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Special Section on Challenged Networks

It is our great pleasure to introduce this Special Section of the Journal, presenting advanced solutions for mobile challenged networks. The special section collects extended papers from the 9th ACM Workshop on Challenged Networks, CHANTS 2014. After a decade of research into this area, the subject of challenged networks is both generating solutions for practical applications, still remaining a fertile ground for innovative research in a broad area of topics. Indeed, the networking mechanisms devised for challenged networks (encompassing also the opportunistic and DTN networking paradigms) can support several novel research areas, such as Mobile Edge Computing, IoT, architectures for the Future Internet (such as 5G), community networks, network support for developing areas, just to mention a few. The papers in this special section provide a very significant sample of the dual nature of current research in challenged network (applied and fundamental), covering both practical solutions for fully exploiting their potential, as well as fundamental results. Specifically, the special section presents findings about the optimal use of mobile devices storage resources when local applications and opportunistic forwarding tasks compete for them; the development and test of a practical context-aware framework for Web-based deployment of DTN applications; the analysis of robustness of opportunistic networks under Sybil attacks.

In the paper *Efficient and Transparent Use of Personal Device Storage in Opportunistic Data Forwarding* by Sayed Amir Hoseini, Azade Fotouhi, Mahbub Hassan, Chun Tung Chou, Mostafa H. Ammar, authors focus on a problem that has seldom be addressed in the opportunistic networking literature, i.e. how to optimally manage limited storage available at users' mobile devices to support forwarding operations. Originally, the paper claims that storage requirements from local applications should have higher priority than forwarding tasks, and therefore to-be-forwarded messages might be lost when local applications request memory they are occupying. In this scenario, they propose a Bayesian approach to identify the correct amount of data to be forwarded upon contacts between nodes, to reduce the risk of message loss.

The paper *Dynamic Framework for Building Highly-Localized Mobile Web DTN Applications* by Kartik Sankaran, Akkihebbal L. Ananda, Mun Choon Chan, Li-Shiuan Peh, develops a framework for facilitating deployment of mobile DTN applications. The framework allows users nearby a specific point of interest to run DTN applications on their smartphone's Web browser, without the need to install and run specific applications that will not be useful anymore once the users leave that particular location. In addition, the framework is context-aware, and can automatically detect when DTN protocols need to be run or switched off. The framework, which is implemented and tested with real applications is therefore a very significant tool to support practical diffusion of DTN applications in real settings.

Finally, in the paper *Stalk and Lie – The Cost of Sybil Attacks in Opportunistic Networks* by Sacha Trifunovic and Andreea Hossmann-Picu, authors analyze the well-known Sybil attack pattern in the context of opportunistic networks. They study the cost for an attacker (in terms of resources and time invested) to build a Sybil attack, assuming that state-of-the-art defensive measures are implemented. Quite interesting, the main take-home message of the paper is that opportunistic networks are kind of naturally self-defending from this type of attacks, due the volatile networking environment, that forces attackers to invest very significant amounts of resources. This is a fundamental result towards making opportunistic networks a trustable networking platform.

As a whole, this special section collects a very interesting set of results and solutions for challenged networks, thus contributing to support their development and application in the real world. We would like to thank all the authors for their high quality contributions, and the reviewers who provided timely and constructive feedback to the authors to improve the quality of this special section.

Mario Gerla
UCLA, USA
Andrea Passarella
IIT-CNR, Italy

E-mail addresses: gerla@cs.ucla.edu (M. Gerla), a.passarella@iit.cnr.it (A. Passarella)

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