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Emerging Technologies for Smart Devices

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Abstract

This Special Issue includes the best revised selected papers from The 1st IEEE International Workshop on Emerging Technologies for Smart Devices (ETSD 2012), that took place in Anaheim, California, USA, in December 3-7, 2012. This first edition of ETSD received very good contributions. Then, this special issue includes the better conference papers after a rigorous review process in order to revise and enlarge the original contributions while avoiding self-plagiarism.

Keywords: Smart Devices, Smart phones, Tablets, mobile devices.

1. Introduction

Smart devices, such as smart phones and Pad devices, are penetrating to our daily life. We should study how the technologies for these devices evolve and how they affect how people will live in the future.

This special issue explores and explains the scope and set future directions in emerging technologies for smart devices. In this regard, this special issue considers high-level contributions considering different topics including new communication paradigm for smart devices, user experience and usability with smart devices, performance and robustness, utilization of multiple access networks, distributed/ubiquitous computing with smart devices, mobile cloud, algorithms and protocols for smart devices, optimization for smart devices, device monitoring and management, social and life enhancement with smart devices, mobile services and applications (m-health, m-learning, m-government, etc.), security aspects for smart devices, and economic aspects.

Along its four papers, protocols and algorithms solutions are presented, furnishing important contributions to the state of the art and offering, at the same time, an important updated overview about emerging communication technologies for smart devices.

The paper entitled “Increased Energy Efficiency via Delay-Tolerant Transmissions in Cognitive Radio Networks” [1], proposed by Bi Zhao and Vasilis Friderikos, is focused on how to capitalize the delay tolerance of various Internet applications with the central aim of reducing the energy consumption in cognitive networks and as a result to prolong the recharging periods of terminals. The proposed system considers the stochastic distribution of the Primary Users (PU) arrival rate and time duration in primary channels, which is used by the Secondary Users (SU) to estimate the connections. SUs query a trusted database for historical information of PU traffic in order to select candidate channel for message transmission, so SU traffic can access the primary channels more efficiently and increase the channel utilization. Authors present a scheme that explicitly utilizes the distribution of SU traffic loads to provide load-balancing. They have modeled the problem using an M/M/K/L queuing system and they have analyzed the performance of the SUs competition under different situations of traffic blocking probabilities, blocking thresholds and queuing delays. The proposed optimal message transmission schemes can accommodate significantly more messages in the queue simultaneously under the same blocking threshold. Moreover, the system can reduce the energy consumption without affecting PU traffic.

The paper presented by Mohammed Elbes, Ala Al-Fuqaha, and Muhammad Anan, “A Precise Indoor Localization Approach based on Particle Filter and Dynamic Exclusion Techniques” [2], shows a particle filter and dynamic access point exclusion techniques for indoor localization. The proposed approach fuses RSSI measurements received from nearby access points and data obtained from the Inertial Navigation System to converge to more accurate distance estimation. The data fusion technique is based on particle filter. It takes advantage from the high distance accuracy provided by the MIT Cricket and avoids its Line of Sight problems by proper installation of the beacon and listener. Furthermore, the proposed approach is a pattern-based one that relies on empirical training data as opposed to

closed-form mathematical models. The approach is compared with the Euclidean Distance probabilistic methods used for localization obtaining better results.

The paper authored by Diana Bri, Alejandro Canovas, Jesus Tomas and Jaime Lloret, "An Intelligent System to Detect the Type of Devices Sending and Receiving Data in the Network" [3], presents an intelligent system to detect the type of the device generating Internet traffic in the data network of the Internet Service Provider. It studies the behavior of the devices in order to know if it is a mobile or fixed device. The proposal uses an intelligent system based on a multilayer perceptron neural network and finite state machines that lets the Internet Service Provider know the type of device using the data network. The system analyzes the variations in transport and application layers to discriminate the percentage of Internet traffic generated by mobile and fixed devices. Tests are performed successfully even using a router with Network Address Translation.

We believe that this special issue provides a better understanding of advances on network Protocols & Algorithms for emerging technologies for smart devices. To conclude this special Issue, we would like to thank all the authors that submitted papers for this special Issue and for leveraging the quality of this publication. We would also like to thank the reviewers for their timely comprehensive reviews and constructive comments. Finally, we wish to express our thanks to Jaime Lloret Mauri, Editor-in-Chief of Network Protocols and Algorithms, for his help and cooperation on this publication.

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