From west to east, RIPPA covers Victoria

Field trial and event update - May 2018

The Robot for Intelligent Perception and Precision Application (RIPPA) attended two National Vegetable Extension Network (VegNET) field days in Victoria this month, visiting both Werribee South and Lindenow. Following a recent visit to the Tasmanian Agricultural Productivity Group (TAPG) Precision Agriculture Expo in Hagley, RIPPA headed north to show Victorian growers the potential it has to benefit the vegetable industry.

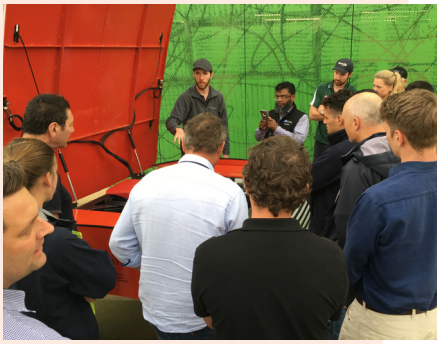

Figure 1: Participants get a closer look at RIPPA with Justin Clarke from the University of Sydney

Figure 2: RIPPA demonstrates its ability to autonomously monitor brassica crops in Werribee

Figure 3: Justin Clarke from the University of Sydney outlines the latest progress of the RIPPA project

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 range of different growers and industry leaders. The ACFR research team delivered presentations outlining the key features and an in-field demonstration of RIPPA, designed to allow growers to engage with the researchers and see the robot first-hand and discuss within the context of their own production system (Figure 1).

The main aim of RIPPA is to reduce input costs such as labour and fertiliser, as well as to increase the marketable yield of vegetables. To do this, RIPPA has been designed to undertake a range of tasks 24 hours a day 7 days a week. 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 (Figure 2).

The presentation provided an overview of the robotics project, detailing the advances in crop mapping, decision support systems, individual plant metrics and plans for development of automated variable rate spraying (Figure 3).

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.

Hort Innovation

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The in-field demonstrations showed RIPPA's ability to autonomously guide itself to monitor and map a variety of vegetable crops and also demonstrate what RIPPA 'sees' with its on-board sensors and cameras (Figure 4). Figure 5 shows a map outlining foreign objects that were detected at the Lindenow trial site, as well as images taken by RIPPA's on-board camera of the individual foreign objects.

The crop mapping showed the ability of the robot to obtain information on a range of different crop and weed metrics including crop growth and health NVDI (or Normalised Difference Vegetation Index) values, plant size and density (Figure 6).

Figure 4: The University of Sydney team show the RIPPA in action

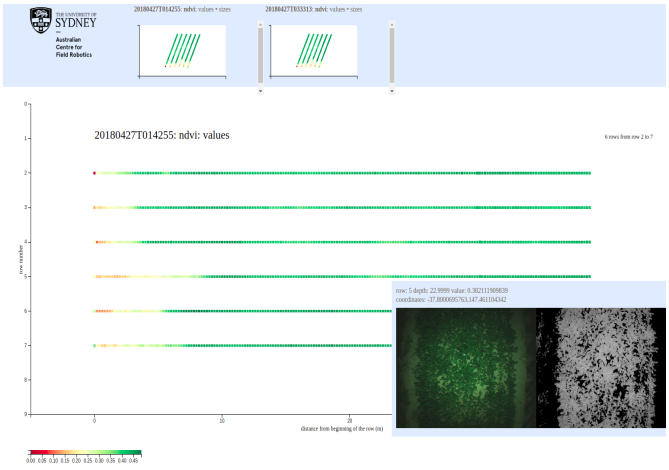

Figure 5: Detailed information of foreign body detection by RIPPA in a baby leaf crop at the Lindenow trial site, showing both images of what RIPPA 'sees' and a map that outlines where in the field the foreign bodies were detected

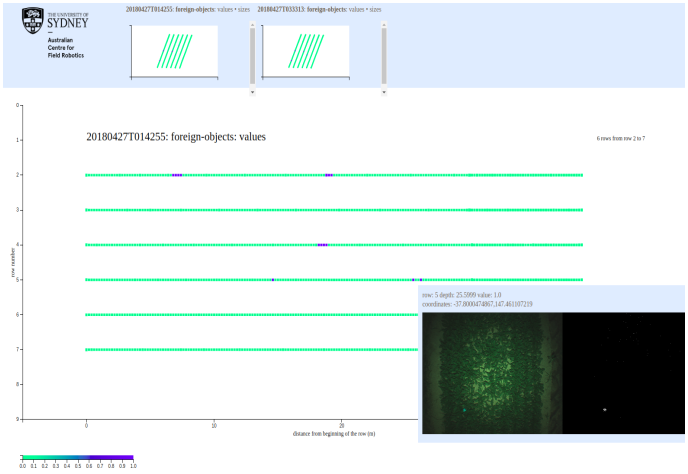

Figure 6: Crop growth and health (NDVI) values gathered by RIPPA at the Lindenow trial site, with darker green showing more growth and red/yellow showing less growth

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.

The events were equally as beneficial for the team at ACFR as they were for the participants, providing valuable feedback to the team on a range of data visualisations that could be produced from the RIPPA's crop mapping functionality and other areas of technology development.

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.