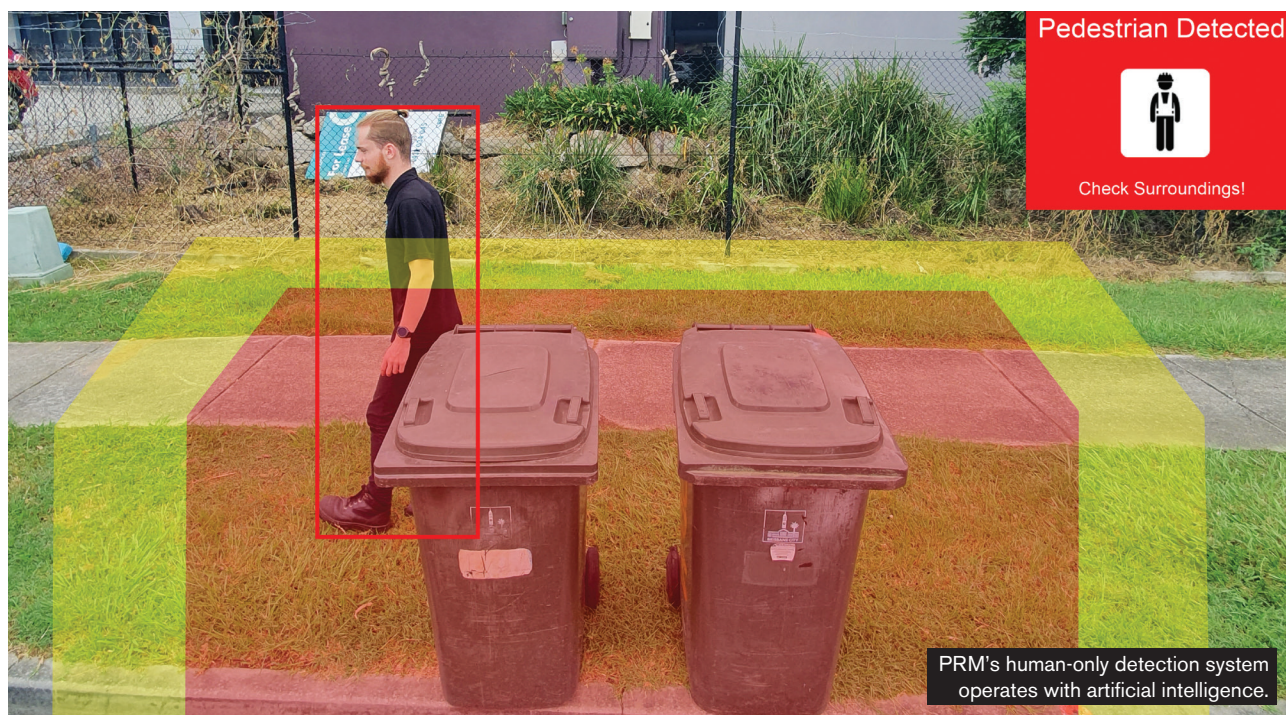


Mobile AI pedestrian detection

MIKE DAVIS OF PRM ENGINEERING DISCUSSES THE WASTE SECTOR APPLICATIONS OF ARTIFICIAL INTELLIGENCE ENABLED HAZARDOUS MONITORING SYSTEMS.



Engineers have been developing and trialling self-driving car prototypes for decades, and while we're not yet "permanent backseat drivers", the technology is developing rapidly.

As the product of artificial intelligence (AI), a central element of autonomous vehicle research is the ability to detect and avoid pedestrians and other obstacles on the road.

As the machine learning movement progresses, AI in industrial applications is also moving beyond

the automotive industry. To that end, PRM Engineering Services, a Brisbane-based control and engineering solutions firm, has introduced the latest in AI human recognition to the waste industry via hazardous monitoring.

Developed over three years, Sentinel VISION AI monitors danger zones in real time to reliably alert machine operators and pedestrians of safety breaches.

According to Mike Davis, PRM Group Managing Director, Sentinel

Vision AI was developed in response to growing legislative and cultural safety impetus. As a result of this change, he says companies are becoming more aware of risks and are seeking better solutions.

Mike adds, however, that safety system development has typically focused solely on operators or site employees. What sets Sentinel Vision AI apart, he says, is its dual operator and public monitoring approach, which works to support not just workplace health and safety, but also

behavioural change.

“When operating in an essential service such as waste management and resource recovery, it’s not enough to simply install operator-focused hazard systems,” Mike says.

“Kerbside collection truck drivers, for instance, are faced with a number of uncontrollable variables, such as pedestrians or cyclists. Furthermore, operators at public transfer stations are faced with the risk of members of the public getting hurt by moving machinery, arms offloading dustbins or compactors.”

To address these challenges, PRM developed Sentinel Vision AI, which uses cameras and machine learning to recognise when a human enters a hazardous zone.

“A lot of other safety detection systems register all objects, be they wheelie bins, power poles or other vehicles. They don’t actually distinguish if the ‘object’ is a person. In contrast, Sentinel Vision uses AI to create an alert when people are detected,” Mike explains.

“While operators certainly don’t want to hit inanimate objects, the focus needs to be on human safety. And when beeps and buzzers are going off regularly, operators often become desensitised.”

Mike highlights that in a waste context, operators often work in close proximity to other vehicles, buildings, objects and, most importantly, people. As such, alarms go off regularly, causing operators to sometimes ignore or even switch off safety systems.

PRM’s human-only detection system incorporates multiple cameras, which are mounted to mobile machines such as wheel loaders, excavators and refuse trucks. The cameras are pointed at the zone operators want to detect, Mike says, with as many or as few cameras

installed as needed.

“The images are then processed by an AI neural network that is trained using machine learning and information input algorithms. The network pulls the image out, and if there is anything that looks like a person, or part of a person, an alarm will sound,” Mike says.

Detection zones are customisable and determined using a drag-and-drop interface, with an additional option of pre-warning zones.

Sentinel Vision uses a combination of visual and audible alarms, which alert the operator and pedestrian that they’re in the wrong place.

“By alerting pedestrians as well as operators, we’ve developed a system that supports behavioural shift and greater awareness.”

Mike Davis **PRM Group Managing Director**

In addition to visual and audible alarms, the system has a unique voice alarm system that speaks directly to pedestrians.

“Beeps and buzzers are easy to dismiss, but a human voice speaking from the side of a mobile vehicle is very difficult to ignore,” Mike says.

Sentinel Vision can be retrofit to any existing machine, with optional motion-stop integration providing hard engineered control at closer distances. He adds that with a detection distance up to 12 metres in optimal conditions, the system is more vigilant and reliable than human spotters or traditional electronic tag monitoring systems. As a value add for the sometimes dusty and unlit environments of waste operations, Mike says the system is enabled to work in low light conditions. He adds that user feedback highlights Sentinel

Vision’s ability to detect under harsh conditions as a unique industry standout.

According to the PRM team, Sentinel Vision has been trialled by a number of top tier waste management companies. Mike adds that results have been positive, with multiple companies reporting that when people are alerted by the voice alarm, behavioural change is noticeable.

“By alerting pedestrians as well as operators, we’ve developed a system that supports behavioural shift and greater awareness. Ideally, over time, Sentinel Vision will be activated a lot less, because people will have learnt

not to walk in front or behind active machines and vehicles.”

Despite Sentinel Vision representing an exciting new development for PRM, it’s one in a long line of engineering and technology innovations for the company. Mike says PRM is an integrator and developer of a number of products specialising in safety systems, such as height limiters, pedestrian detection and bespoke engineering products.

“We have an extensive history in the earthmoving industry, as well as interfacing systems for OEMs,” he says.

“Our talented team of engineers, together with a support staff of electrical, hydraulic and installation specialists, are able to offer end-to-end innovative and customised solutions to our wide range of customers.” ■