Preface to the Proceedings of the 5th International Workshop on Semantic Sensor Networks (SSN2012)

Cory Henson[1], Kerry Taylor[2], and Oscar Corcho[3]

[1] Kno.e.sis, Wright State University, Dayton, OH USA
`coryhenson@gmail.com`
[2] CSIRO ICT Centre & Australian National University, Canberra, Australia
`Kerry.Taylor@csiro.au`
[3] Ontology Engineering Group, Universidad Politécnica de Madrid, Spain
`ocorcho@fi.upm.es`

Welcome to the Fifth International Workshop on Semantic Sensor Networks 2012, held in conjunction with the 11th International Semantic Web Conference, Boston, USA, 11-15 November 2012.

It is estimated that today there are 4 billion mobile devices that can act as sensors, including active and passive RFID tags. This is complemented by an even larger number of fixed sensors recording observations of a wide variety of modalities. Geographically distributed sensor nodes are capable of forming ad hoc networking topologies, with nodes expected to be dynamically inserted and removed from a network. The sensors are increasingly being connected with Web infrastructure, and the Sensor Web Enablement (SWE) standard developed by the Open Geospatial Consortium is widely being adopted in industry, government and academia alike.

While such frameworks provide some interoperability, semantics is increasingly seen as key enabler for integration of sensor data and broader Web information systems. Analytical and reasoning capabilities afforded by Semantic Web standards and technologies are considered important for developing advanced applications that go from capturing observations to recognition of events and ultimately developing comprehensive situational awareness. Defense, transportation, global enterprise, and natural resource management industries are leading the rapid emergence of applications in commercial, civic, and scientific operations that involve sensors, web, services and semantics. Semantic technologies are often proposed as important components of complex, cross-jurisdictional, heterogeneous, dynamic information systems. The needs and opportunities arising from the rapidly growing capabilities of networked sensing devices are a challenging case.

This workshop aims to provide an inter-disciplinary forum to explore and promote the technologies related to a combination of semantic web and sensor networking. Specifically, to develop an understanding of the ways semantic web technologies can contribute to the growth, application and deployment of large-scale sensor networks on the one hand, and the ways that sensor networks can contribute to the emerging semantic web, on the other.

The workshop sought paper submissions on topics including:

– Semantic support for Sensor Web Enablement
– Semantic integration in heterogeneous sensor networks
– Citizen sensors, participatory sensing and social sensing

- Semantic web services architectures for sensor networks
- Semantic algorithms for data fusion and situation awareness
- Rule-based sensor systems
- Semantic policy management in shared networks
- Semantic discovery of sensors, sensor data and services
- Semantic approaches to status monitoring and configuration of sensor systems
- Semantic sensor context management and provenance
- Semantic web in sensor data mashups
- Spatio-temporal reasoning in sensor networks
- Reasoning with incomplete or uncertain information in sensor networks
- Semantic middleware for active and passive sensor networks
- Experience in sensor network applications of semantic technologies
- Semantic reasoning for network topology management
- Ontologies for sensor and RFID networks
- Semantic feedback and control
- Emergent semantics and ambient intelligence in sensor systems
- Scalability, security, trust and privacy in semantic sensor networks
- Sensors and observations for symbol grounding

The First International Semantic Sensor Network Workshop was held with ISWC in 2006, six years ago. Since that time there has been a considerable growth in interest in the use of modern semantic technologies to address long-standing issues that seem to inhibit the widespread deployment and application of sensor technologies. In particular, the Open Geospatial Consortium has begun to consider the contribution of semantic technologies to the SWE standards. In June 2011, the W3C Semantic Sensor Networks incubator group (SSN-XG) published its final report, including a proposal for the semantic annotation of SWE standards and an ontology to describe sensor networks and facilitate annotation, which has attracted a lot of interest and is being used in semantic sensor network initiatives worldwide. Finally, a W3C Community Group[1] has been recently established to continue channelling the work that is being done in this area.

We received a total of 16 papers, all of which were carefully reviewed by at least three members of our international program committee. Only six were accepted for presentation as full papers, indicating an increasing pressure for quality in the workshop, while we also accepted other five papers as short papers and one as a demonstration paper. Four papers were rejected. Therefore, there will be twelve presentations, covering aspects related to Linked Data publication and exploitation of sensor data, several extensions and uses of the Semantic Sensor Network ontology, event processing and SPARQL extensions for dealing with sensor data, and sensor data characterisation. Furthermore, we will feature a keynote from Dave de Roure.

---

[1] `http://www.w3.org/community/ssn-cg/`

[2] `http://spitfire-project.eu/`

We hope that you enjoy the workshop, and learn from the papers here. We appreciate your feedback on the workshop this year and hope that you can find a way to contribute in 2013.