

BUSINESSFOCUS

Tech eye makes biodiversity tracking easier

Intelligent platform leveraging key technologies to establish integrated sky-to-ground monitoring network



Migratory birds rest at the Yellow River Delta national nature reserve in Dongying, Shandong province, in December. ZHOU GUANGXUE / FOR CHINA DAILY

By LI JIAYING
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Facial recognition technology, which has found wide use in identifying or confirming an individual's identity, is now moving beyond human faces.

At a digital monitoring center of the Yellow River Delta national nature reserve in Dongying, Shandong province, a variety of data is on display on a large screen, showing the real-time status of the reserve's biodiversity.

The vast nature reserve, with an abundant and diverse bird population, used to pose challenges for scientists in tracking its biodiversity and conducting on-site monitoring.

Today, staff members at the reserve can monitor and tally the biodiversity situation in real time, simply through an intelligent monitoring platform.

As part of Chinese tech company Huawei's Tech4All digital inclusion initiative, the monitoring platform leverages information technologies such as big data, remote sensing and artificial intelligence to establish an integrated sky-to-ground monitoring network.

After terminal collection devices transmit data to the cloud via a well-covered 5G network, AI performs real-time identification and annotation, presenting results on the monitoring platform while conducting a series of data analyses.

This aids the reserve in intelligent species recognition and facilitates real-time monitoring free from excessive human intervention, effectively enhancing conservation management and decision-making efficiency.

"The use of science and technology not only mitigates the effect of human activities on the natural environment, but also opens up more possibilities for biodiversity conservation. Seeing without disturbing, guarding without interfering — that is the greatest respect humankind can show nature," said Shan Kai, a senior engineer at the ecological monitoring center under the Shandong Yellow River Delta national nature reserve management committee.

To date, the monitoring platform has collected more than 38,000 videos and 60,000 images, which have been used to train an AI system to recognize 47 species.

"Digital technologies have a significant role to play in the improvement of biodiversity monitoring efficiency. Integrating various collected information into a big data platform is essential to better serve the management ends for conservation areas," said Li Diqiang, a professor at the Chinese Academy of Forestry.

Currently, the platform can recognize species in motion and in flight, as well as perform group identification for bird species.

The identification accuracy for flagship species (species whose conservation is assumed to correlate positively with the protection of other unrelated species or communities) and large bird species has surpassed 90 percent.

With more materials brought onto the platform, the accuracy of AI identification is expected to improve, according to Huawei's Tech4All team.

In September, Huawei extended



A screenshot of an intelligent platform conducting on-site monitoring of a bird at the Yellow River Delta national nature reserve in Dongying in December 2022. PROVIDED TO CHINA DAILY

its collaboration with the Yellow River Delta national nature reserve, reaffirming its commitment to safeguarding biodiversity through state-of-the-art technologies.

These will help broaden camera capture zones and optimize the functionality of the monitoring platform to better support relevant research activities.

"We carry out intelligent monitoring of migratory birds by deploying cameras in conservation areas and leveraging 5G network and AI analysis on the backend. As a tech company, we aim to advance the digitalization and intelligence process of biodiversity conservation through such solutions," said Zhou Jianguo, head of the brand division at Huawei's China strategy and marketing department.

Collaborative efforts from the government, research institutes and tech companies are important in

driving the standardization and development of digital biodiversity monitoring platforms, Zhou said.

The Chinese tech company has participated in various biodiversity conservation projects around the world, including in Europe, South America and Southeast Asia. It has also introduced a slew of initiatives, such as the protection of rainforests in tropical regions and the preservation of rare species in Northern Europe, Zhou added.

"With intensified global efforts, we are gaining a deeper understanding of our role in building an ecological civilization," he said. "At the forefront of global digital advancements, China has a distinct edge in this process, particularly in the construction and innovation of digital infrastructure."

As the government has set high goals for the comprehensive advancement of a green and intelli-

gent ecological civilization during the 14th Five-Year Plan (2021-25) period, the country aims to establish an intelligent and efficient digital governance system for the ecology.

Meanwhile, the effect of China's technological efforts on sea creatures' living environment is also becoming obvious.

With the support of digital twin technology, Chinese scientists are offering innovative solutions for marine biodiversity conservation in Latin American countries.

At an exhibition hall inside the China (Hainan) Museum of the South China Sea in Qionghai, Hainan province, a large screen displays a digitalized underwater world of the Caribbean Sea.

Through the digital twin system showcasing marine biodiversity on the screen, visitors can witness the continuous growth of diverse sea creatures.

Carried out by a scientific cooperation platform jointly led by China's Beihang University and Colombia's Santiago de Cali University, the digital twin technology simulates marine ecosystems, contributing to research on the protection of marine ecological environments in Latin American countries.

"If we build a digital-twin fish model corresponding to a real fish species in the Caribbean Sea and provide real environmental data for the digital creature, we can easily acquire the species' simulated growth performance results just like that from nature," Luo Xun, Chinese director of the cooperation platform, said in a previous interview.

Both tropical oceans, the South

China Sea and the Caribbean Sea share similar latitudes and marine conditions and host a diverse array of sea species.

With the aim of collaborative innovation under the Belt and Road Initiative, the cooperation platform has partnered with various research institutions from the two sides to undertake marine biodiversity conservation research.

So far, the Chinese and Colombian researchers have collaborated to create digital models for over 100 species of fish, coral, and mangroves in the Caribbean Sea region, significantly improving the efficiency of marine ecological conservation and restoration efforts.

Meanwhile, the National Forestry and Grassland Administration and Chinese tech heavyweight Tencent signed a strategic cooperation agreement in May, aiming to develop the world's first photo-realistic digital panda model through cutting-edge digital technologies.

With Tencent's photo-realistic 3D model restoration and real-time cloud rendering tools, the digital panda has achieved millimeter-level precision in replicating an authentic panda's skeleton, muscles, skin, fur and other details, presenting a remarkably lifelike representation for education and research.

"All parties should pay more attention to solutions based on the protection of ecological species, promote technological innovation in the field of natural conservation, and establish effective and smart natural conservation plans with Chinese characteristics," said Yang Chao, chairman of the China Green Carbon Foundation.

'Agrivoltaics' lights up rural revitalization efforts

By LI JIAYING

Rural areas in China are seizing new opportunities brought on by the growth of the photovoltaic sector.

An emerging production model, known as "agrivoltaics" that combines the use of land for food production and PV for electricity generation, is paving the way for multifaceted rural development.

The edible mushroom industry has for long been a poverty alleviator in Gutian county of Ningde, Fujian province.

In recent years, the county has propelled the transformation and upgrading of its edible mushroom industry, with a focus on improving cultivation conditions.

Last year, a transition away from traditional mushroom fruiting rooms to photovoltaic mushroom farms increased yields by about 20 percent, with the price per pack rising by about 1 yuan (\$0.14) compared to the previous year due to higher quality, said Yu Xinkao, a local mushroom grower.

"The total income from a single crop of mushrooms is expected to increase by around 80,000 yuan," Yu said.

With advantages including higher

production efficiency, concentrated land use and optimized safety control, the mushroom agrivoltaic project has successfully led to a multidimensional development pattern, fostering increased income for mushroom growers and local enterprises while generating power.

Zheng Guidong, deputy Party secretary of Gutian county, said eight photovoltaic mushroom growing bases have been established in the county since May 2021, constructing 450 standardized mushroom production sheds with a total investment of 370 million yuan.

The overall installed capacity of the agrivoltaic project stands at 30,746 megawatts, with an estimated annual output of about 31.74 million kilowatt-hours and an annual power generation revenue of 13.5 million yuan, Zheng said.

Similarly, at an agrivoltaic demonstration area in Xinqiao township, Qianxinan Bouyei and Miao autonomous prefecture in Guizhou province, neatly arranged solar panels cast shadows on rows of red chili plants, and workers are busy harvesting and loading red chilies onto trucks.

He Yu, Party secretary of the Qianxinan subsidiary of SPIC



Villagers cultivate red chili plants under solar panels in the Qianxinan Bouyei and Miao autonomous prefecture, Guizhou province, in July. TAO LIANG / XINHUA

Guizhou Jinyuan Co Ltd, the operator of the agrivoltaic demonstration project, said the new energy company has — through cooperation with local agricultural firms — adapted to local conditions and cultivated economic crops such as taros, pumpkins, chilis, prickly pears, tobacco, Chinese cabbages and Chinese toon under the solar panels.

"The planting area has reached over 2,000 mu (133.3 hectares), with a total output of 750,000 kilograms and a production value of nearly 2 million yuan. It has also helped increase local farmers' incomes by

about 500,000 yuan," He said.

The company will continue to promote its agrivoltaic industry while keeping up with the development trends and policies of the new energy sector, He added.

"We will continue to expand the scale of agrivoltaic projects, create more job opportunities, and eventually push forward the process of rural revitalization."

With a total rooftop area of around 27.3 billion square meters and over 80 million rural households capable of photovoltaic installation, China's rural areas have demonstrated huge



A grower tends to his photovoltaic mushroom farm in Gutian county, Fujian province, in November.

WANG DONGMING / CHINA NEWS SERVICE

potential for agrivoltaic development, said the National Energy Administration.

Integrating clean energy technology and rural revitalization can help create a powerful engine for the smart and green development of rural areas, said Yang Yongping, president of the North China Electric Power University, during a forum.

"The vast rural areas possess abundant biological resources, power supply and profit potential. We should tailor our efforts to local conditions and vigorously promote the development of new

energy sources," Yang said.

Currently, the cumulative number of rural households installed with distributed photovoltaics has exceeded 5 million, driving investment of over 500 billion yuan, data from the NEA showed.

As of end-September, the cumulative installed capacity of distributed photovoltaics nationwide had exceeded the 100 million kW threshold to reach 105 million kW.

This has taken the nation's total installed capacity of photovoltaic power generation to 520 million kW, according to the NEA.