Special Issue on "Internet of Things and Future Applications"

(Selected Topics from the CWI/CTIF Workshop on October 25-26, 2010 in Grimstad, Norway)

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The second edition of the Center for Wireless Innovation (CWI), Norway and Center with TeleInfrastruktur (CTIF), Denmark workshop has been held in Grimstad, Norway from October 25–26, 2010, focusing on the key topic for the "Internet of Things and Future Applications".

Internet of Things has recently received strong attention due to its potential to offer seamlessly personalized data applications to end users with a support of mobility, as well as allowing the creation of individual application content.

The application areas for Internet of Things have a huge span, which is another attractive feature. The successful deployment of the technologies enabling Internet of Things, however, faces many challenges, that can be summarized into convergence with existing and future communication networks, interoperability of protocols and standards, and protection of personal and sensitive data.

This Special Issue is offering you selected high-quality papers that propose research solutions to the above challenges.

The first paper, "Reflections on Trust devices—An Informal Survey of Human Trust in an Internet-of-Things Context" by Geir M. Køien, examines aspects and issues related to trust in devices in an Internet-of-Things environment. When devices are intelligent, such as the Internet of Things devices, and can act in an autonomous manner based on the arisen context, confidentiality, personal privacy and trustworthiness of the communication needs to be maintained. The paper investigates and presents a multifaceted view of trust in software, hardware, devices and services. Further, the paper investigates some aspects of human trust and what may affect that trust.

Security is a key challenge for enabling the successful adoption and deployment of Internet of Things. Users would expect that personal security and privacy levels are guaranteed.

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The second paper entitled, "A Composite Privacy Leakage Indicator" by Nils Ulltveit–Moe proposes a novel privacy leakage metric that combined with subjective logic can reduce the privacy leakage estimates for encrypted or coded payload. Thus, the paper is related to field of privacy-preserving intrusion detection systems.

Security challenges in the IP-based Internet of Things, are undertaken by the third paper, entitled "Security Challenges in the IP-based Internet of Things" authored by Tobias Heer, Oscar Garcia–Morchony, Rene Hummen, Sye Loong Keohy, Sandeep S. Kumary, and Klaus Wehrle. Beyond these challenges, it is important to gain an insight at which level to base the security in the Internet of Things. The paper gives an overview of the deployment model and general security needs of Internet of Things communications. Further, it presents the challenges and requirements for IP-based security solutions and explores the specific technical limitations of standard IP security protocols.

Internet of Things is in essence a pervasive environment where objects communicate with each other in a dynamic and unpredictable manner. In such a scenario, information for various kinds of objects and services should be identified. A service can be seen as an entity that is ether an instance of an application or a specific data object. Identifying those services on a personalized basis is a key challenge. The fourth paper entitled "A User-centric Approach for Personalized Service Provisioning in Pervasive Environments" by Anis Yazidi, Ole–Christ-offer Granmo, B. John Oommen, Martin Gerdes and Frank Reichert proposes an adaptive multi-criteria decision making mechanism for recommending relevant services to the mobile user. The proposed approach combines both the reputation of the service, the user's current context, the user's profile, as well as a record of the history of recommendations. Finally, the paper proposes an architecture of a system that builds a personalized and context-aware application that delivers narrowly targeted information to the user, while being unobtrusive.

The fifth paper entitled "Interoperability of Security-enabled Internet of Things" by Sarfraz Alam, Mohammad M. R. Chowdhury and Josef Noll, addresses secure success provision to Internet of Things-enabled services and interoperability of sensor information between different administrative domains. Authors propose a layered architecture of Internet of Things framework where a semantically enhanced overlay interlink the other layers and facilitate secure access provision to Internet of Things-enabled services. The main element of semantic overlay is security reasoning through ontologies and rules.

We are confident that the current special issue will give you novel ideas related to your current work and will help you advance further the interesting yet, still, challenging area of the Internet of Things.

Author Biographies

Ramjee Prasad has been holding the Professorial Chair of Wireless Information and Multimedia Communications at Aalborg University, Denmark (AAU) since June 1999. Since 2004 he is the Founding Director of the Center for TeleInfrastruktur (CTIF), established as large multi-area research center at the premises of Aalborg University. Ramjee Prasad, a Fellow of IEEE, the IET and IETE, is a world-wide established scientist, who has given fundamental contributions towards development of wireless communications. He achieved fundamental results towards the development of CDMA and OFDM, taking the leading role by being the first in the world to publish books in the subjects of CDMA (1996) and OFDM (1999). He is the recipient of many international academic, industrial and governmental awards and distinctions of which the most recently is the cross of the order of chivalry (Ridderkorset af Dannebrogordenen) from the Danish Queen due internationalization of top-class telecommunication research and education. He has published a huge number of books (more than 25), journals and conferences publications (together more than 750), more than 15 patents, a sizeable amount of graduated PhD students (over 60) and an even larger amount of graduated M.Sc. students (over 200). Several of his students are today worldwide telecommunication leaders themselves. He is the founding chairman of the Global ICT Standardization Forum for India (GISFI) and was the founding chairman of the European Center of Excellence in Telecommunications known as HERMES of which he is now the honorary chairman.

Prof. Frank Reichert has been working for over 25 years on technology and strategies for fixed and wireless communication systems both on national and international level. Since July 2005 he is with UiA (University of Agder), undertaking research in wireless communication networks and services. Currently he is the Dean of the Faculty of Engineering & Science. Cooperations include projects with Ericsson on wireless residential communications, and the Norwegian Center for Wireless Innovation with six other institutions. From 1995 he was with Ericsson Sweden, guiding investigations on, e.g., Future Service Layer Architectures, Wireless Internet technologies, and 3G applications and terminals. Assignments included creating and managing European Research projects (e.g. EUREKA Subproject PRO-COM, ACTS OnTheMove). Frank established Ericsson Cyberlab Singapore in 1999, focusing on user centric, ethnographic application and terminal design, as well as rapid prototyping of new HW/SW products exhibited at fairs like CeBIT 2001 and COMDEX (e.g. Ericsson Cordless WebScreen, Delphipad, Nanorouter). He has been working as an expert, evaluator and auditor for the European Commission in industrial R&D frameworks such as RACE, ACTS, 5FP, 6FP, and Celtic Calls 1-3. Dr. Reichert holds a PhD degree in Electrical Engineering from Aachen University of Technology, Germany.