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An Edge-based Platform for Dynamic Smart City Applications

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Abstract

A Smart City is a cyber-physical system improving urban behavior and capabilities by providing ICT-based functionalities. An infrastructure for Smart City has to be geographically and functionally extensible, as it requires both to grow up with the physical environment and to meet the increasing in needs and demands of city users/inhabitants. In this paper, we propose iSapiens, an IoT-based platform for the development of general cyber-physical systems suitable for the design and implementation of smart city services and applications. As distinguishing features, the iSapiens platform implements the edge computing paradigm through both the exploitation of the agent metaphor and a distributed network of computing nodes directly scattered in the urban environment. The platform promotes the dynamic deployment of new computing nodes as well as software agents for addressing geographical and functional extensibility. iSapiens provides a set of abstractions suitable to hide the heterogeneity of the physical sensing/actuator devices embedded in the system, and to support the development of complex applications. The paper also furnishes a set of methodological guidelines exploitable for the design and implementation of smart city applications by properly using iSapiens. As a significant case study, the design and implementation of a real Smart Street in the city of Cosenza (Italy) are

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