Hindawi
Journal of Sensors
Volume 2019, Article ID 2513493, 2 pages
https://doi.org/10.1155/2019/2513493

Editorial

Cost-Effective Techniques for Sensors Technology

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Received 31 December 2018; Accepted 31 December 2018; Published 17 March 2019

The concept of the Internet of Things (IoT) has opened a new paradigm in the interaction between objects and human beings. In the IoT, sensors and actuators are embedded in physical objects and interconnected through wired and wireless networks, creating new opportunities from hardware, software, and applications. In this regard, sensors play a fundamental role to extract valuable information of the object and its environment. The enormous significance of sensors for developing valuable applications in the IoT makes them a hot spot in research activities, where miniaturization, performance, and power consumption are the most important lines of development. It is expected that more than 25 billion connected "Things" will be in use by 2020. Each of this IoT entitites will contain at least one sensor; therefore, it is desirable to integrate cost-effective sensors. This special issue is aimed at serving as a major platform to facilitate the discussion and exchange of research ideas and technology development, encourage multidimensional knowledge sharing, and enhance research activities in investigating strategies to optimize techniques for sensor technology. In total, seven papers are included in this special issue and are summarized as follows.

Three papers describe different technologies to develop cost-effective sensors. In particular, shear force sensors fabricated by inkjet printing, piezoelectric sensors to detect adulteration in liquor, and spray-deposited temperature sensors. The shear force sensor consists of four miniaturized printed capacitors, exhibiting a normal force sensitivity of $S_z = 5.2$ fF/N and a shear force sensitivity of $S_y = 13.1$ fF/N in the force range from 0.1 N to 8 N. In the case of the piezoelectric sensor, authors demonstrate the capability of the quartz crystal resonator (QCR) to characterize samples of liquor at different concentrations of adulteration and classify them according to their viscosity, detecting fake liquor. The transparent nanomaterial-based temperature sensors are fabricated with different material combinations. The highest Seebeck coefficient is found for a junction made of carbon nanotubes (CNTs) on top of silver nanowires (AgNWs), whereas its efficiency in terms of power is the lowest because of the higher sheet resistance of the CNTs. The best combination for energy harvesting purposes would be poly(3,4-ethylenedioxythiophene) polystyrene sulfonate (PEDOT:PSS) and AgNWs.

The other four papers investigate different algorithms for optimizing sensing performance. First, a study on attenuation properties of surface wave of acoustic emission (AE) simulation source based on piezoelectric composite material (OPCM) sensing element is presented. Then, a robust data interpolation for incomplete acquisition in wireless sensor networks is shown based on back propagation artificial neural network operator. Also, an indoor and outdoor positioning system is described using a hybrid of support vector machine and deep neural network algorithms. The results also show that the proposed approach can provide scalable positioning, and 100% of the estimation accuracies are with errors less than 1 m and 1.9 m for indoor and outdoor positioning, respectively. Finally, an attack resistant VANETs

security algorithm (VANSec) is detailed in terms of trust computation error and normalized routing overhead to establish communication among vehicles (V2V) and road-side infrastructure (V2I).

Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this article.

Acknowledgments

The guest editors hope the information provided in this special issue is useful. Finally, we would like to thank the authors for an excellent contribution of their research works as well as very warmly acknowledged the reviewers for their valuable comments.

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