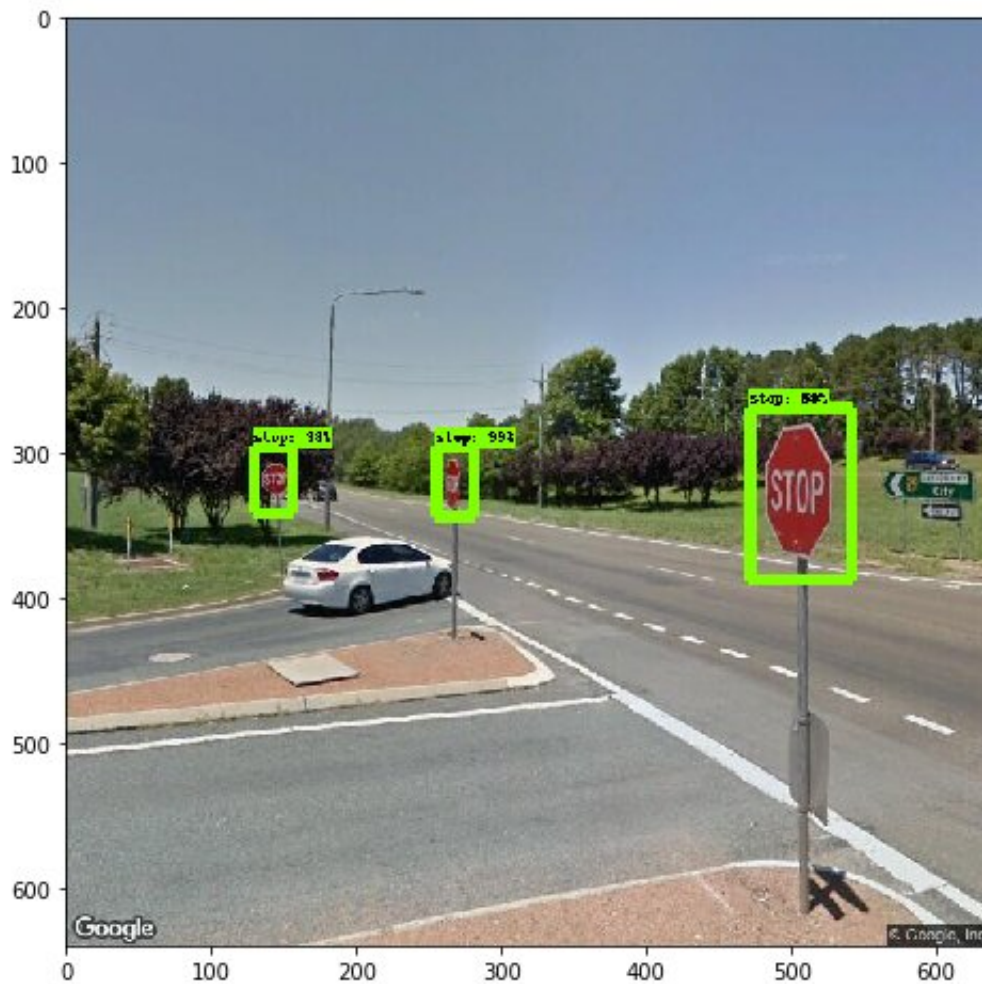# New AI system manages road infrastructure via Google Street View

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The system identifies and locates the stop signs. Credit: RMIT University

Geospatial scientists have developed a new program to monitor street

signs needing replacement or repair by tapping into Google Street View images.

The fully-automated system is trained using AI-powered object detection to identify street signs in the freely available images.

Municipal authorities currently spend large amounts of time and money monitoring and recording the geolocation of traffic infrastructure manually, a task which also exposes workers to unnecessary traffic risks.

Results just published in the journal of *Computers, Environment and Urban Systems* show the system detects signs with near 96% accuracy, identifies their type with near 98% accuracy and can record their precise geolocation from the 2-D images.

Study lead author and RMIT University Geospatial Science Honours student, Andrew Campbell, said the proof-of-concept model was trained to see 'stop' and 'give way'(yield) signs, but could be trained to identify many other inputs and was easily scalable for use by local governments and traffic authorities.

"(Municipal authorities) have requirements to monitor this infrastructure but currently no cheap or efficient way to do so," Campbell said.

"By using free and open source tools, we've now developed a fully automated system for doing that job, and doing it more accurately."

The team found during investigations that mandatory GPS location data in existing street sign databases was often inaccurate, sometimes up to 10m off.

"Tracking these signs manually by people who may not be trained geoscientists introduces human error into the database. Our system, once

set up, can be used by any spatial analyst—you just tell the system which area you want to monitor and it looks after it for you," Campbell said.

Campbell credited the project's initial concept to his industry mentor at Alpine Shire Council and RMIT Geospatial Science alumnus, Barrett Higman.

RMIT geospatial scientist and project co-lead, Dr. Chayn Sun, said the fact that some councils were already attaching cameras onto rubbish trucks to gather street footage showed how valuable visual data were becoming, given what technology could now do with it.

"This imagery is critical for [local governments](#) in monitoring and managing assets and with the huge amount of geospatial applications flourishing, this information will only become more valuable," Sun said.

"Ours is one of several early applications for this to meet a specific industry need but a whole lot more will emerge in coming years."

Sun said footage from other sources, like that from rubbish truck cameras or any other geo-referenced imagery of the road network collected by municipal authorities, could also be fed into the system.

"Where footage is already being gathered, our research can provide councils with an economical tool to drive insights and data from this existing resource," she said.

More information: Andrew Campbell et al, Detecting and mapping traffic signs from Google Street View images using deep learning and GIS, *Computers, Environment and Urban Systems* (2019). [DOI: 10.1016/j.compenvurbsys.2019.101350](#)