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Is the future of farming automated?



Day two of Smart Horticulture Asia featured discussions around autonomous growing and the use of robots in harvesting

Opening the second day of Smart Horticulture Asia, Autogrow's chief executive Darryn Keiller said the company had made a strategic choice to bring all of its data to the cloud, in order to take the next step.

"To take advantage of any of the new technologies that are available," said Keiller, "you need to group data and information to the cloud to be able to analyse it. This is something that can't be done on premise. The cloud offers so much versatility."

Keiller was referring to the company's FarmRoad solution. FarmRoad's Yield Prediction model was initially created to service large scale greenhouse tomato producers combining the biophysical understanding of crop varieties, with crop and environmental data and proprietary artificial intelligence (AI)-based models and engines.

[In September, it was reported some growers hit 95 per cent yield accuracy](#) while using the FarmRoad solution. Keiller explained the process for the solution to

"We build a 3D composite of what the plant looks like. This allows growers to determine the microclimate conditions around the plant and the leaves, and it becomes very precise about what you can extract from that information," he explained.

Keiller believes the agriculture industry is stuck in a time bubble and as such is championing the move to "leave the spreadsheet and move to the cloud."

"Cloud technologies are very commonplace in our day-to-day activities," he highlighted. "They are present on our mobile devices and used a lot in gaming. In all of these applications the cloud is commonplace – except for agriculture."

Keiller concedes limitations exist to what can be achieved, most notably because plants are alive. "You can't just throw technology at any old problem at hope it will solve it, without understanding how it might affect a living organism," he explained.

Priva Horticulture Global, best known for its advanced and stable greenhouse

Koppert believes the industry is heading to a point where advanced prediction models will be able to identify consumer demand, energy costs and prices, and that it may dictate what is grown, where and when.

"We aren't there yet, but I see it in the future," said Koppert.

"It's not only about prices or production, it's also an economic model for a grower. Autonomous growing is a buzzword in our industry, and it is justified. However, it is important we recognise that it is not about finding more data, but instead about finding useful and smart data that can help us take the next step," said Koppert.

"Worldwide we see the scaling of food projects, and it is difficult to find experienced growers who can lead the future of production."

Koppert pointed to the history of technology in the horticulture industry and how all new developments had helped make lives easier.

"Autonomous growing is the next step for

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Smart Horticulture Asia chairman, Harrij Schmeitz.

necessary for all companies to keep pace with developments and to keep scaling.”

Can robots replace humans?

The second session of the day featured presentations from Rui Andres, chief executive of Fieldwork Robotics, Edwin Vanlaerhoven, head of strategic business development at Certhon Aichi, and Haruhiko Kato, director of Denso Agritech Solutions.

The conversation revolved around the use of robotic harvesting. Andres said Fieldwork Robotics had chosen to work with a difficult product on purpose.

“Raspberries are a difficult crop because there needs to be the right amount of pressure to release the fruit, but not so much to bruise it,” he explained.

“At the moment our robots are harvesting a raspberry bush in 12 seconds per arm, which is a similar speed to humans. It will be competitive with humans like for like, and we aim to be less than 10 seconds next year.”

Andres believes one of the most important aspects of using robots in the future is being tactile to their application.

“Right now, I think a change in the variety of raspberry we grow will be needed to make them harvestable by robots. Although my view is that robots should be able to adapt to the crop, we are ten years away from them being on the market and able to do that, so it will have to be reversed, and crops will need to adapt to the robot,” noted Andres.

“At the moment robots are filling gaps created by insecure and unreliable

solutions, was represented by its general manager - Asia, Bram Koppert.

labour, and they are not replacing humans. In the future, though, I believe robots will fill the tasks that are harder to get humans to do.”

This belief, that robots and humans can work harmoniously side by side, is shared by the world's second largest automotive parts company, Denso.

In March 2020, Denso and Certhon formed an alliance with the objective of uniting Denso's knowledge and expertise in the field of automation (industrial robotics, AI, machine learning) and Certhon's advanced horticulture technology to develop next-generation horticultural solutions to answer global food challenges.

Kato outlined the limitations of current robots manufactured and used across Japan. “Most robots are for industrial use only. They engage in simple routine work only, and only recently have they begun to cooperate with humans.

“If we implement industrial robots to agriculture, there's a big gap on two areas – it's a different environment, unlike a factory, agriculture takes place in different conditions.

“Then there's the expectations, we assume they need to operate like humans. However, when a human harvests fresh produce, they may be checking growth conditions or for signs of disease. Handling these tasks and communicating with colleagues is important, and if robots take over, this is a big challenge in making sure this still occurs,” he added.

Kato explained the company has been applying lessons it has learned from the automotive industry to the horticulture industry, but there's only so much that can achieve – which is why it has teamed up with Certho.

the agriculture industry, but it is

Vanlaerhoven pondered whether growers were ready for robots, suggesting, “Maybe not at this moment, but growers are becoming increasingly aware of labour issues, and so they need to start adopting these technologies now as robots need development.

“Through robots, we can achieve fewer people in the greenhouse, and solve some of the issues caused by insecure labour,” he said.

Kato added the goal was for robots to eventually be able to teach workers how to harvest fresh produce properly.

“The idea is to grow robots and workers together, so at the beginning, the robot learns from the worker. Then the robot can eventually teach the grower,” he explained.

“People can operate robots in a greenhouse from remote locations, it'll be like a game,” said Kato.

To an extent, Andres agreed, concluding that robots won't have the capability of replacing humans altogether, at least not in the next 30-40 years. “We won't achieve a 100 per cent automated greenhouse production within the next 30-40 years, but what we can do is improve processes so that there is better synergy between crops, humans and machines.”

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