2013 7th IEEE International Conference on Digital Ecosystems and Technologies (DEST 2013) – Complex Environment Engineering

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2013 7th IEEE International Conference on Digital Ecosystems and Technologies (DEST)

Conference Tracks

Tracks deals with deep ICT foundations of digital ecosystems, including large-scale, virtualized infrastructures, hosting ecosystem services and processes.

Ecosystems require a novel approach to ICT technology development, closely related to the engineering of complex systems includes how the technological support for digital ecosystems, presents contributions in various application domains, it requires convergence of multi discipline of science and engineering studies. Radically increasing the involvement of stakeholders with smart planet and complex cyber physical systems.

For example in energy systems or healthcare systems. In the longer term, approaches for enabling collaborative ecosystems may lead to high-impact solutions for today´s most pressing challenges.

The tracks will identify domain requirements, research challenges and systems solutions with respect to the concept of Digital Ecosystems, Smart Planet and Complex Cyber Digital Systems, as outlined in the background and objectives of IEEE DEST 2013. Within this context, the tracks will focus on, but not be limited to, the issues like - scalability and availability, heterogeneity, elasticity, utility, mobility, integrity and evolvability.

TRACK A: FOUNDATIONS OF DIGITAL ECOSYSTEMS AND COMPLEX ENVIRONMENT ENGINEERING

TRACK B: CONVERGENCE OF TECHNOLOGIES FOR SUSTAINABLE INFRASTRUCTURES

TRACK C: DIGITAL HUMANITIES

TRACK D: CYBER-SECURITY ECOSYSTEM

TRACK E: HYBRID BIOLOGICAL-DIGITAL SYSTEMS

TRACK F: HEALTHCARE AND SUSTAINABLE LIVING

TRACK G: PLATFORMS FOR SOCIAL AND COMMUNITY INVOLVEMENT / ENGAGEMENT

TRACK H: CYBER-PHYSICAL ENERGY SYSTEMS

TRACK I: COLLABORATIVE PLATFORMS FOR SUSTAINABLE LOGISTICS AND TRANSPORTATION

TRACK J: FUZZY SEMANTIC COMPUTING IN DIGITAL ECOSYSTEMS

TRACK K: BIG DATA ECOSYSTEMS

TRACK A: FOUNDATIONS OF DIGITAL ECOSYSTEMS AND COMPLEX ENVIRONMENT ENGINEERING

Track co-Chairs

- **Christian Guetl,** *Graz University of Technology, Austria*
- **Leila Ismail,** *University of the Emirates, UAE*
- **Cary Lexar,** *Rose-Hulman Institute of Technology, USA*

Track A addresses the foundations of Digital Ecosystems in the context of Complex Environments Engineering. A digital ecosystem is defined as an open, loosely coupled, demand-driven, domain clustered, agent-based, self-organized environment where species/agents form short and long-term coalitions for specific purposes or goals, and everyone is proactive and responsive for its own benefit or profit. Interactions among peers in Digital Ecosystems may involve, besides unbridled competition, new modalities of pre-competitive and collaborative partnerships. Digital ecosystems are characterized by complexity – demanding radically new solutions.

This track focuses on the theoretical foundations, that can be drawn upon form various disciplines.

Track Papers

TRACK B: CONVERGENCE OF TECHNOLOGIES FOR SUSTAINABLE INFRASTRUCTURES

Track co-Chairs

- **Paolo Ceravolo,** *University of Milan, Italy*
- **Ralph Deters,** *University of Saskatchewan, Canada*
- **Balan Pillai,** *Stanford University, USA*
- **Christian Wagner,** *City University of Hong Kong, Hong Kong*

The ICT infrastructure underlying digital ecosystem must ensure the basis for digital ecosystems' economic operation. Track B will include contributions on how the ICT infrastructure can enable Digital Ecosystems by providing the required connectivity, mobility, availability, and security solutions. Typically, members of an ecosystem employ technological agents to procure products and access services on their behalf in order to achieve collective and individual goals.

The ICT infrastructure needs to provide solution ensuring that the ecosystem's resources are available as and when they are legitimately needed, protecting confidential information from loss and avoiding corruption of information.

Track Papers

TRACK C: DIGITAL HUMANITIES

Track co-Chairs

- **Tobias Blanke,** *Kings College, UK*
- **Mark Hedges,** *Kings College London, UK*
- **Jeffrey Shaw,** *City University of Hong Kong, School of Creative Media, Hong Kong*

The digital humanities form a bridge between the traditional practices of scholarship and the opportunities afforded by advances in technology, enabling researchers to reconsider old problems in new ways, and providing the methods, tools and frameworks to support them in developing new modes of enquiry. On the one hand, the humanities are faced with ever greater volumes of complex data and digital resources, for example from the increasing mass digitisation of historical records.

On the other hand, research in the humanities is moving away from the model of individual scholars to one in which international and inter-disciplinary teams of researchers collaborate actively within a diverse ecosystem of digital resources, tools, and services, not forgetting of course the users themselves. The rapid evolution of Web technologies continues to privilege the human as a key agent, both as provider and consumer of content, and this in turn is investing humanities scholarship with an increasing awareness of vast new audiences and potential participants.

Track Papers

TRACK D: CYBER-SECURITY ECOSYSTEM

Track co-Chairs

- **Haidong Xia,** *Intel Corp., USA*
- **Vidyasagar Potdar,** *Curtin University, Australia*
- **Hongxia Jin,** *Samsung R&D, USA*

Cyber-Security Ecosystems are a synergetic composition of technologies addressing both proactive and reactive strategies to create countermeasures for security. Their objective is to prevent attacks to our various connected systems and devices. Enablement requires much industry, political and ecosystem cooperation that is often lacking.

Cyber-Security Ecosystems utilize a collection of countermeasure technologies from simple heuristic and patter matching methodologies, such as anti-virus techniques, to preventive, even hardware based schemes to isolate computation from attack strategies. These systems are typically challenging to use, only partially effective, and most significantly lack adoption for many systems within our connected network of devices. Devices from all markets are of interest including consumer, business and industry, since they all interact through network connectivity and can be used for security attacks directly or as an agent. Research on the methodologies and effectiveness of these strategies would be welcome along with studies where elements of the computational infrastructure are weak in countermeasure adoption would be welcome. Also of particular interest to the ecosystem is an understanding how to measure effectiveness of any solution strategy. The domain focus of this track will be accordingly on security technologies, their effectiveness and usage across the ecosystem but it is open to adjacent domains as well.

TRACK E: HYBRID BIOLOGICAL-DIGITAL SYSTEMS

Track co-Chairs

- **Maarten H. Lamers,** *Leiden University, The Netherlands*
- **Wim van Eck,** *Royal Academy of Art, The Hague, The Netherlands*
- **Fons J. Verbeek,** *Leiden University, The Netherlands*

Increasingly, digital systems interfere into our daily lives. However, some tasks remain to be assigned to biological organisms. Seeing eye dogs have not yet been functionally replaced by assistive technology; digital pets are still less commonly the recipients of human affection than real pets. Both science and arts have experimented amply with integration of biological entities and technological systems, with the goal of complex task achievement. Cockroaches, neural cells, fish and slime molds were employed to control robots. Communities of real crickets were shown to interact with robots. Pigeons, bats and dogs were used as sensory and decision-making parts in technological systems. Crickets, hamsters and paramecia have driven the behavior of non-player characters in computer games. Through crowdsourcing, even humans serve as key components in greater digital systems.

Hybrid biological-digital systems aim to solve tasks by using qualities of a real biological component to complete a digital task-oriented system, or by forming a distributed system in which peers are both biological and digital entities.

TRACK F: HEALTHCARE AND SUSTAINABLE LIVING

Track co-Chairs

- **Rémi Bastide,** *ISIS-University Centre for Health Informatics, Carmaux, France*
- **Harold Boley,** *University of New Brunswick, Canada*
- **Amadou Sienou,** *Abamix Research, Germany*
- **Matthew Smith,** *Leibniz University Hannover, Germany*

eHealth, Telemedicine, and Bio-System Research Systems all describe approaches to improving the capacity of healthcare systems through fundamental and applied research, technology, and services. Researchers and companies are, for example, exploring the use of sensor devices, human-system interfaces, and medical record systems in order to provide radically new solutions for helping patients.

These advances require structural changes as well as technological development. Societies are facing an increase in chronic degenerative diseases that require monitoring and long-term patient management, the growing desire of patients to be treated in a family environment in order to protect their social ties, and, finally, a need to reduce costs. These factors necessitate a new strategic orientation in services offered by healthcare systems, in particular the transfer of a large portion of care activities from the hospital to the patient's residence.

Track Papers

TRACK G: PLATFORMS FOR SOCIAL AND COMMUNITY INVOLVEMENT/ENGAGEMENT

Track co-Chairs

- **Azam Esfijani,** *Curtin University, Australia*
- **Margaret Tan,** *Singapore Internet Research Center, Singapore*

The internet, together with other advances in ICT such as the increased take-up of smart mobile devices, is enabling a new era of community engagement. In science, the application of volunteer computing is providing examples of engagement in which members of the public can contribute to scientific advances of social importance.

Examples include modelling climate change (ClimatePrediction.net), developing drugs for AIDS (FightAids@home), or simulating the spread of malaria (MalariaControl.net). The participatory ecosystem is becoming still wider with projects such as GalaxyZoo, in which volunteers contribute their "thinking" rather than their computers, and global initiatives to broaden take-up such as Africa@home and Asia@home.

On the social side, we are seeing substantial evidence of the role that digital technologies, especially the "Social Web" such as blogs, Twitter, Facebook, and video sharing sites, can play in community activism. The Social Web is in some quarters becoming the mainstream method for connecting people, sharing information, and influencing developments, particularly in areas where traditional modes of communication operate less effectively. This is reflected in a number of recent geopolitical events that have been referred to as "Twitter Revolutions", and these technologies have played an undeniable role in such events as the “Arab Spring” and humanitarian crises such as the 2010 Haiti earthquake. The use of these technologies has however led to debates concerning the extent to which such digital technologies genuinely promote more democratic community action, and the extent to which they can be exploited by the powerful to reinforce their positions.

Track Papers

TRACK H: CYBER-PHYSICAL ENERGY SYSTEMS

Track co-Chairs

- **Martin Anda,** *Murdoch University, Australia*
- **Neil Brown,** *Institute of Energy and Sustainable Development, De Montfort University, UK*
- **David Goodfield,** *Murdoch University, Australia*

Cyber-Physical Systems are a synergetic composition of computational control and physical actors. They aim to achieve an enhanced functionality that relies on both, the interaction with and coordination in between the physical and the virtual components.

Cyber-Physical Ecosystems are built as agile networks of cooperating, independently developed subsystems. Cyber-Physical Ecosystems are emerging at the interface between robotics, sensor networks, systems of systems engineering, and multi-agent technologies. Research on theories, architectures, models, methods, and tools are required to form a uniform and integrated perspective to systems engineering for this class of complex systems. They need to be validated and verified in key applications such as micro grids, multi-robot systems, or autonomous traffic. The domain focus of this track will be accordingly on robotics and telematics, but is open to adjacent domains as well.

Track Papers

TRACK I: COLLABORATIVE PLATFORMS FOR SUSTAINABLE LOGISTICS AND TRANSPORTATION

Track co-Chairs

- **Frederick Benaben,** *Ecole de Mines d'Albi-Carmaux, France*
- **Farookh Hussain,** *University of Technology, Sydney, Australia*
- **Eddie pereira,** *Curtin University, Australia*

Across application domains, organizations and enterprises (such as Small-Medium Enterprises) gain their strengths from flexible market orientation, agile value chains and cluster-based innovation capacity. The changing global (business) environment challenges all organizations to aim for agility and performance-driven management through process-focused thinking. These challenges reach far beyond the business world, affecting for example the formation and coordination of emergency teams in case of environmental disasters.

For the effective collaboration of all the partners in such scenarios, the agility aspect of the Digital Ecosystem paradigm demands explicit support for risk management and collaboration. Agility implies the continuous improvement and reengineering of the business processes involved. However, the outcome of such process management efforts is risky because of the lack of operational information about future processes, so risk management is a key component. Similarly, collaboration support is required to allow real-time information sharing and interaction of the parties involved, for example in case of deviation from the agreed-upon target process.

Track Papers

TRACK I: FUZZY SEMANTIC COMPUTING IN DIGITAL ECOSYSTEMS

Track co-Chairs

- **Morteza Saberi,** *Curtin University, Australia*
- **Edy Portman, BISC,** *Berkeley University, USA*
- **Ali Azadeh,** *University of Tehran*
- **Alireza Faed,** *Curtin University, Australia*

Semantic computing deals with semantic information from texts such as structured data, video, audio, written content, etc. Because of the structure of fuzzy logic, it is suitable for a semantic computing technique environment. Fuzzy semantic computing is also a suitable technique that can strengthen ICT to support different digital ecosystems.

The primary focus of this special session is about the issues and challenges related to Fuzzy Semantic computing in digital ecosystems.

Track Papers

TRACK K: BIG DATA ECOSYSTEMS

Track co-Chairs

- **Elizabeth Chang,** *Curtin University, Australia*
- **Roberto Pieraccini,** *International Computer Science Institute and UC Berkeley, USA*
- **Tharam Dillon,** *DEBI International, Australia*

Track Papers

SEED WORKSHOP: BUILDING A DIGITAL ECOSYSTEM FOR SOCIETAL EMPOWERMENT

Track co-Chairs

- **Jenny Huang,** *Strategic Standards, AT&T Inc. - Director of Research, iFOSSF.org*

Traditional approaches to Social, Economic and Environmental Development (SEED) have historically employed a closed, top-down model in which problems are viewed narrowly and the input of local stakeholders is rarely sought. More recent efforts to address development from a holistic, multidisciplinary perspective—while a major step in the right direction—have been hindered by a lack of appropriate tools and well-defined processes to enable disparate resources to work effectively together towards common goals.

The SEED Framework, developed by iFOSSF (International Free and Open Source Solutions Foundation), is specifically designed to support locally-led innovation with self-organizing, multidisciplinary collaborations and, most importantly, to translate concepts and ideas into actions. Combining the strength of both structured and unstructured workforces, the framework employs an open, "coopetition" strategy that integrates existing standards and practices across multiple sectors, enabling a high-level, results-oriented collaboration with a deep awareness of the local culture.

Track Papers

Additional Papers: