Sloth-inspired robot hanging over crops delivers realtime view for farmers

April 13 2017, by Nancy Owano

(Tech Xplore)—Crop monitoring and assessing is a vital component of agriculture. Questions over automating the tasks turn to possible solutions such as flying robots (not very energy wise) and ground monitors (running into other obstacles in the process). Georgia Tech researchers have something else in mind.

Follow that sloth. The team have come up with robots that can hang above crop fields to inspect plants as they grow.

In a video that shows their effort, Jonathan Rogers, assistant professor, mechanical engineering, at Georgia Tech introduced its Tarzan robot. Talking about the future of agriculture, he spoke of the need to employ automation and robots.

"So when somebody came to me and asked, How do we get a robot to *live* in a field for long periods of time—and walk around and move around persistently without needing a human to help it?"

Rogers said the only way was to do something out of the way—off the ground.

Many obstacles on the ground would be a problem and flying through the air would be energy intensive, noted Jamie Condliffe in *MIT Technology Review*. This way, "it swings its arms to traverse a guy wire strung up across a patch of land."

Rogers said, they can basically string this robot up along the crop row and it can take pictures of the plants underneath and then beams those pictures back to the farmer.

Condliffe pointed out these on-board cameras keep a watchful eye on crops so that large fields need not be constantly tended by farmers.

Rogers said farmers can perform analysis, or algorithms can perform analysis, to analyze how the crops are doing in realtime. Benefits? People will have an automated way to analyze how their crops are doing and what their crops need in realtime.

The sloth is energy efficient, he said in the video, so essentially one day

it can be powered by the sun with no need for batteries or charging.

So is this effort a lab project only? *Digital Trends* said "the team behind this particular robot isn't just developing it for open-ended research. Instead, the researchers have a very specific real-world use case for it."

Luke Dormehl reported on their work Wednesday. Prof. Rogers told *Digital Trends* the plan.

"Our first immediate application is for something called high-throughput phenotyping, which is a method of experimentally evaluating plant attributes for different breeds to evaluate [things like] drought tolerance ,"

There is a farm field at the University of Georgia where phenotyping is done; they will deploy the system there. Rogers called phenotyping "a very labor intensive process." The team aims to better automate. the process. "Moving forward, we see this as a key capability that can be deployed across the agricultural sector."

Actually, Georgia Tech carries an interesting description of the place. It is a 4-acre soybean test field outside Athens. Plant genetics researchers "scribble detailed notes and make daily observations as different breeds of soybeans grow in the July sun."

They go up and down rows, to measure crop growth and gauge leaf wilting, among other things. They try to correlate "phenotypes with desirable drought tolerance properties to help ensure the future of farming. It's repetitive, monotonous, and very hot."

Enter Rogers and Ai-Ping Hu, a senior research engineer. "Their team is building machines that will hang over the crops, suspended by parallel guy-wires. The robots, fitted with cameras, will swing like gibbons along

the cables, taking picture after picture of each plant. Down each row, then side to side, and back again, from one wire to another."

Dangling like this over the field, the robots will give the researchers more frequent measurements as well as avoiding some of the laborious work.

More information: www.news.gatech.edu/features/c … eating-next-robotics

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