RIPPA front and centre at Precision Agriculture Expo

Field trial and event update - April 2018

The Robot for Intelligent Perception and Precision Application (RIPPA) was showcased at the fourth annual Tasmanian Agricultural Productivity Group (TAPG) Precision Agriculture Expo in Hagley, Tasmania. The autonomous robot, designed through the Horticulture Innovation Centre for Robotics and Intelligent Systems at the University of Sydney's internationally-recognised Australian Centre for Field Robotics (ACFR), attracted a crowd of over 130 to understand how it would help growers reduce input costs such as labour and fertiliser, and increase marketable yield of vegetables through crop intelligence (Figure 1).

Figure 1: Expo participants keenly watching RIPPA monitor a strip-tillage broccoli crop

Figure 2: Justin explains RIPPA's ability to monitor and collect data on crops

The levy funded robot has been designed to undertake a range of tasks 24 hours a day 7 days a week, that aim to benefit the vegetable industry. These include being able to:

- Automatically remove weeds through a wide variety of implements
- Autonomously detect and remove foreign objects
- Determine crop health and soil status
- Conduct autonomous precision spraying on individual plants
- Monitor crop growth and estimate yield through intelligent data analytics.

Justin Clarke from the University of Sydney's ACFR gave an update on the development of the robot and an overview of the project, detailing the advances in crop mapping, decision support systems, individual plant metrics and plans for development of automated variable rate spraying (Figure 1 and Figure 2).

The live demonstration showed RIPPA's ability to autonomously direct itself, map, and monitor crops. Attendees also had the ability to observe what RIPPA 'sees' with its on-board sensors and cameras. Figure 3 shows a graph detailing foreign objects that were detected at the Expo trial site, as well as images that have been taken by RIPPA's on-board camera of the individual foreign objects.

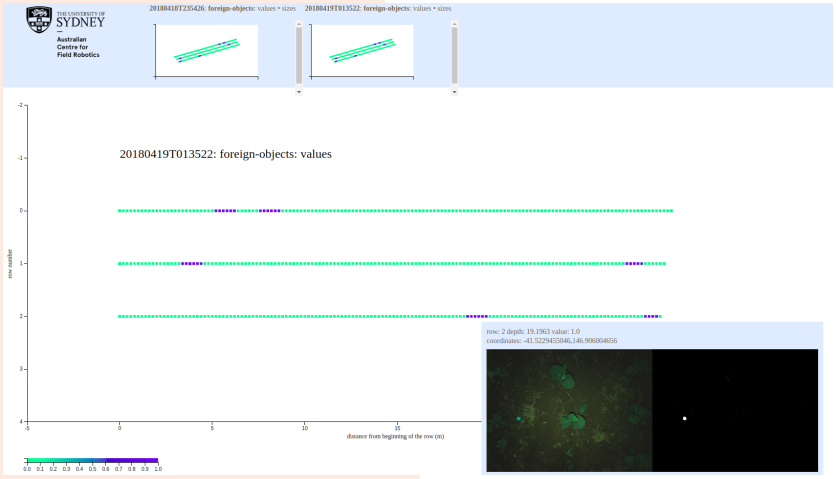

Figure 3: Detailed information of foreign body detection by RIPPA on farm, showing both images of what RIPPA 'sees' and a map that outlines where the foreign bodies were detected in the field

This project has been funded by Hort Innovation using the vegetable research and development levy and contributions from the Australian Government.
Hort Innovation is the grower-owned, not-for-profit research and development corporation for Australian horticulture.

RIPPA front and centre at Precision Agriculture Expo

In addition to foreign body detection to improve the robustness of current costly field scouting for quality assurance, RIPPA can also monitor crop growth indices to determine individual plant health. Figure 4 provides an overview of RIPPA's ability to monitor one crop growth metric, NDVI or Normalised Difference Vegetation Index. These NDVI values provide both real-time images as well as a map that outlines detailed color-coded values from row to row based on how 'healthy' the plant appears.

The event provided the ACFR research team with valuable feedback from growers on a range of data visualisations that could be produced from the RIPPA's crop mapping functionality (Figure 5 and Figure 6). The research team will continue to refine the mapping outputs and begin linking cutting-edge research on the development of automated variable rate spraying to the robotic platform, with the aim of being commercially available in the coming years.

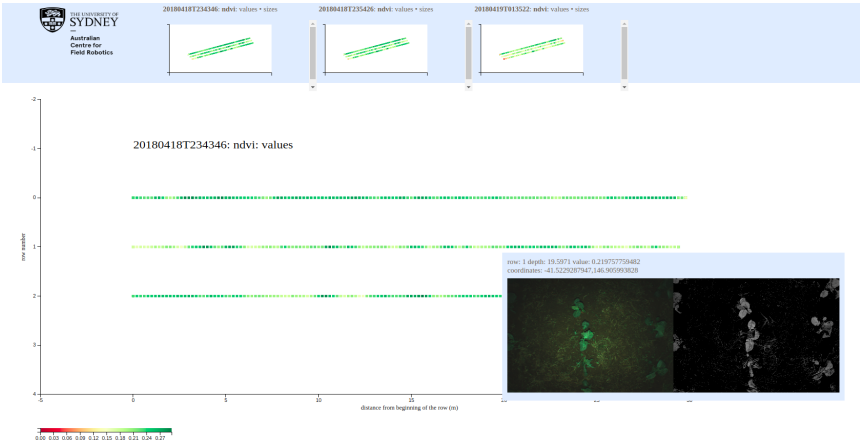

Figure 4: NDVI, Normalised Difference Vegetation Index, values gathered by RIPPA at the Expo trial site

Figure 5: The research team show the robots ability to autonomously monitor and map a broccoli crop

Figure 6: RIPPA autonomously monitors broccoli crops at the Hagley trial site

FURTHER INFORMATION

To find out more, including information on upcoming events, please contact:

Carl Larsen (carll@rmcg.com.au)

or Salah Sukkarieh (salah.sukkarieh@sydney.edu.au)

or visit www.sydney.edu.au/acfr/agriculture.