Will automated agriculture help meet the world's food demand?

December 11 2012

Automation can "increase efficiency and yield by having many of the manual tasks of farming performed by specially designed agricultural robotic devices," says Professor Salah Sukkarieh.

Australia's potential to become the 'food bowl' of Asia has triggered a

drive to develop robots for use in farming and agriculture and University of Sydney mechatronics experts are leading the way.

Professor of Robotics and Intelligent Systems Salah Sukkarieh at the Faculty of Engineering and Information Technologies leads a team that is developing robotic devices with the ability to autonomously sense, analyse and respond to their own surroundings.

With the Asia-Pacific region's lack of arable land, water, and infrastructure countries in the region are looking toward Australia for farming and agriculture solutions.

"There is a big drive at the moment to conceptualise the future of Australian agriculture in terms of a 'food bowl' supplying the vast Asian market," says Professor Sukkarieh.

But says Professor Sukkarieh labour costs and technology will restrict Australia's ability to meet the associated increase in demand for fresh produce.

"This is where automation can help. We can use it to increase efficiency and yield, by having many of the manual tasks of farming performed by specially designed agricultural robotic devices."

Professor Sukkarieh is leading a three phase program, with the first stage using autonomous perception to enable robotic devices to read and understand their surroundings. He says the devices should be commercially available to farmers within the next couple of years.

With the support of Horticulture Australia, his team developed robotic systems, sensors and intelligent devices trialled on an almond farm in the regional centre, Mildura.

The robots can move through an orchard gathering data and developing a comprehensive in-ground and out-of-ground model of the entire orchard says Professor Sukkarieh.

"Traditionally it has been necessary for someone to actually walk through the orchard, taking and analysing soil and other samples and making decisions on the health and yield quality of the plants," he says.

"The devices we've developed can collect, analyse and present this information autonomously, so a major part of the farmer's job can be done automatically."

The second stage, which the team will commence in the new year, involves applying this technology to standard farm tractors, so that as well as being able to perceive their environment and identify any operations required, they will also be able to perform many of these operations themselves, such as applying fertilisers and pesticides, watering, sweeping and mowing.

The third and most complex stage will be to enable the devices to carry out harvesting.

"The devices we've developed already can identify each individual fruit on the tree and its degree of ripeness, which is about 80 percent of the job done. But being able to harvest them is our ultimate goal."

As well as developing the technology, the team is working with farmers to determine how small changes to traditional agricultural practices can allow them to make the most of this new technology.

Provided by University of Sydney