

RIPPA driving innovation in Griffith, NSW

Field trial and event update - July 2017

The RIPPA™ (Robot for Intelligent Perception and Precision Application) was front-and-centre in Griffith NSW as part of the recent Riverina Vegetable Innovation Field Day. This was part of a week-long trial at TJM Research Development & Extension farm, following similar data collection on commercial farms in Victoria, Tasmania and Queensland over the past eight months.

Created through the Horticulture Innovation Centre for Robotics and Intelligent Systems in the University of Sydney's internationally-recognised Australian Centre for Field Robotics, RIPPA aims to benefit the vegetable industry by:

- Operating autonomously 24 hours 7 days a week
- Automatically removing weeds through a wide variety of implements
- Autonomously detecting and removing foreign objects
- Determining crop health and soil status
- Conducting autonomous precision spraying on each individual plant
- Monitoring crop growth and estimating yield through intelligent data analytics.

The aim of RIPPA is to reduce farm input costs such as labour and fertiliser, as well as improve marketable yield of vegetables.

Almost 100 people attended the field day to listen to a keynote address from Dr Zhe Xu, Research Fellow from the University of Sydney (Figure 1), before having the opportunity to see the robot in action on a trial broccoli plot with an open Q&A session with the project team – a first for this

growing region (Figure 2). In addition to robotics, attendees also heard about the use of drones in vegetable production from Dr John Hornbuckle (Deakin University) and solar power technology from John Cochrane (Glynncorp Electrical).

The main components of the robot and intelligent systems that were being tested during the trial included the RIPPA platform and mechanical weeder and associated perception techniques.



Figure 1: Dr Zhe Xu, Research Fellow from the University of Sydney, presents at the Riverina Vegetable Innovation Field Day



Figure 2: RIPPA in action as the crowd gets to know more about robotics in vegetable production

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The broader trial evaluated and demonstrated specific functions of the robot and intelligent systems. This included:

- Autonomous operations
- Green-on-green weed detection and mechanical weeding using techniques that can be 'trained' to recognise weeds of various sizes and species
- Mechanical weeding and data collection at night.

RIPPA collected a large amount of data that will support further technology development, particularly in the trial broccoli and spring onion crops. The trial achieved a number of positive outcomes for growers and further development, including:

- First demonstration of 'training' perception algorithms to recognise weeds in the field as an operational practice (Figure 3 and Figure 4)
- First demonstration of being able to recognise weeds and mechanical weeding at night (Figure 5)
- Identification of a number of operational and capability improvements that will support routine operation of these perception techniques that will be incorporated into the development program by the research team.

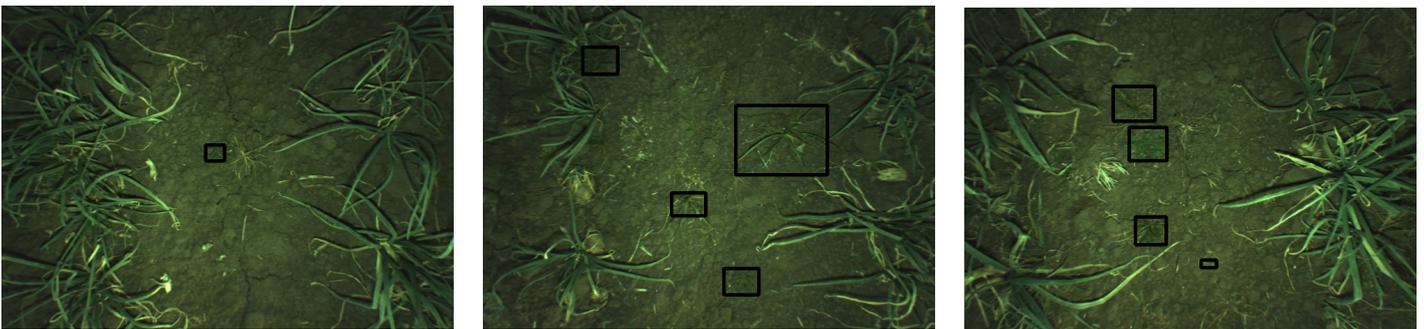


Figure 3: Images captured by RIPPA showing the ability to train a model to recognise only the weeds of importance in a spring onion crop, for example whether weeds are alive or dead (left), large or small (middle), or different species (right)

RIPPA will continue to be developed and improved based on the findings of the trial and the important feedback received from growers. This includes further refinement and operationalisation of green-on-green weed detection through better tools for training models in the field, as well as development of a mechanical weeding implement. The research team will also be investigating the grower interest in pest and disease identification and how best to inform management decisions.

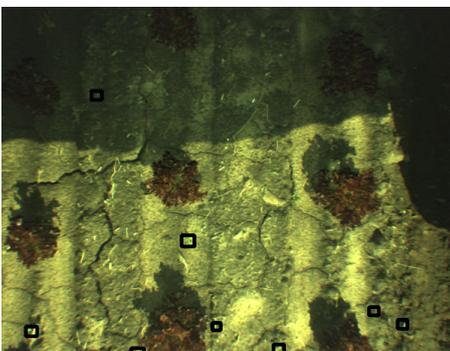


Figure 4: Image captured by RIPPA showing the ability to scale to different crops, such as lettuce, after 're-training' the model



Figure 5: RIPPA autonomously weeding a broccoli crop at night

FURTHER INFORMATION

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

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