From traffic analysis to system security: broad interest within the Infocommunications domain

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THE TERM "traffic analysis" may be misleading in this issue of Infocommunications Journal. Civilians naturally think it is something about analyzing vehicular transport on the roads – although for ICT practitioners it always has been about telco- or computer network traffic. Surprisingly though, the first two articles in this issue are actually discussing road transport traffic analysis. The methods we use in the infocommunications domain is now applied to the transport domain by our very own experts in the communications society. The third article in this issue is indeed, on (cellular) mobile network traffic. Mobile network in the the sense that the user equipment can be mobile; yet another way to get confused with transportation systems. The current issue of the journal features eight papers and 92 pages if counting the front and back covers as well. This makes the current issue the thickest so far – but not only in volume. Let us have a brief overview of the papers in this issue.

Attila Nagy and his co-authors aim to detect incidents on the roads that lead to congestion. Their new, Transient-based Automatic Incident Detection (TBAID) method uses a novel approach to detect the occurrence of incidents, using new features such as speed, flow and occupancy. Their results showed that this method performed better than the currently available ones in terms of both speed and reliability on traffic data collected from freeways. They also made the data-set available for further, open analysis and comparisons.

In their paper, Mehran Amini et. al. describe a new, macroscopic model based on fuzzy cognitive map for road traffic flow simulation. They applied fuzzy cognitive maps (FCM) reasoning on historical data collected from the e-toll dataset of Hungarian networks of freeways. Through the customized scenarios, macroscopic modeling objectives such as predicting future road traffic flow state, route guidance, freeway geometric characteristics indication, and effectual mobility can be evaluated by using their method.

Regarding the dynamic management of 5G network resources, Khalil Mebarkia and Zoltán Zsóka present the QoS impacts of slice traffic limitation. They propose different policies for setting up the parameters of the service function chaining methods. The model behind the methods ignores the load and latency details or limitations of VNFs, but considers link capacities and network loads coming from the different slices, which share the available resources according to the implemented queueing. This allows the systematic evaluation of QoS properties that can be experienced on the links or by the service requests.

Yahieal Alnaiemy and Lajos Nagy descibe their design for a novel UWB monopole antenna structure with reconfigurable band notch characteristics based on PIN diodes. The proposed antenna is comprised of a modified circular patch and a partial ground plane. The band-notch characteristics are achieved by etching a slot on the partial ground plane and inserting three PIN diodes (allowing reconfigurability for eight states with UWB) into the slots for adjusting the operating antenna bands.

The Hungarian research organizations joined forces under the Quantum Technology National Excellence Program to stay in the frontline of the Quantum Key Distribution (QKD) domain. In their paper, Márton Czermann et. al. demonstrate the first successful quantum key distribution over physical layer in accordance with the truth table of BB84 protocol in the country. Part of the deterministic tests they achieved 97.49% as the best individual performance among base pairings.

Gábor Árpád Németh and Máté István Lugosi present a new, heuristic algorithm for the All-Transition-State criteria of deterministic finite state machine specifications. The length of the resulting test suite and its fault coverage can be fine-tuned with the three different versions of their algorithm (standard, iterative with and without an iteration limit) allowing the test engineer to find a suitable trade-off between the overall length of the test suite and fault coverage.

Silia Maskuti et. al. present their new results towards security mitigation in SoS using a generic autonomic management system to assist engineers in developing self-adaptive systems. They propose a generic autonomic management system (GAMS) that automatically tracks runtime uncertainties and adapts System of Systems (SoS) settings without human intervention.

In their paper, Matthias Maurer and his co-authors investigate the possibility to create a predictive maintenance framework using only easily available log data based on a neural network framework for predictive maintenance tasks. They outline the advantages of the ALFA (AutoML for Log File Analysis) approach, which are high efficiency in combination with a low entry border for novices, among others.

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