Rising High from Cloud to AI

Several major provinces across China are covered in large swathes of saline-alkali soil. This is soil with salt and PH levels that are higher than normal, and therefore deadly for most plants. For this reason, about 247 million acres of land in China isn't suitable for farming – roughly 10 percent of the country's territory.

By Ken Hu, Huawei Rotating Chairman

In 2006, the National People's Congress of China set a minimum standard for arable land in the country. To strike a balance between a secure food supply for China's growing population, while still ensuring enough land for urban and industrial development, they drew a red line at 297 million acres of farmland.


Ken Hu

Seawater rice: Worth its salt

For the past few years, a group of outstanding scientists have been using a combination of digital and biochemical innovation to increase the country's rice provisions. They are recovering 16.5 million acres of arable land from otherwise infertile soil, which they will use to grow a new type of rice – colloquially known as "seawater rice" – that has a much higher tolerance to salt.

This project is spearheaded by a scientist named Yuan Longping. According to Yuan, these 16.5 million acres of recovered land will be able to produce 1,821 kilograms of rice per acre. That's over 30 billion kilograms of extra rice per year, more than the annual rice output of Hunan Province, the greatest rice producer in China, and enough to feed up to 80 million people.

Yuan and his team are able to reinvigorate saline-alkali soil with a four-layered approach, where they cultivate new rice varieties and regulate soil conditions based on insights they gather from an underlying IoT platform. Huawei was fortunate to have the opportunity to work with Yuan's team on this platform.

> The results of the AI system plus human insights are incredible. They're able to reduce water consumption by 30 percent, cut fertilizers by 40 percent, and increase profits by 20 percent.

Futuristic farming in Qingdao

When you look out at the rice paddies in Qingdao, a modern city along the east coast of China, you can see poles at regular intervals throughout the fields. If you look closely, you can see small weather stations and high-tech telecoms modules on each, and in the future you'll also see high-definition cameras.

Beneath these modules are a whole range of sensors, both above and below the ground. These sensors collect information about light, temperature, alkalinity, and plant growth, which is then transmitted through NB-IoT networks to a high-capacity data center – a smart agriculture cloud.

The data from these sensors is used to feed an AI system that, when combined with insight from human experts, helps farmers use fertilizers and pesticides more precisely, monitor soil quality more effectively, control pests, and automate yield forecasting.

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Reinventing agriculture with digital technology

When we talk IoT, sometimes the conversation can get pretty technical. But when it comes down to it, this project is all about digitizing the land. In addition to repurposing saline-alkali soil, scientists can use digital technology to upgrade existing farmland, increase productivity, and improve yield quality.

ICT is changing the way agriculture works. Throughout its long 10,000-year history, agriculture has gone through four key periods of development, from basic sedentary farming – where we largely depended on the forces of nature to grow our food – to mechanization, to automated large-scale production, and finally to intelligent operations. Right now we're in the age of Agriculture 4.0, which has created enormous room for growth in information technology.

Huawei will keep working with Yuan's Qingdao Seawater Rice R&D Center to drive ongoing innovation in IoT, big data, mobile internet, and cloud computing, which will help accelerate the development of smart agriculture around the globe.

All industries are going digital

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faster than ever

These new developments aren't limited to agriculture; smart agriculture is a microcosm of the massive changes we're seeing across all sectors. Every industry on earth – including industries like transportation, manufacturing, finance, and even public services – is picking up the pace of its digital transformation. Huawei is proud to be part of this digitalization process on an unprecedented global scale. Right now, 211 of the world's top 500 companies are working with Huawei to drive this process forward.

As more and more organizations go digital, we've noticed a few trends.

To start with, ICT has clearly become a strategic enabler, not just a tool for driving efficiency. New advances in ICT have made the impossible possible. For example, when 5G networks are the norm, it will only take six seconds to download an 8 GB high-definition video. New technology will have an indelible impact on business strategy and the way we think about user experience. Suffice to say, ICT will soon be at the forefront of corporate strategy.

Second, digital transformation is more about choosing a partner than simply choosing a supplier. At Huawei, we have established 36 joint innovation centers with our customers and 18 OpenLabs with our partners around the world. These help us take a more focused approach to our customers' unique business needs and challenges, and speed up the overall innovation process.

Third, when it comes to choosing technology, organizations need to look beyond individual technologies and consider the greater overall synergy between devices, networks, and the cloud – what Huawei calls device-pipe-cloud synergy.

Devices are like feelers that sense the environment around them. Pipes are the neural networks that connect everything, and cloud is the foundation of ambient intelligence. How well these three elements work together will determine the success or failure of a given technological solution.

Welcome to Huawei Cloud

Two years ago at Huawei Connect I talked about how digital transformation brings greater connectivity, more sharing, and more freedom. But to make that happen we need to adopt a cloud mindset – that is, get a better view from the cloud.

Companies like Google and Uber were "born in the

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cloud." They were the driving force behind the Cloud 1.0 era, where they leveraged digital technology to create fresh business models and disrupt traditional industries. Now we find ourselves in the Cloud 2.0 era, where all traditional industries and enterprises will make use of the cloud to reshape their businesses and drive productivity gains.

This transformation is taking place faster than we could have ever imagined. It's safe to say that the world as we know it is already, in effect, cloud-based. According to Huawei Global Industry Vision (GIV) forecasts, by the year 2025 over 85 percent of enterprise applications will be deployed in the cloud.

We've made significant progress in the cloud market since we set up our Cloud BU in 2017. Huawei Cloud now provides services to many of the world's top-tier multinationals and large enterprises. To date, we've launched more than 120 cloud services with over 60 solutions for domains like manufacturing, healthcare, e-commerce, and the Internet of Vehicles.

The cloud is a runway, intelligence the engine

For us, cloud is just the beginning. We view it as a runway. To fly high, enterprises need an engine too. So after cloud, the next step is intelligence.

> At Huawei, we believe that the true value of AI lies in its practical application. Wherever there is a business challenge, AI should be there to help out.

Providing enterprises with artificial intelligence is the focus of Huawei's next stage of development. AI is the latest general-purpose technology to grow out of human ingenuity, and it will soon be everywhere, just like electricity and computers are today. If we want to make the most of it, we need to pay attention to two areas.

First, we need to keep on driving innovation in the AI space, and we should focus this innovation on algorithms, computing power, and data.

Where can we get more data, and how can we use it best? How can we process it in a way that meets real and practical needs? How can we break the limits of the Moore's Law and beef up our computing power by a factor of ten, a hundred, a thousand? And how can we optimize our algorithms?

These are all questions we hope to answer through nonstop, focused innovation. In 2017, we released the Kirin 970, the world's first AI-powered chip. We'll release the next generation of AI chips soon.

Second, applications are key. At Huawei, we believe that the true value of AI lies in its practical application. Wherever there is a business challenge, AI should be there to help out. We're working hard to make AI more affordable, easier to use, and more secure.

Based on machine learning, deep learning, voice recognition, and image recognition, we're developing applications for all kinds of scenarios like city management, Internet-based innovation, financial insurance, healthcare, logistics, and commercial retail. In essence, we're transforming cloud-based AI services into Enterprise Intelligence, and meeting a broad range of needs for different organizations around the world.

As easy as looking in the mirror

We recently worked with a company called Tukuchina, a major provider of stock images in China, to help them deal more effectively with image piracy. In the past, identifying stolen images and holding people responsible was a hugely problematic. But today, Content-Based Image Retrieval (CBIR) technology has dramatically improved Tukuchina's ability to assert image copyright.

To address the eight most common methods of piracy, we used visual processing algorithms and deep learning to train a search engine with 5,000 copyrighted images. Then we used this engine to identify more than 80,000 pirated images from a set of 42 million that are published all over the web. We were able to identify pirated images with 99 percent accuracy.

This anti-piracy checking tool is now available on

> In the past, drivers looked up at traffic lights to determine whether they should stop or go. Today, traffic lights are looking back at vehicles, counting them up and deciding when to give the green light.

Huawei's public cloud. With AI, finding pirated images on the Internet is as easy as finding yourself in the mirror.

AI-powered traffic lights for lighter traffic

Shenzhen has the highest vehicle density in China, with more than 510 vehicles per kilometer. In Bantian, where we have more than 60,000 employees commuting to and from our global headquarters every day, it wouldn't surprise me if the area around Huawei's campus had the highest vehicle density in the entire city.

Starting in June this year, the Shenzhen Traffic Police have been testing one of our cloud-based AI solutions on nine intersections around the city. They are using AI to adjust traffic lights based on real-time traffic flow. In the past, drivers looked up at traffic lights to determine whether they should stop or go. Today, traffic lights are looking back at vehicles, counting them up and deciding when to give the green light.

As a result, average vehicle speed has increased by 15 percent. Right now we are also using this technology in other cities like Beijing and Shanghai. We hope to give everyone a better experience on the road.

Creating an intelligent world

For the past 30 years, I think it's fair to say that Huawei has been moving in the right general direction, and we've done so while keeping our organization spry and light on its feet.

In our early days, we had no money and we were clueless when it came to strategy. Back then our goal was to become one of the top three players in the world. So we plunged ahead full throttle, fighting to take the lead and leave our competitors in the dust.

Moving forward, we want to mobilize around a vision that looks farther into the future.

In 2006, we agreed on a simple vision: to enrich life through communication. In 2014, we built on this vision, committing ourselves to building a better connected world.

At the end of 2017, after careful thought, we have yet again reorganized around a new and grander mission: To bring digital to every person, home and organization for a fully connected, intelligent world.

To get there, our goal for the time being is to build out the cloud as a runway. Then we'll equip our customers with an intelligent engine, giving them the horsepower they need to race ahead into the intelligent world. Faster, better, and safer.