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Extending queuing networks to assess mobile crowdsensing application performance

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Abstract

Copyright © 2016 EAI. The widespread and pervasive adoption of smart devices is boosting Internet of Things and contribution-based paradigms. In particular, Mobile Crowdsensing (MCS), due to its big potential of sharing and collecting large population of contributors-devices, is acquiring interest. Devices such as smartphones and smart boards are equipped with different sensors and actuators able to probe data about the physical environment. In a typical MCS scenario, data produced by sensors are sent to the remote server, where they are collected and processed by the applications. To exploit the MCS paradigm in large-scale business contexts the quality of service of MCS applications must be monitored and guaranteed. Therefore, techniques and tools able to represent and evaluate MCS system quality attributes such as performance and energy consumption are required. However, modeling MCS system is quite challenging since not only the number of users but also the number of contributors may vary. In this paper, we propose to adopt queuing networks, a well-known formalism able to deal with large number of requests, to address this issue. In particular we introduce and implement a new policy allowing the number of server to be variable. The proposed model is then adopted in the evaluation of an example, providing interesting insights on contribution, provisioning and usage impacts in terms of some performance and energy consumption metrics.

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Keywords

Energy consumption, Mobile crowdsensing, Performance, Queuing networks

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