Editorial

Lorna Uden

FCET,
Staffordshire University,
The Octagon, Beaconside,
Stafford, ST18 0AD, UK
E-mail: L.uden@staffs.ac.uk

Biographical notes: Lorna Uden is Professor Emeritus of IT Systems in the Faculty of Computing, Engineering and Technology at Staffordshire University. Her research interests include technology learning, HCI, mobile learning, activity theory, knowledge management, web engineering, multimedia, e-business, service science and innovation, semantic web, software as a service (SaaS) and problem-based learning.

Welcome to V8 N1 of this journal, which consists of four papers. The first paper is, 'Social network restructuring after a node removal', by Rokia Missaoui, Elsa Negre, Dyah Anggraini and Jean Vaillancourt. These authors argue that many studies in social network analysis (SNA) focus on static networks as indicated in the literature. However, a social network is a dynamic structure where links and entities appear and disappear. In this paper, they present a method to predict the new structure of a social network once a node is deleted. It first selects a substitute to the disappearing node whenever the latter is central in terms of its centrality measures, and then makes appropriate links based on the user's preferences. In practical terms, given a social network, what happens if an entity disappears? What will be the new structure of the network? Which node will become a substitute and play the role of the deleted node if the latter happens to be a leader or a mediator or a witness? What are the links that more likely will be created in order to maintain the network in some stable structure?

In this paper, the authors propose a procedure for predicting the evolution of the structure of a social network after the deletion of an entity. Such a procedure first identifies the role of the removed node within the network, then effectively removes the node and its ties with its neighbours, determines the potential substitute and finally creates new links between the (unique) selected substitute (if it exists) and some identified nodes. Since degree, betweenness and closeness centralities are among the most important measures for the role or position of a node in a network, they focus on them and associate to them three distinct roles, respectively: *leader*, *mediator* and *witness*. When the deleted node has no role or no substitute, its neighbours are then connected as a *clique* or a *chain*. The latter option links neighbours in a decreasing order of their degree centrality.

The objective of the present work is to exploit network topology to devise an approach towards:

1 finding a substitute to a deleted node if the latter is a central one

2 adding appropriate links to maintain the network connected.

Copyright © 2013 Inderscience Enterprises Ltd.

The approach exploits the role played by nodes to predict the new structure of a social network once one entity disappears. The role of a node in the network is expressed in terms of its centrality in the network. Three important roles are considered: the leader, the mediator and the witness. An entity acts as a *leader*, a *mediator* or a *witness* if it has a high degree centrality, betweenness centrality and closeness centrality, respectively.

The preliminary experiments conducted on two known social networks show that the system can predict a social network structure in a reasonable time and that the link options *OLD* and *IMP* offer relatively good results in terms of execution time and 'a return to normal state'.

Future work includes the following issues:

1 study and quantify the degree of influence/prestige of a node in directed networks rather than the role (based on centralities) in undirected graphs

2 handle the situation where the deleted node belongs to a given community

3 devise a procedure to predict a potential deletion propagation (i.e., cascading effect) to other nodes (e.g., when an influential entity leaves an organisation)

4 handle the removal of a set of nodes rather than only one.

The second paper, 'Enhancing web server relative delay services by an integrated SA-fuzzy logic controller' is by Malik Loudini and Sawsan Rezig. According to these authors, applying feedback control schemes to enhance the performance of software processes is becoming an attractive research area. The main advantage offered by this technique of automatic control is its robustness to modelling inaccuracies, system non-linearities, and time variation of system parameters. Most of the feedback control techniques and algorithms rely on the availability of formal parametric models of the controlled system and control theoretic tools. This is not always possible for software processes for which analytical models are not easily obtainable or the models themselves, if available, are too complex and highly non-linear. A challenging problem is how to provide efficient performance control over a wide range of workload conditions knowing the highly non-linear behaviour of a web server in its response to the allocated resources.

This article addresses an investigation of the capabilities of intelligent feedback control methodologies to provide satisfactory web server quality of service (QoS) in terms of delay services. Fuzzy logic-based control architectures are proposed to enhance the system performances. The first closed-loop control scheme to be applied is the standard proportional integral (PI) type Mamdani's fuzzy logic controller (FLC). Then, the simulated annealing (SA) algorithm (SAA) is used to optimise the FLC parameters with innovative tuning procedures. Both of the FLC and the SA optimised FLC (SAOFLC) are implemented and tested to attempt to improve the QoS of a web server faced to sudden variations of workload. The performances of the adopted closed-loop intelligent control strategies are examined via simulation experiments.

These authors argue that digital simulations have allowed us to validate the effectiveness of the proposed structures of control. Indeed, both of the FLC and the SAOFLC capabilities have been evaluated when applied to guarantee desired dynamic performance of the web server relative delay service. They argue that both of the adopted intelligent control strategies have realised quite satisfactory results in view of the hard robustness tests with which the controllers were faced. However, further studies to

improve the obtained performances by other feedback control schemes as well as the optimisation by other techniques (such as tabu search, and genetic algorithm are needed).

The third paper is, 'Clustering facilitated web services discovery model based on supervised term weighting and adaptive metric learning', by Lei Chen, Geng Yang, Wei Zhu, Yingzhou Zhang and Zhen Yang. With the explosive growth of web services, research on how to rapidly find the desired services becomes increasingly important and challenging. In this paper, the authors focus on non-semantic web services discovery and present a clustering facilitated web services discovery model (CFWSFinder). According to these authors, compared with the existing models, CFWSFinder has several characteristics. First, in services representing process, CFWSFinder imports WordNet and latent semantics index to represent non-semantic web services as the low-dimensional compact semantic feature vectors; Second, in services clustering process, CFWSFinder employs a modified Kernel batch self-organising map (KBSOM) neural network to minimise the services discovery duration; Third and most importantly, in services matching process, by using the category label information achieved from services clustering process, CFWSFinder can adopt supervised term weighting scheme and adaptive metric learning method to ameliorate the services discovery precision.

The authors argue that experimental results performed on the real-world web services collection demonstrate the feasibility of the CFWSFinder. Research is required to validate the effectiveness of this approach. Furthermore, this work has not taken into account services' QoS properties such as reliability and cost.

The fourth paper, 'A controlled experiment investigation of understandability and correctness on two query languages for XML data', is by Euclid Keramopoulos, Ignatios Deligiannis, Georgios Spanos, Achilleas Pliakas and Konstantinos Tsekos. In this paper, the authors presented a controlled experiment, aiming at investigating the *understandability* and *correctness* in two query languages, namely KINISIS against XQuery.

XQuery is the W3C standard query language for XML documents. KINISIS is a graphical query language which is designed and implemented upon XQuery, using metaphors extracted from the European Road Traffic Act. They conducted a controlled experiment to assess users' performance, with respect to understanding and correctness, in developing queries in KINISIS and in XQuery. The findings, from the collected and statistically analysed data, showed that users performing on KINISIS had significantly better results compared to those using XQuery. An output of this study is that a graphical XQuery language that is based on successful metaphors is more appropriate for novice users in XQuery technology, instead of textual XQuery.

Further research is needed to change/improve the KINISIS GUI and to design the graphical query construction in a different philosophy, where the graphical illustration of a query will not be based in a one-to-one representation of the XQuery constructs, but in a 'browsing' method of the underlying semi structured metadata and data.