Leaky water pipes found at high speed using AI

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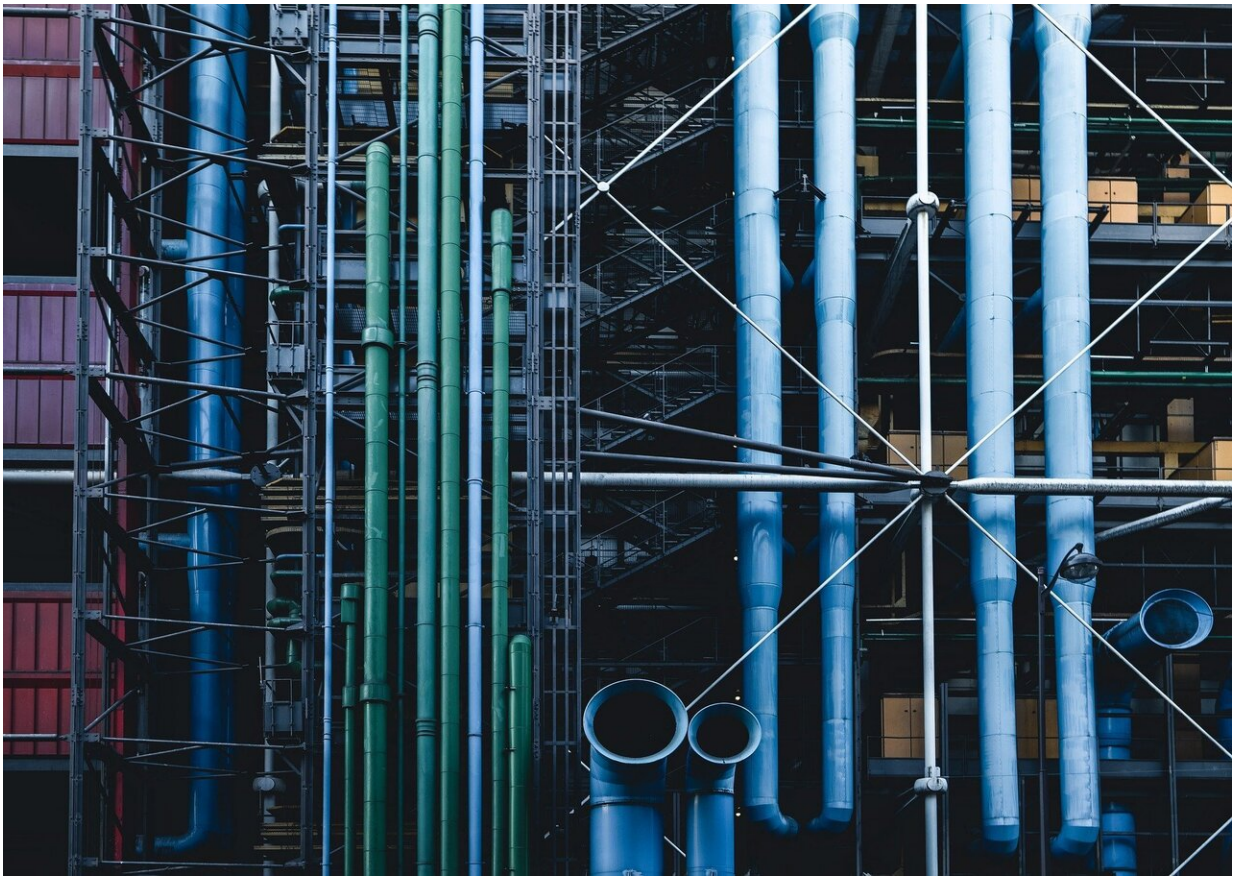

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Researchers have been able to pick a water leak within 1 percent of its location within seconds.

Artificial intelligence combined with pressure waves has been used to find faults in major water pipelines faster and more cheaply than existing methods.

Jessica Bohorquez and researchers from the University of Adelaide have developed a system that utilises the deep learning capability of AI and has dramatically increased the chances of detecting cracks in underground pipes.

"In a country where water is scarce, there is an urgent need for this type of technology," says Jessica.

"At present, about 15 percent of Adelaide's treated drinking water is lost through cracks in pipes before it reaches households. In some cases these cracks are tiny and almost impossible to locate."

The new method uses a deliberately generated small pressure waves that travel through the piping. Sensors connected to an AI system learn to identify the small and short-lived changes in the behavior of the wave when it encounters a defect in the pipe wall.

As more faults are encountered, the AI develops its ability to identify them.

"Our results so far indicate that once fully trained the AI can pick a leak within 1 percent of its actual location just a few seconds after the pressure wave has passed it," says Jessica.

She adds that once put into full operation the new system will potentially bypass current time-consuming detection methods, saving mega-litres and mega-bucks.

The research appears in the *Journal of Water Resources Planning and*

Management.

More information: Jessica Bohorquez et al. Leak Detection and Topology Identification in Pipelines Using Fluid Transients and Artificial Neural Networks, *Journal of Water Resources Planning and Management* (2020). DOI: 10.1061/%28ASCE%29WR.1943-5452.0001187

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