hebei province. There he inspected the application of a number of innovative achievements, such as the construction technology of the racing track, reliability of the snowmaking function, 100 percent green electricity and reliability of the power supply.

According to concerned experts, 112 new technological achievements of 37 projects have been applied in the test competition, and 10 project groups have participated to help the national teams' training in freestyle aerials, ski jumping, biathlon, speed skating, ice hockey etc.

The countdown to the 2022 Olympic Winter Games has begun as the Olympic flame was ignited at the birthplace of the Games in Ancient Olympia in Greece, and arrived in Beijing on October 20, 2021.

Editor's Pick

The Birth of a Smart and Zero Carbon Container Terminal

By LU Zijian

Located in Tianjin Port, north China, the world's first smart and zero-carbon container terminal began operation on October 17.

Accompanied by the completion of the construction, 13 world-class conundrums are answered and 76 patents and know how are created as well. It offers a Chinese solution to the intelligent upgrading and low-carbon development of container terminals to the world.

A smart terminal

This terminal at Section C of Beijing Port Area of Tianjin Port is the realization of the automated container terminal 2.0 project proposed by Tianjin Port Group (TPG).

It was difficult to transform the idea into reality as there was no precedent.

The intelligent horizontal transportation administration system used by the terminal is the first of its kind in the world.

As the "smart brain" of the terminal, the system can calculate the optimal solution for loading and unloading automatically, enhancing efficiency by

20 percent compared to traditional terminals.

The system is a combination of single trolley quay crane, ground intelligent unlocking station, Artificial Intelligence Robot of Transportation (ART), and horizontal transportation side loading and unloading yard.

Upgraded from unmanned container trucks at Tianjin Port, ART is the world's most intelligent and lightest unmanned container truck with the lowest cost and energy consumption. It has also realized level-4 piloted driving.

Compared with traditional automated container terminals, the smart terminal needs 60 percent fewer employees, reduces 50 percent of the reversed transportation of container operation and can transport 39 natural containers (in different sizes) per hour.

The terminal also benefits from the combination of 5G technology and BeiDou Navigation Satellite System (BDS). A hundred and fifty-five 5G base stations were built in the port, covering the major part of the port with 5G network. Together with a BDS reference station, dynamic high-precision positioning at millimeter level can be achieved. See page 2



Artificial Intelligence Robot of Transportation (ART) at the smart and zero carbon container terminal at Section C of Beijing Port Area of Tianjin Port. (PHOTO: XINHUA)

Sci-tech Achievements during the 13th Five-Year Plan Period



Global Innovation Index ranks 12th in 2021 from 29th in 2015.



Up 71.83%

R&D spending rises from 1.42 trillion RMB in 2015 to 2.44 trillion RMB in 2020.

Nationwide tech contracts transaction rises from 98.36 billion RMB to 282.52 billion RMB.



Please turn to page 2 for the corresponding report. (PHOTO: Science and Technology Daily)

Applaud the Sci-tech Achievements of the 13th Five-Year Plan

By Staff Reporters

Beijing Exhibition Center has been quite different these days as a large number of items, which demonstrate China's major achievements and reform progress in science and technology development during the 13th Five-Year Plan period, are on display.

The exhibited items include (but not limited to) the Chang'e-5 lunar probe, Mars rover, the deep-sea manned submersible Fendouzhe (Striver), and the 600 kph high-speed maglev train.

The exhibition focuses on the frontier of global sci-tech, the main competitive area of economy, the major needs of the country, and people's life and health. Both large devices and innovative products benefiting people are on display. Apart from the achievements, the sci-tech work done behind the curtain is also shown to the public.

As sci-tech journalists, we are al-

most familiar with every displayed item, but witnessing the collection of all the items still makes us excited, even in tears. Abundant and spectacular, the exhibited items are the manifestation of China's improvement in sci-tech strength, glories shared by the entire sci-tech community.

The 13th Five-Year Plan period is not only the decisive stage in finishing building a moderately prosperous society in all respects, but also a critical period to build China into an innovation-oriented country.

For the past five years, China has systematically pushed problems tackled in basic research and key technologies. Sci-tech achievements have been promoted to enter the main competitive area of economy and society in an all-round way. The scale and quality of sci-tech talents have been increased and sci-tech institution reforms have been deepened in key sectors. Integration with the

global innovation network has been actively implemented. All these actions contributed to the historical accomplishments and reform of China's sci-tech cause.

In particular, China swiftly conducted relevant research and development work in response to the unexpected COVID-19, contributing to the global fight against the pandemic.

The sci-tech community and other sectors of society have implemented the new development concept and carried out the innovation-driven development strategy, which is a key step to build China into a science and technology giant.

We should give a round of applause for the sci-tech achievements of the 13th Five-Year Plan period.

Looking forward to the 14th Five-Year Plan, China is to welcome more magnificent sci-tech achievements in the new era.

WEEKLY REVIEW

50th Anniversary of the Restoration of PRC's Lawful Seat in the UN

On October 25, 1971, the 26th Session of the UN General Assembly adopted Resolution 2758 with an overwhelming majority, and restored all rights of the People's Republic of China in the United Nations. China's Mars Orbiter Resumes Communications with Earth

China's Mars orbiter has resumed communications with Earth after the solar conjunction and will start remote sensing of Mars in early November, the China National Space Administration said on October 22. New Approach to Lower Cost of Hydrogen Fuel Cells

Chinese scientists have recently developed a new approach to produce a series of high-performance platinum alloy catalysts, which is expected to lower the cost of hydrogen fuel cells significantly and promote their industrialization. Over 1.5 Bln Doses of COVID-19 Vaccines Provided overseas

According to the State Council Information Office, China has provided 150 countries and 13 international organizations with protective suits, masks, ventilators and more than 1.5 billion doses of vaccines, ranking first in the world. Second Batch of Lunar Samples for Research Distributed

China has announced a list of 17 research institutes that will receive the second batch of reported 17.936g lunar samples from its Chang'e-5 mission.

Sci-tech Backs up Centenary of Archaeology

By TANG Zhexiao

Excavation of the Yangshao site in Henan province, the first excavated location of the Yangshao culture, began in October 1921, marking the beginning of China's modern archaeology. Archaeological work in the country has undergone earth-shaking changes for the past century.

Before the 1980s, traditional field surveys mostly relied on the "Luoyang shovel", a kind of archaeological drilling tools, to understand underground cultural relics through drilling holes and archaeologist's experience.

Today with modern science and technology, archaeology is closely connected with advanced remote sensing exploration technology, along with excavation, protection and restoration technology.

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S&T DAILY WECHAT ACCOUNT (EN)



China Lays Out Top-level Design on Decarbonization

By LI Linxu

A top-level design to achieve carbon peaking and carbon neutrality, has been laid out by China in a document jointly released by the Central Committee of the Communist Party of China and the State Council on October 24.

The document, titled *Working Guidance For Carbon Dioxide Peaking And Carbon Neutrality In Full And Faithful Implementation Of The New Development Philosophy*, details the country's goals and measures towards carbon peaking and carbon neutrality.

By 2025, China's carbon dioxide emissions per unit of GDP will be lowered by 18 percent from the 2020 level, according to the goals set by the document, adding that the energy consumption per unit of GDP will be lowered by 13.5 percent from the 2020 level.

By 2030, China's carbon emissions will peak, and by 2060, the country will

be carbon neutral, says the document.

In the new stage of development, the matter of carbon peaking and carbon neutrality is of great significance to effect a comprehensive green transformation in respect of economic and social development, said He Lifeng, chairman of the National Development and Reform Commission.

Aside from the goals for cutting carbon emissions, the document also sets out the goals for improving the energy efficiency of key industries, increasing the share of non-fossil energy consumption, and elevating the carbon sink of ecosystems.

China aims to gradually increase the share of non-fossil energy consumption to around 20 percent by 2025, around 25 percent by 2030, and more than 80 percent by 2060.

In 2020, the non-fossil energy consumption accounted for 15.9 percent, up 6.2 percentage points against 2012.

The series of goals indicate China, the biggest developing country, will complete the world's most dramatic reduction in carbon emission intensity, and reach carbon neutrality from carbon peaking in the shortest period of time in human history, said He, adding that this will inject great impetus into achieving goals of Paris Agreement on climate change and make a great contribution toward building a community with a shared future for mankind.

To achieve these objectives, the document puts forward an array of working guidelines, such as exercising nationwide planning, prioritizing conservation, leveraging the strengths of the government and the market, coordinating efforts on the domestic and international fronts, as well as guarding against risks.

In addition, the document also lists a series of measures, such as promoting comprehensive green transformation in

economic and social development, carrying out in-depth industrial restructuring, accelerating the development of a clean, low-carbon, safe and efficient energy system, and promoting a green and low-carbon mode of opening-up.

Energy conservation must be a key feature of the entire process and all sectors of economic and social development, says the document, which calls for deepening reforms of energy systems and mechanisms.

The country plans to strictly control fossil fuel consumption, such as coal consumption, and actively develop non-fossil energy, such as wind, solar, biomass, marine, and geothermal energy sources.

Meanwhile, China will strengthen research in green and low-carbon technologies and promote their applications.

By 2060, China will have fully established a green, low-carbon and circular economy, says the document.



China is striving for a comprehensive green transformation in economic and social development. (PHOTO: VCG)

Zhejiang Accelerates Smart Manufacturing Transformation

By CHEN Chunyou

The manufacturing industry is the foundation of a nation and China's Zhejiang province is currently accelerating its efforts to upgrade this industry empowered by innovation. Zhejiang released a pilot list of 36 industrial clusters for smart manufacturing this May, which will promote the breakthrough in core technologies.

According to a report reviewing the country's digital development in 2020, released by the Cyberspace Administration of China this year, Zhejiang's industrial digitalization index ranked first in China.

This achievement was not realized overnight. It is the result of making full use of its industrial advantages and the pioneering spirit of the local population.

Rebirth of iron & steel production base

The Banshan iron and steel production base, which in the past was a pollution churning collection of smokestacks and noisy machines, was closed by the Hangzhou Iron and Steel Company in late 2015, in response to the country's plan to eliminate excess and outdated capacity.

In order to seek a new point of development, the company made the shift to digital infrastructure. In 2020, the construction of a cloud computing data center was launched in the place where the steel mill once stood. About 30,000 machine cabinets and 300,000 servers will be housed in the center, which can meet the needs of both governments and enterprises. The center is going to be one of the most energy-saving data centers coupled with the largest comput-

ing capacity in China.

Moreover, a group of advanced manufacturing enterprises in the field of artificial intelligence, robotics, applied chips and 3D printing will become the engine of the company's new manufacturing development.

Immediate economic benefit vs future development

In the past, the lead battery industry was one of the pillar industries of Changxing county, Huzhou city, discharging more than 10 tons of lead emissions annually.

In 2004, local enterprises were encouraged to upgrade the traditional battery industry with advanced technology, equipment, and craftsmanship, realizing a high-end, high-quality, and high-efficiency development. The call for green development was positively supported by local enterprises.

Two lead battery reforms were carried out in the county in 2005 and 2011. The number of lead battery enterprises was gradually reduced from 175 to 16, and all of them were moved to the high-tech park.

Far from the reform weakening the capacity of the battery industry, it actually pushed the lead battery enterprises to transform into a new energy industry.

Now, the new energy industry has become the primary strategic emerging industry in Changxing. The county has gradually formed a new energy industry chain, with the new energy battery as the core, covering intelligent vehicles and key components, new energy equipment, and energy storage.

From manufacturing to smart manufacturing

Another example of smart manufacturing is the building of an industrial Internet platform in Xiaoshan district, Hangzhou city. The digitalization of the paper packaging industry in the district was relatively weak, especially in the process of design, research and development.

In order to realize digitalization, local enterprises set up a joint laboratory with universities and institutes committed to building an intelligent factory. Thanks to this measure, the order delivery rate increased by more than 10.2 percent, the energy consumption reduced by more than 18 percent, and the cost for human resources decreased.

Centering on smart manufacturing, Zhejiang has found its own way to green development, in which a balance between ecology and economy is achieved.

Zhejiang released its 14th Five-Year Plan for the construction of a global advanced manufacturing base this July. In the next five years, the province will focus on the fields of information technology, biomedicine, new materials, energy conservation and environmental protection as well as new energy, on its impressive journey of smart manufacturing.

Sci-tech Backs Up Centenary of Archaeology

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With the advent of various emerging frontier disciplines such as imaging, chronology, genomics, big data, cloud computing and artificial intelligence, sci-tech archaeology bursts vitality and has become an inevitable trend in contemporary archaeology.

China is accelerating the introduction of sci-tech assistance in the field of cultural relics protection. The prime example of this is the sandstone excavation of the Yungang Grottoes, which represents the outstanding achievement of Buddhist cave art in China in the fifth and sixth centuries AD.

To solve problems of collapse, seepage, rain erosion and weathering, cut-

ting-edge technologies, such as big data and three-dimensional scanning, were introduced as part of the protection of the Grottoes, along with artificial intelligence and virtual reality.

Making full use of the supporting and leading role of modern technology in the protection of cultural relics is of global interest. For now, it still needs to be improved in the application of science and technology in the archaeological exploration, protection and restoration of cultural relics.

Modern Chinese archaeology, which has gone through a century of history with the support of science and technology, is continuously promoting the enhancement of national pride and cultural self-confidence.

Last Five-year's Achievements Strengthen Confidence in Innovation

By Staff Reporters

An exhibition showing China's achievements in scientific and technological innovation during the 13th Five-Year Plan period (2016-2020) was held at the Beijing Exhibition Center from October 21 to 27.

Covering an area of over 20,000 square meters, the exhibition consists of 12 parts and displayed a total of more than 1,500 equipment and models, exemplifying China's achievements in multiple areas such as basic research, high-techs, major sci-tech projects, agricultural science and technology, social development, sci-tech innovation in regions, opening up and cooperation, science popularization, etc.

Focusing on the scientific research, economic development, the country's major demands, and the people's welfare, the exhibition selected a number of landmark sci-tech achievements that show the country's sci-tech strength.

The 600 kph high-speed maglev train represents the collaboration of research and industry in China. China has

handled core technologies with independent intellectual property rights, and successfully developed a complete set of high-speed maglev engineering equipment with a speed of 600 km per hour, making itself one of the few countries to master this technology.

Science and technology have also made contribution to fighting against COVID-19 epidemic. More than 80 Fire Eye laboratories, firstly developed by Chinese scientists for detection of COVID-19, have been built in nearly 30 countries and regions around the world, and COVID-19 testing products have covered more than 180 countries and regions.

Apart from the symbolic achievements in scientific innovation, the exhibition has also promoted the spirit of scientists and affirmed their hard work in pushing forward scientific progress and facilitating global cooperation.

The event is jointly sponsored by the Ministry of Science and Technology, the National Development and Reform Commission and the Beijing Municipal Government, among others.



Taizhou, a coastal city of Zhejiang province, specialized in medical equipment manufacturing, is quickening the pace of building an intelligent town. (PHOTO: VCG)

The Birth of a Smart and Zero Carbon Container Terminal

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Zero carbon terminal

As the first to realize self-sufficient green power generation and consumption in the world, the terminal emits no carbon dioxide in its operation. The energy consumption of the terminal is 17 percent lower than that of traditional automated container terminals.

"All facilities are powered by electricity generated by the integrated storage and load system of wind and solar energy. No carbon dioxide will be emitted in the process," said Yang Jiemin,

vice president of TPG.

With three berths, 12 quay cranes, 42 bridge cranes and 76 ARTs in operation, it is not easy to realize zero carbon emissions in such a large area.

According to Yang Rong, general manager of Tianjin Port Second Container Terminal, two 4.5 megawatt offshore wind turbines, generating up to 25 million kWh annually, were planned when the terminal was designed. Solar photovoltaic panels covering more than 3,700 square meters were installed on building roofs and greenbelts at the port.

Both approaches are making full use of the port's natural advantages — abundant wind energy and large area, which will reduce 30 percent of cost of operation compared with that in automatic container terminals at the same coastlines, noted Yang Jiemin.

"There are also two small power storage stations at the terminal," said Yang Jiemin, adding unused electricity can be transmitted back to the State Grid.

As for ships ashore, the terminal set up a shore power system to provide

electricity, realizing the zero carbon emissions of the ships.

Jiao Guangjun, president of TPG, said that they have also adopted advanced energy monitoring technologies, analyzing the statistics of all types of energy consumption in real-time, ensuring zero carbon emissions.

The operation of the terminal is not only a step towards China's goal in carbon peaking and carbon neutrality, but also a duplicatable scheme for the upgrading of container terminals that can be promoted globally.



An exhibition showing China's achievements in scientific and technological innovation during the 13th Five-Year Plan period (2016-2020) in Beijing. (PHOTO: TANG Zhexiao)

Extensive China-Japan Cooperation in Digital Society and AI

By QI Liming

The 17th Beijing-Tokyo Forum was held from October 25 to 26 in Beijing and Tokyo online and offline simultaneously.

Co-hosted by China International Publishing Group (CIPG) and Japanese non-profit think tank the Genron NPO, participants from both countries shared ideas and held in-depth dialogues on digital economy, artificial intelligence (AI), economic and trade cooperation, and cultural exchanges during the two-day forum.

At the sub-forum of the 17th Beijing-Tokyo Forum on October 26, both Chinese and Japanese experts held candid and in-depth discussions on the prospects of bilateral cooperation in digital society and AI, and reached consensus on relevant issues.

Sino-Japan digital cooperation boasts great prospects

Xu Zhilong, editor-in-chief of the

Science and Technology Daily, said at the forum, "The development of digital economy is not merely the development of digital technologies or products, but to build an ecological system of digital economy."

Tatsuo Yamasaki, distinguished professor of the International University of Health and Welfare, expressed his hope that this platform could explore solutions to the issues concerned the community with a shared future for mankind, such as the care of the elderly in an aging society, AI enabling climate change monitoring, tracking carbon footprint through AI technology, reducing energy consumption, and integrating traditional energy with new technologies.

Pang Dazhi, vice president of NetEase, believes that the young generation in China and Japan gets to know each other's culture through digital products, such as animation, games, mu-



Sub-forum of the 17th Beijing-Tokyo Forum on 26 Oct. (PHOTO: S&T Daily)

sic and movies. "In fact, based on the same cultural heritage and highly complementary technology on game development, the two countries have broad space for cooperation in the field of digital culture and digital economy."

Novel trends and scenarios of digital economy

Duan Dawei, Senior vice president at iFLYTEK Co. Ltd. said, there is great room for cooperation between China and Japan in the field of AI. "China and

Japan face common challenges in education, medical care, care for elderly people and other areas. Thus, we can discuss how to offer better service to the public through AI technology."

Taro Shimada, Senior VP of Toshiba Corporation, said that the use of logistics data is vulnerable to natural disasters. "Both China and Japan are committed to improving the toughness of supply chain through sci-tech. Facing the shock of COVID-19, logistics data presents both opportunities and challenges. Common sense has been reached on the sharing of logistics data to a new level."

Jeff Shi, vice president of SenseTime, said AI can help solve the aging problem faced by both China and Japan, dealing with the practical challenge of productivity shortage. "AI can help solve the productivity shortfall. Meanwhile, AI itself is trying to improve productivity by reducing its reliance on data and humans."

"Zero carbonization" gains momentum through digital economy

AI helps develop new materials such as new catalysts, said Junichi Hasegawa, COO of Preferred Networks. "Photovoltaic, hydraulic and hydrogen energy are all commonly discussed energy sources, whereas they all belong to secondary energy sources. Therefore, carbon emissions are unavoidable in the production of these new energies and how to reduce carbon emissions in producing these energies is an important issue."

In addition, human society is inseparable from computers. How to reduce

the power consumption of its data centers and develop new computers with higher efficiency and less emissions is also worth thinking about.

"Total global carbon emissions fell by a record 7 percent in 2020 from the previous year due to the COVID-19 pandemic," said Liu Song, vice president of Pingkai Xingchen (Beijing) Technology Co. Ltd., "However, economic activities did not suspend, the reason is the vigorous development of Internet economy."

Liu said that online activities can significantly reduce carbon emissions while ensuring normal economic development. We may seek new path on energy conservation and emission reduction through the use, transmission and storage of data in the future.

Data protection and security are focused

Hiromi Yamaoka, board member of Future corporation, said that developing AI needs to address concerns on privacy collection. "The application of AI requires the collection of high-quality data, which involves the aspects of data governance, privacy protection and other issues. In the process of developing AI, the concerns should be tackled. In addition, when it comes to cross-border data flows, countries around the world should reach a consensus to ensure the security of data flow," said he.

Liu also shared idea on this topic, saying that the boundaries of national security and personal privacy need to be clearly defined. China has paid attention to the dialectical relationship between development and security of data flow.

Opinion

Why Traditional Industries Struggle to Embrace AI

By YU Haoyuan

Over the past few years, artificial intelligence (AI) has developed in leaps and bounds. However, despite it is now being used in every business from food delivery to mobile payments, traditional industries are still hard to benefit from the value addition of AI.

Preconditions of AI application

"The application of AI is determined by three factors, which are data, computation capacity and algorithm," said Zhu Pengfei, vice president of the College of Intelligence and Computing at Tianjin University. According to Zhu, the data as the basis of AI application must reach a certain volume. In addition, the computing capacity must support large-scale model training, and then the algorithm needs to achieve a certain accuracy, and the client computing power must have a certain reasoning ability.

"Accurate Content Push (to provide precise content for internet users) mainly counts on improving algorithm accuracy, and the improvement of algorithm accuracy is inseparable from massive data as the basis," Zhu explained. He thinks that in this single scenario, the algorithm model is required to make the continuous adjustment and repeated up-

grade for a higher degree of accuracy and formation of a positive sequence.

Why AI is seldom used in traditional industries

Recently, Andrew Ng, a well-known computer scientist and technology entrepreneur, said in adopting AI, industries other than the consumer Internet industry are facing three major challenges in the development progress, which involves "Small datasets," "Cost of customization," and "Gap between proof of concept and production."

"For the traditional manufacturing industries, in their process of transforming to smart manufacturing, data is a very prominent issue," said Zhu. He said data assessment is facing difficulties because many traditional enterprises have neither built data pick-ups nor data centers. As a result, the data of these traditional companies are fragmented and seriously lack quantity and quality, which is challenging to obtain.

Moreover, data from these kinds of industries have business value, and as a result, they are always kept confidential, preventing data from being circulated and being shared. This further creates the effect of an information island, which affects the optimization of the AI algorithm model.

"When we are developing an AI algorithm model, the data we get is often 'processed without privacy issues,' which also seriously affects our judgment because of the confidentiality of the data. In addition, with a lack of technical personnel who can develop AI algorithm models in traditional industries, it may cause trouble in the development process," said Zhu.

He believes conventional manufacturing industries must upgrade their production equipment to be information capable and intelligent if they want to gain high-quality data. Such an upgrade requires enterprises to invest a huge amount of time and energy and increase production costs. It thus has become a barrier to the application of AI in the conventional manufacturing industry, said Zhu.

Solution to getting AI involved in traditional industries

Is there still hope for AI to be used in traditional industries? The answer is yes. The shift toward data-centric AI development has great potential, but what we are doing in the Industry of Consumer Internet is not suitable for traditional industries.

According to Ng, given the current complexity of AI, the bottleneck in the application usually lies in the quality

and matching of the data. Traditional industries should adopt a "data-centric" model to obtain better quality and higher matching data.

Ng listed three things for enterprises to work on immediately to transform:

"Firstly, instead of merely focusing on the quantity of data collected, also consider the quality, make sure it clearly illustrates the concepts needed for the AI to learn.

Secondly, make sure the team considers taking a data-centric approach rather than a software-centric approach.

Thirdly, for any AI project intended for production, plan the deployment process and provide MLOps (Machine Learning Operations) tools to support it."

"Some good application cases have also emerged in traditional industries. For example, the image recognition AI system in the medical field can help doctors read CT images, identify tumors and other lesions, and assist doctors in making judgments," said Zhu.

In terms of AI technology application, the data should be given priority, and application should not be taken into account until high-quality data is realized. Without good data, it is hard to give birth to a really good application, he added.

Hi! Tech

The Future of AI Surgeons

By YU Haoyuan

A few weeks ago, several videos about the performances of China's Edge Medical Robotics surgical robot peeling quail eggs, stitching raw egg membranes, and folding pocket paper cranes attracted the attention of netizens.

The dexterity of Edge's robot means they can meet the needs of urological surgery for prostate cancer and kidney cancer as well as other complex operations. It performed well in trials and was stable during the operations, reducing the amount of bleeding and improving the postoperative recovery.

The development of medical robots can be traced back to 1985. According to application scenarios, medical robots can be classified into surgical robots, rehabilitation robots, service robots and auxiliary robots. Among them, surgical robots are the most dominant category, accounting for about 37 percent.

The da Vinci (Surgical System), created in 2000, is now the most successful robotic-assisted surgical system with minimal invasion. With excellent performance in urology, general surgery, thoracic surgery, gynecology, pediatric surgery, cardiac surgery, and head and neck surgery, da Vinci is widely used in minimally invasive treatment in most fields of surgery.

Compared with normal open surger-

ies, robotic surgery offers many benefits to both doctors and patients. With the help of machines, doctors can not only increase precision by being more flexible and gaining enhanced vision, but also reduce the number of people involved in the operation, which can improve efficiency and reduce labor costs at the same time. As for patients, there are many advantages, such as shorter hospitalization, less pain and discomfort, less time for recovering and returning to normal activities, smaller incisions, as well as minimal scarring.

In 2016, Children's National Health System in Washington D.C. developed the world's first automatic surgical robot, Smart Tissue Autonomous Robot (STAR). The STAR has already performed soft-tissue surgery successfully. It can be operated autonomously by a particular algorithm program, avoiding human errors in operation. Surgeons can just stand by to supervise the machine without being involved in the controls, and suspend operations at any time if an emergency happens.

Will machines finally take over all kinds of surgeries in the near future? Shafi Ahmed, a famous cancer specialist and virtual reality surgery pioneer, thinks its imminent.

It is only a matter of time before robots replace surgeons in the operating theater, he said.



The picture shows a doctor is using the surgical robot in an operation. (PHOTO: VCG)

Promoting Global Cooperation through Digital Economy

Edited by QI Liming

The Digital economy has played a significant role in global economic development over the past few years. Chinese President Xi Jinping recently made a call to grasp the trend of digital economic development and promote the sound development of the digital economy in the country.

Xi also called for further participation in global cooperation of the digital economy and engagement in the digital economy agenda set by international organizations, to contribute China solutions and make the country's voice heard.

Countries from Africa and the "Belt and Road Initiative" are showing great interest in cooperation with China through the digital economy and are voicing their thoughts on the issue via various media platforms.

China-Africa digital cooperation highlighted

Gert Grobler, former senior diplomat of the South African Department of International Relations and Cooperation (DIRCO), said on the Forum on China-Africa Cooperation website that the digital economy plays a significant role in Africa's post COVID-19 recovery and

provides huge opportunities for innovative development and improved livelihoods.

"Africa can learn from China's experience in developing digital technology and economy. Meanwhile, many Chinese companies have been deeply integrated into the digital development of the African continent, producing tangible results in infrastructure construction and talent cultivation, which has already achieved win-win results," he said.

Africa increasingly sees the digital economy as the key point to its economic recovery. With the under-20 population on the continent increasing by more than 25 percent over the past decade, providing high-quality digital tools to the young generation is critical to the success of the digital economy.

Grobler added that Africa recognizes that China has a strong, yet growing digital economy that effectively drives innovation and production in China. Because of this, China has successfully combined the development of emerging technologies with strong GDP growth, which is exactly what Africa wants to learn from.

"We hope that China and Africa will continue to consult, formulating and implementing the partnership as

soon as possible. Besides, a number of projects will be launched in the near future, including an optical fiber backbone network of China-Africa cooperation, the e-commerce promotion season for African products, and the China-Africa BDS Cooperation Forum," he said.

Untapped potential in digital economy in Malaysia - China trade

In delivering his opening address virtually at the 130th China Import and Export Fair opening ceremony on October 14, Malaysian Prime Minister Ismail Sabri Yaakob said that the digital economy, the Fourth Industrial Revolution, and the adoption of sustainable development are "domains with untapped economic potentials" in the bilateral trade between Malaysia and China.

Yaakob said these three areas have untapped potential, although investments and bilateral trade between the two nations have been growing steadily since 2009, whereby China has continued to be Malaysia's largest trading partner, accounting for 18.6 percent of total trade in 2020.

Touching on the digital economy, Ismail Sabri said Malaysia had launched the MyDIGITAL initiative early this year to further accelerate the country's digital transformation.

LIFE IN CHINA

An Italian Professor Inks her Version of Stories

By LONG Yun

September 30 was a big day for Sara Platto. Dressed in a beautiful gown, the Italian professor received the Friendship Award, the top prize given out annually by the Chinese Government to honor outstanding foreign experts in Beijing's Great Hall of the People.

"It was a great honor. I still cannot believe that I was presented with the Award," Platto told *Science and Technology Daily* via a video interview, radiating an infectious enthusiasm.

Her convenient life in China

Platto started her China chapter in 2007, when the Chinese Academy of Sciences invited her to talk on the subject of the connection between dolphins and human beings. Since then, she has forged a deep connection with China.

Her WeChat social media account name is Hailong (meaning dragon in the sea, in Chinese), because Platto devotes her life to animal protection, and dragons portrayed in Chinese legends are protective figures for other living things.

Platto is now an associate professor of Animal Behavior and Welfare at Jiangnan University. She spoke highly of the flexibility and understanding existing in the working environment in China, making her feel comfortable and more integrated with her network.

In terms of her daily life, she noted that China has a well-organized and fully developed e-market. Shopping through online retail giant Taobao and the use of phone payment app Alipay, make life very convenient.

"I have not seen physical money for a while due to the prevalence of these platforms," she said.

Wuhan, her home

Platto said Spring Festival in 2020 is one she will never forget. She could have returned to Italy with her son at the beginning of the pandemic but chose to stay in Wuhan, Hubei province. But the decision was not easy.

"I believed in Wuhan and China. After a discussion with my son, Matteo, we



Sara Platto in the Ceremony of Chinese Government Award. (COURTESY PHOTO)

reached consensus that Wuhan is our home [after which] we chose to stay," she said. Unlike some anxious people around her, Platto said she thinks that, "Life is not that difficult."

She remembers with much laughter that when the lockdown in Wuhan began on January 23 of 2020, it was Matteo's birthday. She had to hastily change the original birthday party plan, moving the birthday celebration online.

During the lockdown, her university, neighbors, and friends shared food, information, and ways to deal with life during that time. Platto specially mentioned the supersized package of food her university sent her. "That package was so large, [that] I shared some of it with my neighbors."

Through the pandemic, Platto developed a deeper connection to Wuhan. She said although her neighbors repeatedly queried her decision to stay in Wuhan, her clear answer that she had decid-

ed to stay encouraged them to some degree and ignited the trust between them.

"Now, I feel much attached to this city and the people around me after we fought against COVID-19 together," she said, adding that the city and the people make her feel safe and warm.

Her role in building bridges

Platto highly values her role as a scientist in defending the truth. "I am a scientist who constantly questions everything, and I have to speak out the truth. My friends and I felt hurt and upset when we saw fake news about China and Wuhan circulating during the lockdown period," she said.

"I hope people outside China see what is happening in Wuhan," said Platto, suggesting the city is appreciated for what it is without any biases. She shared her stories on social media in different forms, which became popular. At the same time, she voluntarily shared advice on China's anti-COVID-19 practices to

help people prevent infection, believing it was a time for all people to unite.

In July 2020, Platto published a book titled *Buongiorno, Wuhan* (Buongiorno means Good day in Italian) to share her and her son's stories while in lockdown, aiming to teach people the courage, the responsibility and the solidarity to look to the future with optimism. "It is not just a book about our life in lockdown time, but a book that portrays our daily life in China with joy and love," she said.

The book has been selected by some Italian middle schools as students' reading material. Platto was invited to have conversations with the students to help them gain a better understanding of China.

In the interview, she repeatedly mentioned the importance of bridging the gap between China and the world outside. At least for now, part of her mission is fulfilled.

Letter to the Editor

Technology, A Life Changer

By Petar Kutin

I have lived in China as a music teacher for nearly a decade, and technology has changed my daily life. I am often amazed by how fast technology develops in China, from how I communicate with my family in Norway, to how I work and improve my teaching.

Thanks to technology, students at the Yew Chung International School of Qingdao (YCIS Qingdao), can learn musical composition as young as six years old. I use various Apps with a simple interface that can teach a lot about music. Students at all levels can participate with simple interface Apps. It gives my students opportunities to enjoy music and generate learning outlets that were unavailable in the past, as well as giving them a special feeling of confidence in music that surprises teachers and parents.

This year's music achievements will all be uploaded to the cloud and will be accessible to everyone just by scanning a QR code. Our school concerts and shows were broadcast online, so even former students were able to watch and enjoy. During the performances, our secondary students played important roles.

Digital technologies provide an enormous field for people to develop in and showcase their talents and abilities, not only for students but also parents and teachers. "Align with technology" is the school motto at YCIS Qingdao.

This generation has an entirely different learning experience from my student days. My daughter is a student in Year 5 at YCIS Qingdao, where every classroom uses an intelligent whiteboard, and everyone has their classroom iPad to do group projects. They often showcase their study outcomes via presentations with well-made PPTs, or sometimes with videos. Today, students learn from various open resources with a responsible and open mind.

Technology is playing a vital role in enhancing the efficiency of my life in China. Thanks to the innovations such as QR codes, and mobile payments, now I can travel in Qingdao without taking any paper money, and just paying by phone. In addition, shared bikes, shared cars, and shared phone batteries make our daily life in China more efficient. These were not available five years ago. The speed of China's technology development is very fast and technology de-

velopment is not just simply for practical reasons. It improves our living standards and allows ordinary people like me to enjoy every minute of their life.

Another technology miracle in China is the high-speed rail. I could still remember those days when I travelled to our sister school in Beijing on the overnight train. Compared to the high-speed train available today, I feel the speed has increased more than 100 percent. And the bullet trains made by China are ultra-fast and comfortable, from booking tickets on the app to scanning the QR code onboard. This is how the country improves everyone's life by supporting technology development and allowing innovation to take root. China's self-developed high-speed maglev trains running at a speed of 600 kph debuted in Qingdao. I am so proud of this development that happened on my doorstep.

In addition, technology undoubtedly gives us incomparable security. To fight COVID-19, China has done a spectacular job during this significant global public health challenge. Technology plays an essential role on this difficult task.

China actively leveraged digital technologies such as AI, 5G and cloud computing, which effectively improved the country's efforts in pandemic monitoring. At YCIS Qingdao, with the teaching software support, we quickly trained all our teachers and promptly moved all our lessons online, ensuring no interruption in learning.

In addition, protecting our students and staff's health is one of the most critical tasks. Data collection is essential to manage the flow of people and the distribution of materials. Software designed by the YCIS group, called GMIS, allows us to track individual students' temperature and travel destinations to predict and provide early warning of any potential risk to the school community.

In the past 30 years, there have been considerable changes in China. Technology makes people's lives more convenient, and young people are enjoying the fun technology brings. I look forward to this young tech-savvy generation to contribute to the world in the next 30 years, creating another technology miracle in China.

(The author is a music teacher at Yew Chung International School of Qingdao, Shandong.)

Wang Yaping: China's First Female Spacewalker

By staff reporters

Wang Yaping will become China's first female "taikonaut" to conduct multiple extravehicular activities (EVAs) outside the Tiangong space station during her stay there. Wang looked composed and confident when she greeted the crowds who came to wish her well on her space journey launch on October 14. She had previously captured headlines worldwide when China unveiled the three-member crew for the Shenzhou-13 space mission.

In China, while people are excited about the new mission, there is an extra amount of excitement because Wang will be the country's first female taikonaut to conduct spacewalks, inspiring millions of people who pursue their dreams, especially women.

Catherine Coleman, a retired NASA astronaut, who spent six months on the

International Space Station from December 2010 to May 2011, sent Wang a video hoping that, "When you look out the window, and you see the stars and the Earth, billions of women will be looking out that window with you, including me."

This is Wang's second space mission. She was selected to the crew of the Shenzhou-10 space mission in April 2013, delivering China's first space lecture to an audience of more than 60 million schoolchildren and teachers whilst onboard the Tiangong-1 space lab module.

According to Pang Zhihao, a Beijing-based space expert and retired researcher from the China Academy of Space Technology, female taikonauts have many unique advantages over men during long-term space stays. They tend to have mental states that can support and endure long-term stays in space and are more sensible and considerate about

any problems. Women's strong communication skills and energy will also help the crew maintain high morale throughout the stay, said Pang.

Women's bodies tend to adapt better to a space environment than men's and are less likely to have adverse reactions, making women more suitable for long-term trips in space, said Pang.

The advantages female astronauts have are also listed in an article published in National Geographic. Women are generally smaller and have weight advantages. In addition, women suffer less from some problematic physical effects of spaceflight. Some personality traits in women that suit long duration missions are also mentioned in the article.

Busting Myth against COVID-19 Vaccines

Myth: A mixed vaccination is more effective.

Facts: COVID-19 vaccines developed by different technical approaches are not interchangeable.

The World Health Organization's (WHO) chief scientist, Soumya Swaminathan, advised people on July 12 against mixing and matching COVID-19 vaccines from different manufacturers, calling it a "dangerous trend" since there was little data available about the health impact. "It's a little bit of a dangerous trend here. We are in a data-free, evidence-free zone as far as mix and match," she said in an online briefing.

However, she later tweeted that data from mix and match studies of different vaccines are awaited - and immunogenicity and safety both need to be evaluated.

Wang's mission also triggered netizens' curiosity about the particular supplies for a female astronaut, such as clothes, hygiene products and cosmetics, including lotion, cream and serum.

Pang Zhihao said that China has fully prepared for female astronauts' long-term stay on space stations. The waste collection system has been designed for females, and the Tianzhou-3 cargo craft has brought appropriate hygiene products to the space station.

In an interview with China Central Television, Wang said of her space adventures to date: "Dreams are like stars in the universe. They look far and unreachable, but as long as we try, we are destined to reach them."

(Source: the Global Times)



Chinese astronaut Wang Yaping (C) talks with children during an event on the 2017 Global Space Exploration Conference in Beijing, capital of China, June 6, 2017. (PHOTO: XINHUA)

Traditional Eastern Wisdom

The Spark of Civilization

By BI Weizi

Drilling for fire means rubbing or drilling a hardwood stick against another piece of wood to make fire by friction. The invention of drilling for fire comes from ancient Chinese mythology.

In ancient times, the area around Shangqiu in Henan Province was a forest, a tribe lived there and hunted for wild animals. Inspired by the sparks that appeared when birds were pecking trees, a man named Suireshi tried drilling wood against wood to create a spark and start a fire. Since then, humankind has learned to start a fire, using it for many purposes, including to cook food and as lighting, heating and smelting. With fire, human life entered a new era.

In order to do a good job of using drilling for fire, it is necessary to have a certain understanding of prehistoric tools, methods and technologies. According to the development level of prehistoric productivity, experts surmise that the fire tools at that time were mainly made of bamboo and wood. And in 1980, two pieces of wooden products with strange shapes were unearthed at the Subeixi site in Shanshan County, Xinjiang Uygur Autonomous Region.

These relics, consisting of a drilling rod and drilling board, were considered by scholars to be the fire tools used by human beings more than 2000 years ago.

While the Suireshi appears to represent one person, he in fact represents all the working people who contributed to creating fire, perhaps a composite of several people, or more likely, he represents a clan.

After the discovery of fire, people could readily use fire to cook food, finally advancing from eating raw animal flesh, and providing conditions for primitive people to gather. Fire marked a great step forward in human civilization.



A cartoon picture shows that a man is drilling wood for fire. (PHOTO: VCG)