



Special session on Cognitive systems for resilience management

Scope. Over the past few decades, the concept of resilience has been rapidly adopting and embodying into research within and across various domains including infrastructural, organisational, social, economic, ecological, social-ecological, socio-technical and psychosocial systems. With the climate change and other global challenges such as in energy and water, the general objective of pursuing a resilient system, though not universally unified, is to build up a system with the ability to proactively withstand, adapt to and recover from external disturbances (such as a flood event) and thus continue to maintain its structure and functions.

On a wide scale, complex nonlinear relationships and interdependencies can often exist in collaborative networks, such as collaborative enterprises, organisations, infrastructures or social networks. In addition, each component or subsystem within a collaborative network also interacts dynamically with the external environment. To enhance the resilience level of a collaborative network in general or in response to a particular external disturbance (e.g., landslides, earthquakes or flooding), advances are needed to holistically characterise these components/subsystems, interdependencies and interactions and, to situate them as part of a well-defined resilience framework which also considering domain-specific resilience requirements such as recoverability and responsiveness. Further, with the potentially evolving nature of collaborative networks and the external environment, the resilience level of a collaborative network is not always static and can be time-varying. It is thus of critical importance to produce proactive resilience strategies for policy makers and field practitioners in response to any relevant (foreseen) environmental changes.

The development of cognitive systems, therefore, plays a crucial role in the resilience research across a suite of cognitive tasks including resilience understanding, assessment, prediction and decision-making. Such cognitive systems are often distributed in nature given the cooperation of scattered cognitive tasks from different stages (e.g., plan, design, operation and maintenance) in the process of system resilience level perception and strategy generation. The cognitive process for resilience management can be realised via a qualitative (mainly based on expert experiences and judgement) or a quantitative approach (which is currently less studied), or even a combination between them. **This special session will focus on the latest development and applications of cognitive systems for the resilience management of collaborative networks and related topics in diverse domains. Topics of interest include, but are not limited to:**

- Data acquisition, processing, contextualisation and analytics techniques for resilience related research such as those of Delphi survey and point cloud and image semantisation
- Standards, definitions and metrics for assessing system level of resilience of collaborative networks at or across different scales (e.g., local, regional, national and global)
- Conceptual resilience frameworks and models for collaborative networks of entities, drawn from climate change, global challenges and natural disasters
- Risk and vulnerability reduction techniques in hazard-prone communities and entities such as manufacturing industries
- Identification and analysis of critical infrastructure interdependencies and cascading effects, and its resilience in terms of adaptation to and rapid recovery from disasters
- Resilience modelling, mapping, forecasting and cost-optimal design and operation for a collaborative network of enterprises, buildings and infrastructures

Special attention will also be given to research of cognitive systems approaching resilience of collaborative networks in a multi-hazard setting.

Section organizers

Yacine Rezgui – Cardiff University, RezguiY@cardiff.ac.uk

Wanqing Zhao – Cardiff University, ZhaoW9@cardiff.ac.uk



PRO-VE'18 – 19th IFIP Working Conference on Virtual Enterprises

Cardiff, UK, 18-20 September 2018, www.pro-ve.org

Submission procedure: Papers accepted for this session are included in the main conference and follow the same reviewing process.

Important dates:

- Abstracts: 12 Mar 2018
- Full paper: 2 Apr 2018
- Acceptance notification: 18 May 2018
- Camera ready: 28 May 2018

Acceptance of papers is based on the **full paper** (up to 8 pages). Each paper will be evaluated by three members of the International Program Committee. However, prospective authors should submit a short abstract in advance, in order to check if the proposed topic fits within the conference scope.

When submitting on the web site, you have to indicate the name of the special session.
Submission on: www.pro-ve.org, with copy by email to the chairs of the special session.