

Partially robotic apple picker envisioned

By DAN WHEAT
Capital Press

Yet another innovator seeking to develop a robotic apple picker doubts three others will have commercial machines soon and believes his partially robotic concept is more readily attainable.

Minglei Xu, 42, was born and raised in Shanghai, China, and obtained his master's degree in computer science from Brigham Young University, Provo, Utah, in 2000. He worked in the Silicon Valley before becoming a serial entrepreneur in 2010.

He built the gaming studio Wild Needle and sold it to Zynga in 2012. He started Grow Mobile — an ad-buying platform for marketers to buy, track and optimize mobile app promotions — in 2012 and sold it in 2014.

The next year, Xu settled on a robotic apple picker as his next challenge because of the need, given labor shortages and because apples are relatively common in shape and size versus dissimilar objects that are more difficult for robots to pick. He started the company FruitBot in Palo Alto, Calif.

"Picking apples is very repetitive and grueling work that the robot is very good at," Xu told Capital Press.

More resources are being deployed into the navigational side of Artificial Intelligence such as self-driving cars, but manipulative AI such as robots capable of cooking or picking fruit without rigid coordinates is the key unsolved arena, Xu said.

Abundant Robotics of Hayward, Calif.; HarvestMoore of Pasco, Wash.; and FFRobotics in Israel all hope to have robotic apple pickers ready for commercial use in late 2018 or early 2019.

They may be able to reach that goal under very constrained conditions but won't be able to achieve the picking rate they want, Xu predicted.

"A fully automated robotic picking system in any industry is nowhere close. It's five years away at least," he said.

A big problem is avoiding obstacles such as limbs and leaves that a robot mistakes as fruit, Xu said. It is seen as a two-dimensional issue that requires aggressive pruning and thinning to remove obstacles when it's really a three-dimensional problem, he said.

While others are targeting the picking of apples within a depth of 18 inches inside the canopy, he said he is working toward a 36-inch depth. His solution is one or two robots on the front of a harvest platform assisted by several human pickers behind. Robots pick



Dan Wheat/Capital Press

Minglei Xu, CEO of FruitBot, Palo Alto, Calif., demonstrates soft grip of his robotic apple picker at the Washington State Tree Fruit Association annual meeting in Kennewick, Wash., on Dec. 4.

the low-hanging, easy fruit and humans pick what the robots miss.

Such a system could be commercialized in 2019 with a 60 to 70 percent pick rate, he said. Robots are not so good at apple clusters and could beep to alert humans to pick those, he said.

"The robot speeds up the most repetitive and easiest part of the work," Xu said.

It's a transitional move that doesn't require a big leap of faith by growers as a purely robotic system does, he said. Mike Willett, manager of the Washington Tree Fruit Research Commission in Wenatchee, said he wrote in a letter in support of Xu getting a Specialty Crop Research Initiative grant.

"A lot of people are looking at pieces of the puzzle. There are a lot of issues. Harvest is one," Willett said. "There's thinning, blossom thinning and different tools at the end of a robotic arm. To move it all forward, we need to have

lots of smart people thinking about the problems."

Xu wants to focus solely on software and robotic picking and says conveyance of fruit into bins, field sorting and stem clipping may include humans and can be figured out by companies already engaged in farm equipment such as PIUMA in Italy and Automated Ag Systems, builder of the Bandit Xpress harvest-assist platform in Moses Lake, Wash.

Xu said he has spoken with both but has not started working with either.

He foresees developing systems to not only help in harvest but logistics and big data, that is tracking of each piece of fruit to provide much more information to marketers and retailers.

Xu is working with five growers in Washington and California for field trials but wants to visit more orchards to look at differences in tree architecture and fruit varieties.

Tillamook transmission line proposal meets with controversy

By MATEUSZ PERKOWSKI
Capital Press

Controversy over an electrical transmission line in Oregon's Tillamook County is expected to come to a head in 2018 as the developer pursues three key permits.

The 8.6-mile line would cross farmland and forestland, drawing opposition from landowners in its path who worry about impediments to agriculture and logging.

Opponents argue that a new transmission line between Tillamook and Oceanside isn't justified by actual electricity demand, but may instead be intended as a connection to future wave power or offshore wind energy projects.

The Tillamook Public Utility District, the project's developer, claims the transmission line is necessary to improve the reliability of the electrical grid and denies it's motivated by renewable energy speculation.

Adding to the tension is the utility's planned use of eminent domain to obtain easements along the transmission line's route.

"It's really angering people in the Tillamook area, as it should," said Cameron La Follette, executive director of the Oregon Coast Alliance conservation group.

To begin construction, the utility district would need to obtain a conditional use permit from Tillamook County, a fill-removal permit from the Department of State Lands and eminent domain authority from the Oregon Public Utility Commission.

Those three permits are pending and are expected to undergo public comment in the coming year.

The Oregon Farm Bureau and Oregon Dairy Farmers Association have both objected to the project.

For dairy farmers affected by the line, it's problematic for multiple reasons, said Kurt Mizee, whose family owns Tilla-Bay Farms.

"Stray voltage," which occurs when electricity essentially leaks into the ground, is one concern, he said.

The phenomenon is known to reduce milk production among dairy cows and harm their health.

The transmission line would also prevent aerial pesticide spraying over certain fields and its construction would be disruptive to grazing and silage harvesting, said Mizee.

A vibratory hammer will be used to install the transmission tower foundations, which is also disturbing to cattle due to the region's soft, spongy soil, he said.

"They've offered us almost nothing as far as compensation for a pretty big impact," said Mizee.



Capital Press graphic

Forestland will also be negatively affected by the transmission line, which will require trees to be cleared along a right-of-way, said La Follette.

A 115-kilovolt transmission line would usually require a 100-foot wide right-of-way, but in this case, it may be narrower under certain circumstances, according to the Tillamook Public Utility District.

Landowners are also concerned about the health impacts to themselves and their livestock from being exposed to electromagnetic emissions, said La Follette.

In 2008, the Tillamook Public Utility District agreed to find possible connection points for an offshore wind energy project to deliver electricity to its grid.

While that memorandum of agreement has since expired, it shows the utility district is at least open to the possibility of offshore renewable energy, La Follette said.

Todd Simmons, the utility district's general manager, said the agreement with a developer was intended to allow the region to anticipate and plan for offshore energy.

However, the utility district doesn't now have any plans to connect to such offshore projects, Simmons said.

Currently, a single distribution line serves about 3,000 properties in the Oceanside area, which is three times more prone to outages than other areas on the utility district's grid, he said.

"When that line goes out, everybody's out of power until we make that repair," Simmons said. "We're vulnerable with that one line."

The distribution line is also at 90-95 percent electrical load capacity, so more capacity is needed to accommodate Oceanside's eventual growth, he said.

Constructing a second distribution line — which has a smaller footprint than a transmission line — wouldn't make sense because it could still be affected by falling trees or car collisions, he said.



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8:45-9:00	Workshop Introductions & Overview
9:00-10:00	"Quality Sells!" (Importance of Quality Beef Programs) <i>Robert Rebholtz Jr.</i> , Chief Executive Office & President, Agri-Beef Co., Inc.
10:00-10:45	"How Retailers Add Value to Beef Cuts" <i>Jeff Van Lith</i> , National Retail Sales Manager, Agri-Beef Co., Inc.
10:45-11:15	Break (provided by sponsors)
11:15-12:00	"China/Pacific Rim Beef Export Market Update" <i>Brett Stuart</i> , Founding partner of Global AgriTrends
12:00-1:00	Lunch (provided by sponsors)
1:00-1:45	"Use of Genomic-enhanced EPD's to Improve Beef Quality" <i>Dr. Matt Spangler</i> , Associate Professor, University of Nebraska
1:45-3:00	"Ins & Outs of 2016 National Beef Quality Audit" <i>Dr. Deb VanOverbeke</i> , Interim Assist Dean, Oklahoma State University; <i>Jesse Fulton</i> , Associate Director - Producer Education, NCBA

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