NEW TECHNOLOGY

Using AI and machine learning to predict fruit yields

The Canadian Agri-Food Automation and Intelligence Network (CAAIN) is reporting on one of its funding projects: Vivid Machines.

"Most of our funding applicants work with massive fields of canola, wheat, and other grains, livestock operations such as beef or dairy farms, or horticulture facilities," said Darrell Petras, CEO of CAAIN.

"To date, we've seen few applicants from the fruit sector, despite the scope and scale of the industry, particularly in British Columbia and Ontario. We were so pleased to receive Vivid Machines' request to support Data-Driven Dormant Apple Tree Pruning and Tree Vigour Models to Improve Farm Outcomes, a $2.4M project to which CAAIN is contributing a little over $800,000. This project is providing technology that will revolutionise orchards by allowing farmers more time to manage the loads of individual trees, ensuring better outcomes in terms of consistency, colour, size and yield."

Crop load management is the process that generates target fruit size, whether on trays or in bags. Vivid Machines' technology can "read" trees and predict crop features for each geolocated tree. There can be literally thousands upon thousands of trees in a single operation.

CEO Jenny Lemieux explains that her team developed a camera that can see, record, and capture a range of data in the RGB spectrum, as well as in near IR, at tractor speed, which is about 7km/h. This as a significant advance that takes videos of each plant; technology geolocates them and attaches a range of meta data, including fruit variety. This information is then fed into computer vision models

"Currently we can predict things such as the number and size of apples on a tree and extrapolate yield for a farm for the year. And we aren't resting on our laurels. We are researching disease detection in collaboration with Vineland Research and Innovation Centre and Cornell University."

Lemieux explains that the CAINN funding has been invaluable. First, it's helping with tree vigour assessment.

"For now, we can predict a tree's yield based on fruit quantity and growth rates," she says. "But that's not good enough. We're working on prediction based on the number of buds on a tree to help direct pruning. Buds appear well before the blossoms, so it gives the farmer more time to take appropriate action—i.e., how much pruning is required to optimize yield. But this is very difficult. We continue to build on our computer vision and machine learning models to broaden our predictive capacity. CAAIN's contribution is allowing us to hire more people to build more datasets, which in turn will allow us to detect the relevant factors while the trees are dormant. That would, in turn, enable us to predict a tree's crop load far enough in advance to allow the orchard manager to prune dormant branches for optimal crop load per tree, making for a healthier operation."

"We're going to be able to generate historical data and compare year-over-year results," she concludes.

The Canadian Agri-Food Automation and Intelligence Network (CAAIN) is a not-for-profit company launched in July 2019 with funding of $49.5 million from the Government of Canada's Strategic Innovation Fund, and assistance from Alberta Innovates in the form of significant in-kind contributions. CAAIN drives collaborative agri-food technology research and innovation from coast to coast.

COMING EVENTS 2024

Dec 4	CanAgPlus Annual General Meeting VIRTUAL
Dec 4	Ontario Potato Board Annual General Meeting, Delta Hotel, Guelph, ON
Dec 10-12	Great Lakes Expo, Grand Rapids, MI
Dec 12	Fresh Vegetable Growers of Ontario Annual General Meeting VIRTUAL 9 am – noon
Dec 12	Agricultural Adaptation Council Annual General Meeting, Delta Hotel, Guelph, ON
2025	
Jan 14-15	Potato Expo, Las Vegas, NV
Jan 22-25	Guelph Organic Conference, Guelph, ON
Jan 23-25	Lower Mainland Horticultural Conference, Tradex, Abbotsford, BC
Jan 27-28	2024 Scotia Horticultural Congress, Old Orchard Inn, Greenwich, NS
Jan 28	Québec Apple Growers Annual General Meeting, Centre culturel et communautaire de la Pointe-Valaine, Otterburn Park, QC
Jan 28-30	Manitoba Potato Production Days, Keystone Centre, Brandon, MB
Jan 30	Greenhouse Health and Safety Symposium, Best Western Leamington Hotel and Conference Centre, Leamington, ON
Feb 3-6	North American Strawberry Growers' Association and North American Raspberry Blackberry Association Annual General Meeting, Outrigger Kona Resort & Spa, Kailua-Kona, Hawaii
Feb 5-7	Fruit Logistica, Berlin, Germany
Feb 12-13	Southern Interior Horticultural Show, Penticton Trade & Convention Centre, Penticton, BC
Feb 14	British Columbia Cherry Association Annual General Meeting, Trinity Baptist Church, Kelowna, BC
Feb 20-21	British Columbia Fruit Growers' Association Annual General Meeting, Penticton Lakeside Resort and Conference Centre, Penticton, BC
Feb 18	Ontario Fruit & Vegetable Growers' Association Annual General Meeting, Niagara Falls, ON
Feb 18	Berry Growers of Ontario Annual General Meeting, Niagara Falls, ON
Feb 19-20	Ontario Fruit and Vegetable Convention, Niagara Falls Convention Centre, Niagara Falls, ON
Mar 6	Ontario Potato Conference, Delta Hotel, Guelph, ON
Mar 11-13	Fruit & Vegetable Growers of Canada Annual General Meeting, Hilton Québec, Québec City, QC
Mar 24	Ontario Processing Vegetable Growers Annual General Meeting, Sheraton Four Points Inn, London, ON