Geofencing promising in biosecurity battle

A Vinehealth Australia pilot project, which saw virtual fences built around vineyards to track boundary crossings, has demonstrated the power of geofencing as a biosecurity tool.

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WHEN PROJECT BOUNDARY RIDER went live in December 2016, interest began to flow in from around the world.

Boundary Rider, an initiative of Vinehealth Australia and funded by Primary Industries and Regions South Australia, created virtual boundaries – or geofences – around vineyards to monitor the movement of people entering properties.

The project was the first known of its kind to assess the value proposition of geofencing technology for biosecurity for the Australian wine industry, which contributes $40.2 billion in gross output annually.

Vinehealth Australia received interest in the technology from other agriculture sectors and wine associations in other parts of the world, including the United States. But now that the pilot project has come to an end, what is the future for geofencing in the Australian wine industry?

THE BOUNDARY RIDER CONCEPT

The Boundary Rider pilot project was undertaken with 31 businesses across the Barossa and McLaren Vale wine regions, with geofences active over a five-month period. A Canadian technology company, Be Seen Be Safe, provided the geofencing software for the trial, which was adapted as a minimum viable product from the poultry industry.

Virtual fences were created around 129 separate land parcels. GPS technology was used to detect the movement of each person carrying a smartphone with Location Services enabled. A purpose-built app called BRider then logged movement of the individual in or out of each geofence.

Push notification messages notified the owner/manager of the visitor and welcomed the visitor to the vineyard. The visitor movements were collated into an electronic visitor book for each geofence, providing the visitor name, date of visit, timestamp and visit duration.

POTENTIAL BENEFITS

There are many potential benefits associated with geofencing for biosecurity.

GEOFENCING: FUTURE SYSTEM NEEDS

Following the Boundary Rider pilot project, a range of vital attributes were identified by participants for future geofencing systems for the wine industry:

1. A geofencing system with biosecurity at its core.
2. Easy to adopt and has a strong value proposition for all users.
3. 100% (or as close to as possible) uptake for geofencing to be an effective management system for biosecurity.
4. Employed by users 24/7 with no down time.
5. Assists and drives owner/managers to prioritise simple biosecurity activities in day to day vineyard operations.
6. Aids owner/managers to complete compliance checks of machinery and equipment and does not build complacency.
7. Openly addresses privacy and successfully negates the 'big brother' issue.
8. A minimum cost (time, $) solution to ensure system longevity and maintenance of high uptake.
9. Produced by developers in the same (or very similar) time zone, tailored to the needs of the wine industry, with capacity to implement system changes rapidly.
10. Incorporates highly accurate and sensitive geofences, the exact location and relative accuracy of which are customisable by property owners. This includes use of high resolution Australian base map imagery and Vinehealth's accurate block boundary layer for South Australian vineyards.
11. Utilises the same geofence around a land area for both incoming and outgoing visitor tracking.
12. Allows owner/managers to receive real-time notifications of visitors crossing geofences via push notifications or similar, and this translates also to real-time visitor logbook records.
13. Allows 'on the go' viewing of the electronic visitor logbook.
14. Capability of integrating the tracking of machinery and equipment, not just people.
15. Allows manual visitor logbook records to be easily and rapidly uploaded, so all visitor records are stored in a single system.
16. Vastly reduced battery draw to that experienced in Project Boundary Rider.
17. A system where mobile phone detection is not only possible for those phones with location services enabled, but also those with location services disabled and older style phones without location services.
18. Allows visualisation of the visitor logbook and capability to export data for integration into financial systems to facilitate payment of staff or service providers.
19. If user registration is required, this process is simple, quick and works first time every time on all phones (types and ages) and search engines.
20. Allows for two-way customised push notification messaging, including for owner/managers to communicate different requirements of entry for different visitor types and ability to turn off messaging for chosen visitor types or visitors (e.g. regular visitors).

"The interconnected nature of each wine region and across the entire industry prompted us to look at geofencing for biosecurity purposes," said Vinehealth Australia CEO Inca Pearce.

"We know there is significant movement of personnel, machinery and equipment between vineyards, regions and states, and this factor makes it difficult to contain and/or eradicate an outbreak of a pest, disease or weed."

Major benefits of geofencing include:

- Enabling increased grower awareness of potential risks and threats to vines.
- Enabling improved direct communications with property owners regarding threats.
- Facilitating timely action and containment of pests and diseases in the event of an incursion.
- Creation of an electronic record (log book) of people movements on and off a vineyard.

PROJECT BOUNDARY RIDER

SUMMARY

- **Concept of geofencing demonstrated for biosecurity**
- **Increased biosecurity awareness of participants and App users**
- **20+ criteria developed for a future geofencing system**

2 wine regions	**31** businesses participated	**5** month duration of geofence activity	**290** signs installed at entrances to vineyards
129 land parcels geofenced	**4,194** sets of 'in & out' crosses of geofences	**138** downloads of App used to register geofence crosses	**76** active BRider App users

Ben Zander. Photo credit Dragan Radocaj via John Hughes.

WHAT DO GROWERS THINK?

Ben Zander, from Wroxton Grange Vineyards in Eden Valley, was a pilot project participant. He can see the benefits of geofencing if implemented across an entire region.

"I think the pilot participants all need to do work to help evaluate the program and identify what issues or shortcomings might be present that could be rectified, what parts are good and what we can collectively think of to enhance or expand this type of technology for industry benefit," Ben said.

"After this year's trial, I would suggest a trial of 100% grower involvement in a couple of regions, and then possible further expansion."

Ben said the visitor movement reports were interesting and sometimes surprising. "The reports via the app reinforced how often winery representatives or contractors come onto my property without my prior knowledge. This is valuable information for my own biosecurity planning," Ben said.

"I had several visitors and neighbours ask about the Boundary Rider signs and the process, which was good to see. And an irrigation contractor asked for information and I explained it. He indicated he would download app, but I never recorded a visit from him even though he was on property again a few times. Maybe it was all too hard.

"Overall, I think this is a good initiative by Vinehealth Australia. We need our industry bodies to be aware of current and future technologies to determine where they might fit to protect our vineyards. It's been great to utilise the collective power of an industry body such as Vinehealth Australia to drive what we can't do as individuals."

- Trace back audits in the event of an incursion.
- Improved vineyard sustainability.

"There are many other potential benefits including improved on-site safety, improved contractor management and property security," Inca said.

RESULTS

The total number of boundary crosses recorded for the pilot was 4,194 pairs, with a pair being an 'in' and 'out' of the same geofence by the same visitor.

Several problems were encountered with the geofencing software, including inaccurate and insensitive geofences, delays in push notification messaging, significant phone battery draw and perceived invasion of privacy.

"While there were some issues with the geofencing software, which is normal for a new technology project evaluating a minimum viable product, we have confidence in the concept of geofencing as an important tool to protect South Australia's vines," said Vinehealth Australia Technical Manager Suzanne McLoughlin, who managed the pilot project.

"Participant feedback was generally positive about the value geofencing could offer vineyard businesses and regulators such as Vinehealth Australia, as an added tool to assist in the protection and management of significant pest and disease incursions."

NEXT STEPS

Vinehealth Australia is confident a geofencing system could add value to biosecurity management for the wine and grape industries, with appropriate industry and government support. Vinehealth is in the process of scoping the future of its vineyard register into a Digital Biosecurity Platform.

This new platform will be an enabler for biosecurity and a great opportunity for hosting some form of geofencing capability in the future. During the build, we will look to technology partners to continue to explore the integration of geofencing into the wine industry.

"Project Boundary Rider provided us with a unique opportunity to evaluate geofencing technology for the wine industry with a group of engaged growers," said Suzanne.

"This pilot study has positioned us well to further consider the benefits of geofencing to manage future industry biosecurity imperatives.

"Australia's biosecurity landscape is a changing one, which is influencing the types of risks we face and our available options to manage these risks.

"Maintaining preparedness and agility is of utmost importance and we need to consider the appropriate role for technology in this landscape, to complement other farm-gate hygiene tools and biosecurity education and awareness programs."

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