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<td>2012</td>
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<td><a href="http://hdl.handle.net/10220/16301">http://hdl.handle.net/10220/16301</a></td>
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Editorial

IP-Enabled Wireless Sensor Network

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Received 17 December 2012; Accepted 17 December 2012

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In wireless sensor networks (WSNs), the use of the IP technology has always been considered inadequate due to its high overhead in processing and memory usage. However, the use of IP technology in WSNs can provide basis for transparent communication among sensor nodes and seamless interconnection between WSNs and the Internet-based infrastructure network, thus eliminating the need for translation gateways or similar devices that are used in current WSNs for this purpose. Besides, many devices in a WSN make network autoconfiguration and statelessness highly desirable for the network operator. For this, IPv6 has ready solutions. Moreover, the large number of devices poses the need for a large address space, which is well met by IPv6. Application of IP technology to IEEE 802.15.4 will be a very important research direction. To accelerate the adoption of these new emerging techniques, a number of important issues must be addressed such as the routing and security of IP-enabled wireless sensor network and applications. In this special issue, we have invited a few papers that address such issues.

The paper titled as “Interconnection between IP networks and wireless sensor networks” proposes a middleware layer that provides transparent communication between IP-based hosts and sensor nodes via gateway nodes, which are employed as access points for the purpose of interoperable information retrieval from WSNs and seamless interconnection between IP networks and wireless sensor networks. The paper titled as “DACH: an efficient and reliable way to integrate WSN with IPv6” presents an adaptive clustering hierarchy algorithm. The communications in cluster are based on IEEE 802.15.4, and one cluster connects with other clusters or with base stations through IPv6 technique.

The paper titled as “Security and vulnerability of SCADA systems over IP-based wireless sensor networks” identifies and removes various vulnerabilities and threats to supervisory control and data acquisition systems over IP-based wireless sensor networks, especially for 6LoWPAN applications. The paper titled as “A group key distribution scheme for wireless sensor networks in the Internet of Things scenario” presents a group key distribution scheme for WSNs in the Internet of Things scenario, which organizes sensor nodes into groups in a hierarchical structure. The paper titled as “Holes detection in anisotropic sensornets: topological methods” gives out a method to detect the holes in the topological architecture of sensornets only by connectivity information, which can properly detect holes on the topological surfaces and connect them into meaningful boundary cycles. The paper titled as “An effective find and replicate strategy for data communication in intermittently connected wireless ad hoc and sensor networks” presents a routing protocol to reduce the number...
of replications in turn, decrease the delay, and increase the throughput.

The remaining several papers address some issues for many applications of wireless sensor network. The paper titled as “Environment-aware CMT for efficient video delivery in wireless multimedia sensor networks” presents a transport protocol for multimedia traffic delivery over WSN. The paper titled as “Remote industrial sensor network monitoring using M2M-based ethical sniffers” considers some security issues in industrial sensor network. The papers titled as “Improve driving safety based on safe distance design in vehicular sensor networks” and “Wireless sensor network for vital signs monitoring: application in a nursing home” address some issues of WSNs applied to intelligent transportation system and monitoring in a nursing home respectively.

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