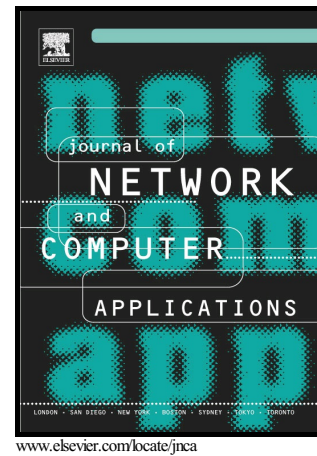


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A distributed real-time approach for mitigating CSO and flooding in urban drainage systems

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Abstract

In an urban environment, sewer flooding and combined sewer overflows (CSOs) are a potential risk to human life, economic assets and the environment. To mitigate such phenomena, real time control systems represent a valid and cost-effective solution. This paper proposes an urban drainage network equipped by sensors and a series of electronically movable gates controlled by a decentralized real-time system based on a gossip-based algorithm which exhibits good performance and fault tolerance properties. The proposal aims to exploit effectively the storage capacity of the urban drainage network so as to reduce flooding and CSO. The approach is validated by considering the urban drainage system of the city of Cosenza (Italy) and a set of extreme rainfall events as a testbed. Experiments are conducted by using a customized version of the SWMM simulation software and show that the CSO and local flooding volumes are significantly reduced.

Keywords: distributed real time systems, multi-agent systems, PID, Gossip-based algorithm, sewer system, flooding, combined sewer overflow

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