AN APPROACH TO A SAFE EGRESS FROM PUBLIC SPACES DRIVEN BY RISK PRINCIPLES

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Abstract
The management of the crowd in public walking spaces, such as squares, stations, and commercial areas, has been a topical research theme. This is linked to the strategic need of addressing the uprising challenges on public safety, ensuring an effective crowd evacuation in emergency scenarios induced by various hazardous critical events, including malicious actions performed by individuals or groups. In designing and managing crowd places, there is the need to demonstrate appropriate levels of safety and security for people egressing, taking into account the pedestrian dynamics in and around the target place. The ultimate scope is avoiding undesirable side conditions, such as extreme crowding. Different engineering tools are available in this framework to support the analysis, planning, and management of pedestrian and evacuation movement. These tools can supplement current emergency protocols with valuable guidelines that can support emergency operators in finding the best strategy during a dynamic egress scenario. This work discusses an approach to safe egress from a public space based on concepts related to classes of risk scenarios. In detail, we simulate the egressing crowd dynamics and consider parameters that may affect the egress performance in open spaces. We show how the unavailability of escape routes, linked to obstacles or emergency needs, impacts the overall scenario in critical extreme crowding. Moreover, starting from punctual data retrieved by sensors (e.g., at the entrance of public space), we propose a method of assessing the risk level in the surrounding area. Based on a case study, we classify the resulting scenarios on a risk ranking that can be used as a support tool for emergency operations management.
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Keywords: risk analysis, safety, evacuation, sensors, emergency scenario.

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