

Editorial from the Editor-in-Chief

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On behalf of the Editorial board, we welcome you to the twenty third issue of the EAI Endorsed Transactions on Context-Aware Systems and Applications. In this issue, we present four selected papers that span various aspects of context-aware systems and applications.

This issue will serve as a reference material for researchers, scientists, professionals and students in computer science and computer engineering as well as developers and practitioners in computing and networking systems design by providing them with state-of-the-art research findings and future opportunities and trends. These papers include some recent advances in context-awareness reflected in this issue. In particular, the issue covers various themes of context-awareness as follows:

Paper 1 by Minoru Nakayama and Yoshiya Hayakawa [3] reports that the frequency of microsaccades is often used as a measurement of eye movement in order to estimate the level of effort required, because some indices of oculo-motors suggest the level of mental activity. In an experiment involving several task-manipulation levels, ocular information including microsaccades, saccades and pupil diameters are measured and compared in order to estimate workload levels during problem solving. While some oculo-motor metrics correlate with the estimated scores of the mental workload, these metrics mutually correlate with each other. A causal relationship model is created using all metrics, including subjective measurements. Metrics of microsaccades perform the function of intermediating behavior between participants subjective assessments and conventional ocular measurements, such as saccades and pupil responses.

Paper 2 by Dumitru Damian [1] presents that energy consumption optimization by predicting vehicle behavior in a dynamic environment represents an active research topic for the automotive industry.

As vehicles are increasingly being equipped with driving assistance systems that function under dynamic driving conditions, a trajectory specific energy saving strategy must consider the trajectory particularities and predict in real time the opportunities for energy savings. Researching and understanding the interactions between complex light intensity shapes and the trajectory spatiotemporal specificity is the main objective of the presented spatiotemporal lightmorphic computing framework for the Romanian Carpathian A1 and DN7 road network. Alternating start and stop locations are included, between the following major cities: București, Timișoara, Deva, Sibiu, Pitești. Each trajectory segment measurement is composed from various slices defined as segmentation lengths (SL) that characterize the light signatures and trajectory profile. The light intensity variations are contained in the light distribution tensor Γ_r . When analyzing the measured values, similarities between measurements are captured in a trajectory specific data-set Φ . This spatiotemporal light distribution symmetry is used to predict the trajectory unique virtual light shape evolution. Observing the light intensity variations offers a unique perspective on the mentioned route. Having a framework to characterize the light signature structural patterns for specific road trajectories, helps to solve several real-world problems like: achieving optimal energy balance for specific trajectories or accurate estimation of light intensity phenomena that can impact the interaction between vehicle and traveling environment.

Paper 3 by Cuong Pham-Quoc, Tran Ngoc Thinh, Trong Nhan Le, Phan Hien Vu, Tan Long Le and Kha Huynh Hoang [4] reports that in this paper, authors present a proposed air quality monitoring system with multiple data sources for smart cities. Authors deploy the system in one of the biggest cities in Vietnam, Ho Chi Minh City. The proposed system uses data collected by the sensors and extracted from remote sensing images. The system also allows users to contribute by provide alerts through a portal.

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With data collected from sensors, authors can provide exact values of fundamental parameters for calculating air quality index (AQI) while data extracted from remote sensing images help governors estimate the AQI values in surrounding areas without sensors deployed. This estimation although cannot provide exact information as sensors, it helps users to quickly understand AQI in an extremely large area with low cost. Along with these data sources, notifications from users also allow governors to react unawareness problems faster. Experimental results show the error (difference) between the systems and commercial devices is less than 24% for sensing system and less than 9% for remote sensing images estimation. The sensing system presented in this paper is low-energy consumption when using only 900mW in average.

Paper 4 by Hong Anh Le [2] presents that Geographic Information System (GIS) has been played an important role in many applications of the daily life since 1970. Recently, with the rapid development of new technologies, earth's data increases explosively. Many studies have been proposed to extend big data platforms with spatial data storage and processing. GIS users, however, still need a method to work with a large of data sets with traditional tools. This paper proposes a method to integrate ArcMap with Apache Hadoop and its ecosystem. The method has two phases including database creating and querying in Apache Hive. There are two tools following the proposed method are developed for illustration purpose. The experiment results on a data set of taxi trips in a year show that the method impressively improves the query performance.

For the preparation of this twenty third issue we would like to acknowledge the work of all our Editors, reviewers and authors who have positively supported this publication. We will be happy to receive from our readers any suggestions, including possible proposals for future issues, which may contribute to further maintain the high scientific quality and relevance of this journal.

We hope you will find this twenty third issue provoking for your research in the field of context-awareness and being useful to your future work.

About the Editor-in-Chief

Phan Cong Vinh received a PhD in computer science from London South Bank University (LSBU) in the United Kingdom. He finished his PhD



dissertation with the title of “Formal Aspects of Dynamic Reconfigurability in Reconfigurable Computing Systems” at LSBU where he was affiliated with the Center for Applied Formal Methods (CAFM) at the Institute for Computing Research (ICR). At present, he is an Associate Professor of Nguyen Tat Thanh University (NTTU) to

take on the responsibility of a senior research scientist. He has been author or co-author of many refereed contributions published in prestigious journals, conference proceedings or edited books. He is editor of three books titled, “Autonomic Networking-on-Chip: Bio-Inspired Specification, Development and Verification” (CRC Press, 2012), “Formal and Practical Aspects of Autonomic Computing and Networking: Specification, Development and Verification” (IGI Global, 2011) and “Nature-Inspired Networking: Theory and Applications” (CRC Press, 2018). He has served on many conference program committees and has been general or technical (co)chair and (co)organizer of several international conferences such as ICCASA and ICTCC series. His research interests center on all aspects of formal methods in computing, context-awareness, nature of computation and communication, and applied categorical structures in computer science.

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