GUEST EDITORIAL

SENSORS AND SIGNAL PROCESSING

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The advanced sensors have been applied to measuring some complex systems. The algorithm of sensors is developed for different applications, and complex signal processing methods are presented in these papers.

In this issue, 7 papers on sensors and signal processing are selected through a peer view process. These papers are mainly concerned about the problems in network sensor processing, application in biology. Sources of these papers come from 10th International Conference on System of Systems Engineering (SoSE2015) and 2014 World Automation Congress (WAC 2014).

There are two papers on sensor. Murai et al. attempted to evaluate the mental workload using heart rate variability (R-R interval), and the performance using body acceleration in the maritime society. The experiment was carried out using a ship handling simulator, a real ship, and a port radio for confirming whether the sensor was useful or not in the real maritime situations. They proposed that physiological index and body acceleration do well for evaluating navigator's and port coordinator's mental workload and performance for real situations and simulator-based ship handling. The result shows that the heart rate variability and body accelerations read their mental workload and performance well. They confirmed that the sticking plaster-type sensor is friendly for the subject of the maritime society because it consists of one piece, and soft. Nguyen et al. exploited an integration between compressed sensing (CS) and sensor collaboration. They proposed an algorithm supporting distributed mobile sensor networks (MSN) for scalar field mapping that had many applications such as environmental monitoring or battle field surveillance, etc. In the algorithm each distributed mobile sensor measured at random positions in a sensing area to form CS measurements and exchanged the measurements to the others through its communication range. All the energy consumption for communications in the network were analyzed and formulated.

There are three papers on signal processing. Rad et al. showed that InfiniBand Low Latency Software Defined Network for high performance cloud was studied in order to understand the performance characteristics of I/O bound scientific workloads deployed on public or private cloud infrastructures. They presented a dynamic flexible low-latency networking architecture for clouds to support high performance computing, and another major contribution of this paper was the

evolution of the proposed architecture with micro and application level benchmarks. The proposed architecture is the first attempt to make cloud architecture suitable for HPC applications that requires high performance communication support. Matsumoto showed that the results applying typical HOG (Histograms of Oriented Gradients)-SVM (Support Vector Machine) based sliding window object detector to the navigational images. For this purpose, large set of navigational images are collected and annotated. He discussed the difficulties and their possible remedies. To overcome the variations in appearances, exploiting multiple classifiers can be effective. The algorithms should be accelerated simultaneously. Jiang et al. showed that applying big data technology in to the study of landslide monitoring is providing a new way to express landslide data monitoring processing and analysis. They introduced the key technology of big data, as well as analyzing the defects using the traditional analysis method of landslide data monitoring. The paper combines the advantages of big data technology, and brings forward four applications of big data technology in landslide monitoring.

There are two papers on application in biology. Ichihara et al. had produced hybrid liposomes (HL) which can be prepared simply by sonication of a mixture of vesicular and micellar molecules in a buffer solution. They had employed HL for chemotherapy and detection of cancer. The chemotherapy and detection of cancer cells with drug-free HL was established without any side effects for the first time. Sakai et al. investigated the influence of protein content in CSF for DWI thermometry on both phantom and patients. They assessed patients with subarachnoid hemorrhage (SAH), as one of the most common forms of brain hemorrhage, and showed that protein content <10 mg/ml did not affect DWI thermometry and low Fisher scale on DWI thermometry in patients with subarachnoid hemorrhage was unaffected by hemorrhage. They discussed the effects of blood contamination on DWI thermometry.

ABOUT THE AUTHORS

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