

EDITORIAL PREFACE

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The International Journal of Embedded and Real-Time Communication Systems (IJERTCS) start its issue three of the fifth volume with three research articles on the topics of data analysis of an RFID system for its dependability, recouping of the modified data in an intruder environment and recursive and dynamic timed automata for web services composition analysis. The journal has an interdisciplinary scope, binding together research from different disciplines with focus on how the disciplines converge to embedded and real-time systems for the communication application domain. The subject coverage of the IJERTCS journal is wide, which allows a clear presentation of how the research results presented in the journal benefit from the convergence of embedded systems, real-time systems and communication systems. The journal is aimed to benefit scientists, researchers, industry professionals, educators and PhD students in the embedded and communication systems sector. An important aim is to provide the target

audience with a forum to disseminate and obtain information on the most recent advances in embedded and real-time communication systems research: to give the readers the opportunity to take advantage of the research presented in the journal in their scientific, industrial or educational purposes.

Today the development of embedded and real-time communication systems is becoming more demanding because of users constant need of more and more features in most of the devices. The industries try to come up with systems that meet the users' demands while still keeping the manufacturing costs and times-to-market within acceptable range. In the core of these efforts is the need to have a streamlined and comprehensive process for specification, design, simulation and validation framework. Constantly developing improved and more efficient specification, modeling, design and verification flows and methodologies is thus in the focal point of research targeted to help manufacturers

meet consumer requirements within a sustainable development and manufacturing time and cost.

The difficult design constraints for embedded and real-time communication systems place great demands on forthcoming research in embedded and real-time communication systems. Research needs to target the challenges in future complex converged wireless systems through persistent development and technological exploration, and experimentation with novel technologies, systems and system design methodologies. Key research areas in this respect are embedded system design, communication system design, system-wide security and hardware/software co-design, producing results that converge into novel technologies usable in future secure embedded communication systems. In this issue, the first two articles deal with dependability and security of resource constrained wirelessly communicating devices, which are very important research topics in the application area of embedded communication system. The third article focuses on development of formal models and tools for ensuring continuous execution of dynamic web services, which is also a very important area in the real-time communication systems.

In the first article of this issue, *Imad Belkacem* (University Oran, Algeria), *Safia Nait Bahloul* (University Oran, Algeria), and *Oum-El-Kheir Aktouf* (Esisar - LCIS - Grenoble INP, France) examined the fault tolerance issues in Radio Frequency Identification (RFID) and proposed a solution for its depend-

ability. The process of RFID sensing, reading and measurements of readers are error prone and affects RFID's overall dependability. The authors proposed performing a statistical analysis on the RFID tags data, using a confidence interval, at the level of the middleware enabling in order to detect erroneous readers and sensors. The analysis was carried out in experimental distributed mini-middleware RFID which is based on SOA Web services. The middleware allows the evaluation of data returned by the reader web service and making decisions about the event. When there is no correlation between the returned data, then offline testing methods will be called.

The second article of this issue is written by *Ambika Nagaraj*, Dayananda Sagar College of Engineering, India. The topic of their article is recouping of the modified data in an intruder environment and focuses on providing security for wireless sensor networks. Sensor networks have so many applications in our day to day life and they are going to be ubiquitous in near future. These networks are mainly used as monitoring tool and in some applications they are deployed in remote and unsupervised environment. Hence, securing these nodes and the data which is being transmitted becomes a necessary requirement. The authors proposed a security solution for wireless sensor network by utilizing location based key generation, mobile nodes and clustered network structure. The developed security model allows regeneration of data if the data is modified by an intruder. The proposed solu-

tion enables protection against sybil, sinkhole and wormhole attack.

The third and last article of this issue is written by *Latrech Fateh* and *Faiza Belala* from University of Constantine 2, Algeria. The authors developed a formal models and tools in order to ensure continuous execution of dynamic web services. Web services are very dynamic, they are all around us and we use them every day without even knowing it. They defined a formal model for dynamic web services composition and also examined how it can be used to specify and analyze backward recovery procedures in case of failure. So, this work has two contributions: definition of a timed automata extension which has a new kind of switches that update dynamically invoked partners and integrated this model in timed rewriting logic in order to define its behavioral semantics. They have used Real-Time Maude system and its LTL model-checker to execute the specification of web service model and to analyse some dynamic properties, including failures and recovery actions. The model has been explained through the Virtual Travel Assistant case study.

As a journal in the focal point of computer science, computer engineering, telecommunication and communication engineering, the International Journal of Embedded and Real-Time Communication Systems (IJERTCS) is positioned well to provide its readership with interesting and well-focused articles based on recent high-quality research. The journal's coverage in topics from

embedded systems, real-time systems, and communication system engineering, and especially how these disciplines interact in the field of embedded and real-time systems for communication, offers its readership both theoretical and practical research facilitating the convergence of embedded systems, real-time computing, and communication system technologies and paradigms. IJERTCS is aimed to benefit scientists, researchers, industry professionals, educators and junior researchers (PhD students) in the embedded systems and communication systems sector. The journal aims to provide its target audience with a forum to disseminate and obtain information on the most recent advances in embedded and real-time communication systems research: to give the readers the opportunity to take advantage of the research presented in the journal in their scientific, industrial or educational purposes. IJERTCS publishes high-quality articles based on recent important advancements in its research area, and aims for a fast turn-around time for submitted manuscripts.

Finally, I wish to thank all the contributors of this issue of IJERTCS, and I wish all readers an enjoyable and enlightening reading experience with the peer-reviewed research articles published in this issue.

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Ethiopia Nigussie obtained her DSc.(Tech.) degree in Communication Systems from University of Turku, Finland (2010) and M.Sc. degree in Electrical Engineering from Royal Institute of Technology (KTH), Sweden (2004) and B.Sc. in Electrical Engineering from Addis Ababa University, Ethiopia (2000). Since 2010, she is Senior Research Fellow at University of Turku. She has expertise in adaptive design approaches for wireless sensor networks, 6lowpan implementations, self-aware design, dynamic power management of multicore systems, self-timed design, self-calibration and reconfiguration techniques, PVT variation tolerance and on-chip interconnects. Dr. Nigussie is the author of Variation Tolerant On-Chip Interconnects book (Springer). She has more than 40 international peer-reviewed journal and conference articles. Her current research interests are energy saving techniques and security solutions for low-power wireless networks and cognitive radio networks.