International Workshop on Interconnections of Wireless Sensor Networks (IWSN’10)

23 June 2010, Santa Barbara, California, USA
Preface

We lately witness a tremendous development in wireless sensor networking (WSN), which makes it possible to monitor, unobtrusively and for long periods of time the physical environment and to collect the relevant data. For many applications, the sensor networks cannot operate in complete isolation. There must be a way enabling a monitoring entity or some end-users to gain access to the data produced by the sensor network, and even to interact with a particular sensor mote to activate/deactivate it, read the sensed value instantaneously, fix some inner parameters, make dynamic code loading into the mote, etc. By connecting the sensor network to an existing network infrastructure such as a local-area network, a private intranet, mobile smart networks, and notably the global internet, gaining remote access to the sensor network would be straightforward. However, many questions need answers, and many challenges must be tackled before such interconnection become effective. Suitability of IP standards must be investigated, as well as the connection architecture. Is it more effective to use fixed gateways? Or is it better to employ a dynamic ad hoc mode where all nodes (or several nodes) cooperatively and alternatively act as gateways. By openly connect a sensor network to other networks new vulnerabilities will take place. An intruder would not need to gain physical access to the network anymore, but it might remotely launch attacks. Security is thus a very important aspect that must be considered. Routing, QoS, node deployment and redeployment, interoperability are also important and challenging issues in the new heterogeneous systems. Interconnection of Wireless Sensor Networks (IWSN) workshop, in its the first edition, is the first form the focus on interconnection issues of WSN.

After a rigorous reviewing process, where each paper has been reviewed by at least three independent and expert reviewers from our program committee, seven papers have been accepted as regular papers for oral presentation. The first paper by Sook Young Lee and Mohamed Younis, presents a new solution for QoS-aware relay node placement, enabling to connect disjoint segments in wireless sensor networks. The second paper is about detecting border intrusion using wireless sensor network and artificial neural network, by Ashish Mishra, Komal Sudan, Hamdy Soliman. Skander Banaousas and Paul Muhlethaler propose a probabilistic event detection solution. The fourth paper by Shahid Raza, Thiemo Voigt provides different options for Interconnecting WirelessHART and Legacy HART networks. The fifth paper presents the development of an internet-accessible image/video sensor web testbed, Paul Bender and Yong Pei. Yang Zou, Jiannong Cao, and Hejun Wu propose TraffiCast - a real-time Pub/Sub based video surveillance system over interconnected WMNs and WSNs. Finally Ketaki Vaidya and Mohamed Younis present an efficient failure recovery solution in wireless sensor networks, through active spare designation. In addition to these technical presentations, we are proud to have an invited talk at the opening session given by Prof Rajmohan Rajaraman from Northeastern University, Boston, MA. The talk is titled “Algorithms for Dissemination of Dynamic Data in Sensor Networks”.

We present our gratitude to DCOSS workshops chair, Prof Sotiris Nikoletseas, for accepting our proposal, and thus giving us the opportunity to organize this workshop in conjunction with the prestigious DCOSS. We are also thankful to our technical program committee members, for the time and effort they provide to ensure a high quality reviewing. We hope this workshop will successfully serve as a venue for researchers, academics, and industrials to debate the different issues related to deployment and interconnection issues of wireless sensor networks, and discuss relevant theoretical and practical solutions.

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Abstract

This talk gives an overview of algorithms for disseminating dynamic data in sensor networks. At a high-level we categorize data dissemination algorithms as structured (e.g., using optimized aggregation trees, overlay networks) or unstructured (e.g., using gossip or diffusion methods). The focus of this talk is on structured dissemination algorithms. We consider the design of overlay networks for connecting a set of publishers to a set of subscribers under arbitrary query and update frequencies, and arbitrary subscription sets. For tree networks, we present an optimal solution, which implies a logarithmic-approximation for general networks. We also consider the design of universal aggregation trees that incur near-optimal cost for any possible set of sources to aggregate. Finally, we discuss hybrid dissemination algorithms that combine structured and unstructured solutions.