

# Multi-disciplinary and dynamic urban resilience assessment through stochastic analysis of a virtual city

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**Abstract** Natural disasters cause an average of 60,000 deaths per year. There was a total of 416 natural disasters worldwide in 2020. Resilience to disruption and quick recovery of the operational performance of buildings and infrastructure is critical to the continuous functioning of cities and communities. This requires recognition of critical weaknesses of urbanized society. This recognition can be mapped in terms of different dimensions that must be rated and weighted based on their relative importance. There have been various efforts to recognize urban resilience indicators and parameters. This paper aims at contributing to the current body of knowledge by differentiating the resilience scoring of buildings and infrastructure based on their use-type. The study includes a stochastic analysis of a virtual city consisting of 10,000 buildings with various use-types. The virtual city is modelled with earlier case studies undertaken by the authors in the city of Lisbon. This study proves how intrinsic and obtained values can be used to generate a building resilience score in conjunction with use-type.

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