Special Issue in

*Evolving Systems (Springer)*

on:

**Evolving Sensor Systems**

**Scope of the issue**

The general availability of low cost sensors, short range radio technology and advances in Internet of Things (IoT) and wireless networking are enabling the wide spread use and deployment of sensors. Sensors are often deployed in so called smart systems where intelligent algorithms are employed to turn the data collected by the sensors into actionable insights, as well as to inform decision making. Sensors are deployed today in a wide variety of application areas for taking all sorts of measurements. Examples include environmental sensors that provide real-time measurements of weather, air quality and other environmental parameters; wearable sensors that provide measurements of body movement, posture and general well-being; as well as industrial sensors used in predictive maintenance to measure the condition of industrial machinery.

Traditional sensor-based systems are convenient for static world-models. However, the real-world is far from static and is often characterised by variety and dynamism. For example, wearable sensors for recognising human activity are typically trained on a predefined, closed set of activity classes e.g. sitting, running, and walking. However, natural human activities are much more varied than these predefined set. Thus, for a human activity recognition system to have full utility in a natural setting, it should be able to recognise new activity types as it encounters them. Another important application of evolving sensor systems is intelligent and autonomous driving. Due to the variety in road circumstances and terrain, intelligent vehicles often need to be trained from live driving data. Thus, the sensors in such systems take in real-time data in order to update the knowledge model to handle new situations.

Evolving systems are inspired by the idea of system models that change and adapt in a dynamic environment. The aim of evolving systems is life-long learning and self-reorganisation in order to adapt to unknown and unpredictable environments through gradual change, system structure evolution and parameter adaptation. An important
consideration is the ability of such systems to balance learning and change, while respecting past accumulated knowledge.

In the present special issue we want to bring together original research on evolving sensor systems, in order to give a broad landscape of tools. These are intelligent sensor systems that refine or evolve their models in order to adapt to changing physical and environmental circumstances. The topics of interest include, but are not limited to:

- Novel/Interdisciplinary Ideas
- Applications of Sensor Systems (e.g. Medical, Environmental, Transport, robotics)
- Wearable Sensors
- IoT
- Context Awareness, Situation Awareness, Ambient Intelligence
- Evolutionary Systems
- Bayesian Systems
- Neural Networks and Deep Learners
- Machine Learning and classification systems
- Case-based Reasoning and decision support systems
- Transfer Learning
- Temporal Analysis
- Human-Machine Interaction
- Pattern Recognition
- Computer Vision
- Image Processing

Authors should prepare their manuscript according to the Instructions for Authors available on the online submission page of the Springer Evolving Systems journal (http://www.springer.com/physics/complexity/journal/12530).

For additional questions, please send an email to the guest editors.

Potential Authors

We will invite the EANN Evolving Sensor Systems workshop presenters and the presenters from the Cyber-Physical Systems session to submit papers to this special issue:

- Jarez Patel
- Francesco Fioranelli
- Matthew Ritchie
- Hugh Griffiths
- Maurizio Fiasché
- Diego E. Liberati
We will also send call for papers to different mailing lists, newsgroups and relevant social media outlets. Call will also be circulated to colleagues and known researchers active in relevant areas. Targets include:

- BCS SGAI mailing list
- JISC AI-SGES mailing list
- SICSA Data Science mailing list
- SICSA Future Cities mailing list
- SIGIR mailing list
- Several interest groups (machine learning, sensor systems, etc.)
- EANN SIG
- EANN 2016 workshop
- WikiCFP

**Important Dates**

- Submission deadline: 30th November 2016
- Notification: 30th January, 2017
- Revised version: 15th March 2017
- Final notification: 30th April 2017
- Publication: June 2017
Guest Editors

Prof Chrisina Jayne  
School of Computing Science and Digital Media  
The Robert Gordon University  
Email: csdm-office@rgu.ac.uk

Dr Nirmalie Wiratunga  
School of Computing Science and Digital Media  
The Robert Gordon University  
Email: csdm-office@rgu.ac.uk