Guest Editorial

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Fuelled largely by the growing interest in intelligent transportation systems, in the recent years, the field of vehicular communication systems has attracted huge number of researchers who are working towards finding effective solutions to various issues in this field. Even though today's sophistication of vehicles and vehicular systems with embedded computing and communications systems is very noticeable, there are more ongoing efforts to make these systems better intelligent and dynamic for various real-life scenarios. We hear now about driverless car, automatic goods delivery truck, energy-efficient automatic driving, vehicles producing hazard alarms in advance, cars talking and giving directions to the human driver, and so on. While the theoretical and fundamental research works are being carried out by the people in the academia, practical solutions are being tested by various industries and research labs. Given today's trend, these vehicular systems are considered mainly for addressing critical issues such as improving passenger safety and reducing traffic congestion on the road by integrating information and communication technologies into the transportation infrastructure and also in the vehicles themselves. In spite of various remarkable advancements in the recent years, there are cases of setbacks as well. In fact, designing high-performance, scalable, robust and secure vehicular networking technology presents an extraordinary challenge to the wireless research community.

Another area of recent interest is underwater communication networks. The past three decades have seen rapid growth of interest in various issues related to these networks. There are critical military and commercial applications that are based on underwater networks. Due to the unique characteristics of the underwater environment, the requirements for effective solutions for underwater networks are different than that of the traditional wireless networks. For instance, the transmission speed of an acoustic signal is very limited which is several magnitudes lower than electro-magnetic signals. Hence, underwater networks experience higher propagation delay. Moreover, an underwater channel faces relatively higher bit error rate due to multi-path, fading, formation of shadow zones and refractive properties of the sound channel. Given this reality of the environment, existing communication and networking solutions developed for terrestrial wireless networks cannot be applied directly in that scenario. The design and practical deployment of such networks indeed face several special challenges. There is still some kind of relation between vehicular and underwater communication networks as both need communication without wire. In spite of the differences of the two environments, ideas from one area could benefit another. With this point in mind, this special issue was planned.

The specific objective of this special issue is to collect high-quality research papers with solid background in both theoretical and practical aspects of vehicular and underwater communication networks. While submission to this issue was open to all, it specifically carried revised and substantially extended versions of selected papers presented at the Third International Conference on Advances in Computing, Communications and Informatics (ICACCI-2014; 24–27 September 2014, Delhi, India). We received quite a good number of papers and after rigorous review process, 10 papers have been finally selected for this issue. The accepted papers are from the authors of at least seven countries. The contributions have the flavours of various aspects in the related fields and hence, it would be interesting to see the diversity of ideas that the authors came up with. Below, the gist of each accepted paper is mentioned:

Goudarzi et al. in their paper entitled 'Hybridisation of genetic algorithm with simulated annealing for vertical-handover in heterogeneous wireless networks' consider a heterogeneous wireless network environment. Their contribution is to the general area of wireless networks. Combining simulated annealing (SA) and genetic algorithms (GAs), the authors present a hybrid algorithm for real-time vertical handover using different objective functions to find the optimal network to connect with a good quality of service in accordance with the user's preferences.

Chou et al. in their paper entitled, 'Green wave-based virtual traffic light management scheme with VANETs' utilise the vehicular ad hoc networks (VANETs) technology to build a virtual traffic light (VTL) environment to reduce traffic congestion. The objective of their work is to adjust the traffic light signal time length on-demand to enable vehicles to pass through numerous intersections rapidly, thereby saving energy and reducing fuel consumption. Their study uses the green wave speed guide with VTL (GS-VTL) protocol to improve the traffic congestion situation especially in urban areas. They show that their proposed phase combination algorithm can facilitate an efficient traffic flow at intersections and prevent unnecessary stops.

The paper by Santa et al. entitled, 'Deployment of vehicular networks in highways using 802.11p and IPv6 technologies' reviews the deployment and operation of communication infrastructures in one of the major European projects in the area of vehicular cooperative systems, namely, European field operational test on safe, intelligent and sustainable road operation (FOTsis). In FOTsis, following the guidelines of International Organisation for Standardisation/European Telecommunications Standards Institute (ISO/ETSI) in cooperative systems for vehicle, IEEE 802.11p and IPv6 technologies have been integrated. Taking advantage of these technologies, the authors carried

out several field tests in real use cases. Their results show the practical usability of the technologies in vehicular networks in highways.

The paper by Boualouache and Moussaoui, 'Urban pseudonym changing strategy for location privacy in VANETs' addresses the issue of the development of an effective pseudonym changing strategy for protection of location privacy of the VANET's users. To clarify at bit, in a public key infrastructure (PKI), the pseudonyms represent a set of certified public keys (anonymous certificates) stored in the vehicle's on-board unit (OBU). In their work, the authors define two types of pseudonyms linking attacks. They then make comparison of the existing pseudonym changing strategies based on the protection against such attacks and the cost involved in changing pseudonym.

The paper entitled, 'A density-based contention window control scheme for unicast communications in vehicular ad hoc networks' by Balador et al. proposes density-based method for adjusting the contention window size (DBM-ACW), which is a novel contention window control scheme for VANET environments based on estimating the network density, which is then used to dynamically adapt the contention window size. Through a series of simulation studies, the authors demonstrate that their scheme DBM-ACW not only outperforms IEEE 802.11p but also other previously proposed schemes under different vehicular scenarios.

Gupta et al. contribute the work entitled, 'Clustering-based enhanced safety message dissemination medium access control protocol for vehicular ad hoc network'. In this paper, they propose clustering-based enhanced safety message dissemination MAC protocol (CESD-MAC), which is an enhancement over the existing IEEE 802.11p/ 1609.4 protocol. CESD-MAC adopts mobility aware clustering and channel access scheduling. Detailed performance analysis shows the efficiency of the proposed protocol over other existing alternatives.

Naseem and Kumar propose QSLB routing protocol in their paper, 'QSLB: Queue size-based single path load balancing routing protocol for MANETs'. This work is on the general MANET, however, being a variant of MANET, VANET could also be benefited from the idea. The authors prove that the nodes located at the centre of the network observe maximum load. Hence, the proposed routing protocol pushes the load further away from the centre of the network. The nodes, having more buffered data packets in its queue, are considered as central nodes. Therefore, the maximum queue size along a path is chosen as a measurement of the centrality of the node. Simulation-based performance analysis shows encouraging results in terms of packet delivery ratio, end-to-end delay and normalised routing overhead.

The paper, 'Context aware spectrum handoff scheme in cognitive radio vehicular networks' by Kumar et al. proposes a context aware spectrum handoff scheme with multiple attributes decision making (MADM) methods for preferred network selection in cognitive radio vehicular networks. Obtained numerical results demonstrate that all MADM methods are effective for preferred network selection for the spectrum handoff.

Peng et al.'s work 'Utilisation and energy consumption of fair-access in sensor networks with selected grid topologies' addresses somewhat different network setting (i.e., wireless sensor networks) to analyse utilisation and energy consumption for fair-access with selected grid topologies. However, the idea presented in the paper would be beneficial for both vehicular and underwater network settings as well. Because, the authors derive in this work, the upper bounds on network utilisation and lower bounds on network energy consumption per cycle in multirow grid topologies under the fair-access criterion. Such topologies and deployment models could also be used for underwater networks, especially. In restricted cases, vehicular networks could also take advantage of similar approaches.

Finally, Lei et al. contribute their work entitled, 'Dynamic resource allocation for multimedia services delivery in cellular/infostation integrated HSR networks' where high-speed railway systems are addressed. The authors investigate the downlink resource allocation problem for multimedia services delivery in HSR MIMO-OFDM (multiple-input and multiple-output-orthogonal frequency-division multiplexing) system with a cellular/ infostation integrated network architecture. This paper is mainly based on mathematical models addressing general wireless communication issues considering specific environment like high-speech railway (HSR); however, we have decided to include this as the proposed algorithm, theoretical analysis and numerical simulations would be beneficial for the greater field of wireless communication networks.

As could be noted from the summaries of the accepted papers, unfortunately, we could not include any paper specifically addressing the issues of underwater wireless acoustic network (UWAN). This is because, we had to select papers from the available number of submissions and no work with specific focus on UWAN got accepted after final review. However, we hope that the works on the general wireless issues with tactical signalling and communication strategies would be of common interest for the readers and those ideas would also be applicable under specific circumstances even in UWAN or similar network environments.

It was indeed a gruelling and time consuming task to ensure quality reviews for all the submitted papers. As we maintained a particular quality standard, perhaps, one or two papers which could have been accepted in a regular issue could not be finally accommodated in this special issue based on competitive merit. Hence, we hope that the authors whose papers have not been finally accepted would enhance the level of contribution of their works and try in other suitable venues. We sincerely thank the reviewers who did an excellent job to help us decide the fate of various papers. We also thank the editorial office and Editor-in-Chief for their kind support and cordial help in resolving issues that were raised during handling the manuscripts.