Improved algorithm plots faster escape routes

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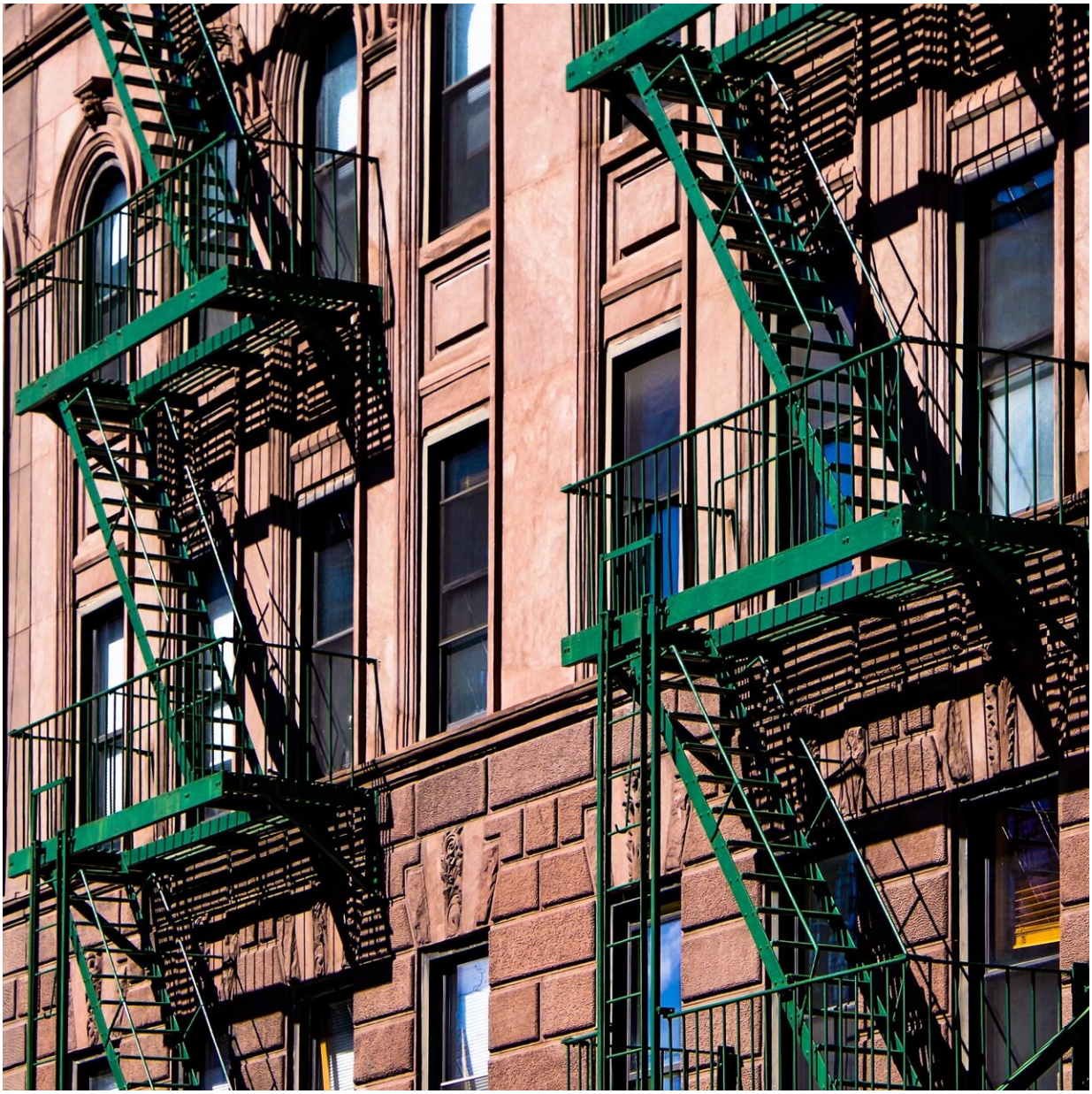

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Research in the *International Journal of Simulation and Process Modelling* has looked at fire escape routes in complex buildings with a view to designing in improvements to help a building's occupants during a potentially catastrophic event.

Yi Zhang, Chi Wang, Wenwen Tong, and Tianqi Liu of Anhui Jianzhu University in Hefei, China, have proposed an improved algorithm that can help them solve the problem of finding the shortest path for escape and evacuation of large numbers of people in complex buildings, such as skyscrapers. Their algorithm is based on Dijkstra's algorithm which is a commonly used algorithm for pathfinding.

Dijkstra's algorithm, developed in the 1950s is today widely used in network routing protocols, maps, and transportation planning. It can offer an efficient way to find the shortest path in a graph. However, for large and complex graphs it does not always discern the most efficient route and so there is room for improvement as the team suggests. Indeed, it can only solve single-source path-planning problems, which is not the problem seen with escape routes from skyscrapers, shopping malls, and other complex buildings.

The researchers developed the original algorithm to allow for multiple sources and multiple convergences. They then simulated real-life scenarios with different numbers of people and different crowd densities in a shopping mall as proof of principle. Their results show that the proposed algorithm is effective in improving the escape efficiency of crowds and provides an answer quickly and efficiently in terms of computing resources.

The ability to evacuate people safely and quickly from complex buildings is important in emergency situations such as fires, earthquakes, or terrorist attacks. The research suggests that incorporating the algorithm into a building management system could allow optimal and improved evacuation procedures and better emergency response to be available to those managing the building and those in charge of an evacuation should it be necessary.

More information: Tianqi Liu et al, Research on fire escape paths for complex public buildings with multiple starting and end points, *International Journal of Simulation and Process Modelling* (2023). DOI: 10.1504/IJSPM.2022.10055344

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