Space Shift to develop AI-Powered Precision Agriculture Solution on AWS
- Contribution to Realizing Sustainable Agriculture by Crop Growth Monitoring -

TOKYO—December 23, 2022—Space Shift Co., Ltd. (Space Shift), a Tokyo-based space startup which develops Artificial Intelligence (AI)-powered software to analyze data as obtained from Earth Observation (EO) satellites, today announced it is collaborating with Amazon Web Services (AWS) to develop technology for precise crop growth monitoring, called AI-Powered Precision Agriculture Solution on AWS. By leveraging AWS's world-leading cloud services, Space Shift will be able to deliver more accurate crop growth assessment with secure, elastic, and cost-effective data handling, and bring value to its global customers in agriculture.

According to the statics from the Ministry of Agriculture, Forestry and Fisheries, the number of farmers continues to decline, down 39% in 2020 from 2,241,000 in 2005. The agricultural sector currently faces challenges caused by aging population, with 70% of farmers are 65 years old or older, and 11% are 49 years old or younger. The decreasing number of farmers means it is necessary to utilize data to support efficient farm work, reducing the reliance on manpower. Satellites can monitor and automatically record data from large geographical areas to monitor and collect information to address challenges such as fully utilizing data in an agriculture industry that is lagging behind in digitalization.

Space Shift aims to contribute to realizing sustainable society through "the optimization of human activities and natural environment" by developing software based on satellite data analysis using AI and Machine Learning (ML), especially focusing on Synthetic Aperture Radar (SAR) satellite data. Today, the number of SAR satellites are increasing rapidly and the utilization of the data in various fields including agriculture can help optimize vegetable production. However, technology or software for analyzing satellite data, which can help end users of the data to utilize them easily and effectively is a priority for Space Shit to address by their technology.

The agricultural sector conventionally uses optical satellites to do remote measurements and calculations to detect crop growth rate. However, because optical satellites cannot conduct observation during cloudy weather, there are practical challenges, including being unable to specify the harvest time or obtain data during the desired time of observation. SAR satellite data can be used to supplement the times when data cannot be obtained, thus enabling more continuous observation. AI is then used to identify growth status, with SAR data allowing for grasping crop planting and growth status. Leveraging their expertise in AI and ML, Space Shift develops the technology on AWS to contribute to expanding satellite data utilization market.

Space Shift is currently developing a service that uses SAR satellites to distribute diagnostic information on the growth of agricultural products. The information obtained will not only be used in the agricultural industry but is also being developed for use in various industries such as agricultural product distribution, marketing and advertising industries, and more. In managing vast fields, even inexperienced growers can harvest better if they know the growth conditions of each field. Advertising agencies and manufacturers can improve sales and reduce costs by knowing the season's timing early enough to run efficient campaigns and properly plan production.

Facing the Sea of Japan, Tottori Prefecture positions the space-related industry as one of the new industries that will be responsible for the future of the prefecture, and works towards the creation of a space industry through industry-academia-government collaboration. Space Shift has focused its attention on smart agricultures by using their technology in space, and in May 2022 opened a Yonago Satellite Data Research Center, Tottori Prefecture, to conduct a demonstration project to monitor crop growth using satellite data for using the prefecture's specialty green onions as the subject. The growth of green onions from planting to harvest is regularly photographed by Capella Space's small SAR satellites, and at the same time, in direct collaboration with farmers who manage large-scale farmland, height and growth spectrum values are manually measured to create a data set as a training data for AI.

The cycle of satellite and ground data collection and model development needs to continue to improve the AI accuracy in the future. Space Shift expects AWS technology will help them do this efficiently and accelerate the cycle of accuracy improvement. Space Shift plans to use AWS IoT Greengrass to collect and process ground data from multiple edge sensors, transmitting the data from the edge to AWS, securely and low-with latency, using Amazon SageMaker to process the data for AI/ML. Space Shift also plans to use AWS's fully managed cloud infrastructure to deliver analysis results on crop growth status to customers more quickly.

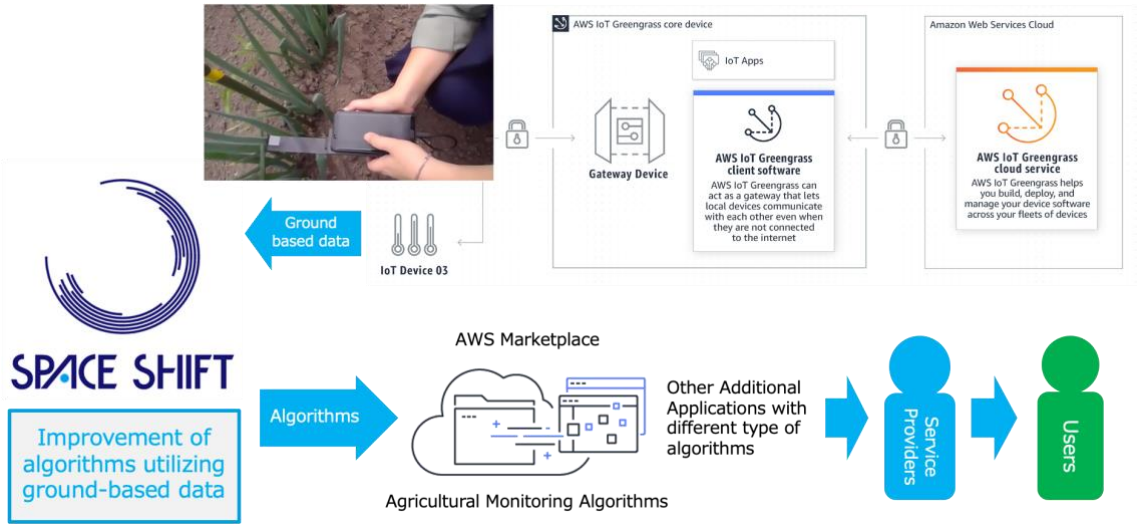
"Space Shift is anticipating their customers' needs for secure, reliable Earth Observation data into the future. AWS's comprehensive cloud services provides the tools to help them meet this goal on a global scale," said Clint Crosier, director of AWS Aerospace and Satellite. "AWS is committed to supporting customers like Space Shift, to leverage space technologies and the power of the cloud, to improve how we live and work on Earth."

The Division of Future and Industry Creation, Tottori Prefecture says, "Space Shift has established an R&D center for satellite data utilization technology in Tottori Prefecture and participates in the

"Tottori Space Industry Network" to utilize a subsidy by the prefecture for implementing a trial project to monitor the growth status of green onions, one of the local agricultural products. With Space Shift's utilizing AWS, we expect to realize stable and highly scalable advanced services, and further accelerate this activity to lead to the resolution of regional issues and the creation of the space industry for realizing the prefecture's goal."

"As the number of farmers decreases due to population ageing, it will become even more important to leverage technology to make farming more efficient, and more attractive to new farmers. Experienced farmers can detect the appropriate harvesting and shipping timing. But it is very challenging for non-experienced or new farmers to do the same," said Makoto Kawaoka, CEO of Kawaoka Farm, which is one of the farms that is collaborating with Space Shift and will use Space Shift's solutions. "It will be necessary to support them to understand the overall situation for agriculture, especially since it is influenced by the environment. This Project has a potential to help existing farmers and people who are willing to start farming by using technologies such as satellite data, IoT, and AI. I am very much looking forward to realizing it."

Naruo Kanemoto, CEO of Space Shift, Inc., says, "Space Shift develops a technology for analyzing various changes on the land by SAR satellite data and AI. In the agricultural sector, data for analyzing changes of farmland by SAR satellite is obscure, so it is necessary to develop AI algorithm combined with ground data. Currently it takes a lot of time and resources to measure crops by hand, but it is important to collect data precisely to develop high accuracy AI that can detect more crop types." He also says, "By utilizing edge AI processing and management function of IoT device provided by AWS Greengrass, it is possible to automate ground data measurement and automatically create a huge amount of training data for AI. Efficient development of AI is possible by utilizing Amazon SageMaker and we expect to accelerate the improvement of AI analysis capacities for SAR satellite data. We will continue to help resolve problems for farmers and regional revitalization through AI technology developed by our company."



Source: Space Shift

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