

---

## Editorial

---

### Serge Demidenko\*

School of Engineering,  
Monash University Sunway,  
Malaysia

and

School of Engineering and Advanced Technology,  
Massey University,  
Wellington, New Zealand

E-mail: s.n.demidenko@ieee.org

\*Corresponding author

### Gourab Sen Gupta

School of Electrical and Electronic Engineering,  
Singapore Polytechnic,  
Singapore

and

School of Engineering and Advanced Technology,  
Massey University,  
Palmerston North, New Zealand

E-mail: sengupta@sp.edu.sg

### Subhas Mukhopadhyay

School of Engineering and Advanced Technology,  
Massey University,  
Palmerston North, New Zealand

E-mail: s.c.mukhopadhyay@massey.ac.nz

**Biographical notes:** Serge Demidenko is a Professor with the School of Engineering, Monash University Malaysia-Australia, and Chair of Electronic Engineering with the School of Engineering and Advanced Technology, Massey University, New Zealand. His main research areas are electronic design and test, fault-tolerance and signal processing. The list of his research publications includes over 200 items. He is a Fellow of *IEEE* and *IET*, and UK Chartered Engineer. He is on Editorial Board of six international journals including *IJISTA – Int. J. Intelligent Systems Technologies and Applications*; *JETTA – Journal of Electronic Testing: Theory and Applications* and *IEEE Transactions on Instrumentation and Measurement*.

Gourab Sen Gupta received his BE (Gold Medal) in Electronics from the University of Indore, India and MEE from the University of Eindhoven, The Netherlands. He was a Software Engineer, Philips India. Currently, he is a Senior Lecturer with the School of Electrical and Electronic Engineering, Singapore Polytechnic, Singapore (on leave) and a Senior Lecturer with the School of Engineering and Advanced Technology, Massey University,

New Zealand. His areas of specialisation are: robotics, vision processing, sensor integration, embedded systems and programming. He is an author of over 70 research publications. He is a Senior Member of *IEEE*.

Subhas Mukhopadhyay graduated (Gold Medal) from Jadavpur University, India. He received MEE from Indian Institute of Science, Bangalore, India, PhD (Eng.) – from Jadavpur University, and DEng from Kanazawa University, Japan. He is an Associate Professor with Massey University, New Zealand. He has authored over 210 publications in electromagnetics, control, electrical machines and numerical field calculation. He is Fellow of *IET* and Senior Member of *IEEE*. He is on Editorial Board of five international journals including: *IEEE Sensors Journal* and *IEEE Transactions of Instrumentation and Measurement*.

---

In recent years, intelligent (smart) sensors, sensor arrays and sensor networks have become an integral part of a range of diverse industries, homeland security, agriculture, automation and preventive maintenance, numerous military projects, environment and water quality monitoring, healthcare and many more. The key benefit of intelligent sensor systems lies in their ability not just to poll the data read by sensors, but also process, store and analyse the data at local facilities, as well as to fast transfer the information (often wirelessly) between the system nodes. The high-volume applications of such systems increase their efficiencies of scale, leading to lower prices and promoting their adoption in new areas. As smart sensor and sensor networks are offering wider functionality, performance and numerous market benefits in the present era often called ‘information age’ (reflecting the shift of the global economy focus from the pure production domain towards information processing), specialists are now looking towards the future ‘sensor age’ with its enmeshing of the physical world with cyberspace. Foundation of this future transition is laid today by the ongoing extensive research activities in sensing technology and relevant fields carried out by a large community of scientists, researchers and engineers virtually all over the world. This Special Issue of *Int. J. Intelligent Systems Technologies and Applications* on ‘Sensors in the information age’ presents some of the recent results of such research activities.

The Special Issue consists of nine articles. The first two articles are related to data processing in sensing systems. It is opened by the article by M.W. Bigrigg et al. proposing to use prediction techniques to anticipate a next sensor value. The aim is to enable one sensor to anticipate the data from another sensor, given a historical stream of data obtained from it. The specific approaches explored in the article include the use of artificial neural networks, pattern recognition and multivariate polynomial regression. The capability to solve ordinary differential equations in hardware and by doing this to increase the operation capacity of sensing systems in areas such as self-diagnostics, model-based measurement and self-calibration is discussed in the next article which is authored by Y.C. Kuang and his co-authors.

This is followed by two articles in the area of image sensing. The first article deals with image sensing. The authors (C. Messom and A. Barczak) present new techniques enhancing feature extraction and recognition of rotated integral images, which is particularly important in such tasks as face tracking, image classification, etc. The second article authored by T. Hemamalini et al., discusses detection of coastal erosion and accretion of a coastal area by means of remote sensing information processing.

The third group consists of the articles devoted to the field of sensor design and applications. The first article (by H.J. Pandya) presents a novel approach of fabricating array of Indium Tin Oxide thin films grown on alumina substrate using direct evaporation. The resultant thin film gas sensor is used for detection of small concentration volatile organic compounds and their mixtures. The second article is authored by I. Ihara and M. Takahashi. It presents a new ultrasound inversion method for determining 1D temperature distribution inside materials. Monitoring of the transient variation in the internal temperature distribution inside materials being processed at high temperatures is required and very important in the industry. The last article of the group (written by D. Djukic) discusses characterisation of magnetic materials which are widely employed in sensing technology.

The Special Issue is concluded with two articles on application of sensing technology in navigation in robotics. In the first article, the author (L. Huang) proposes to use a group of infrared sensors for mobile robot navigating in an environment where stationary physical features like walls exist as natural reference objects. A method to detect a discontinuity of the wall is also presented. In the second article (by R. Akmeiliawati et al.), the use of laser and vision sensing for navigation of a simple fully-autonomous mobile robot capable of performing obstacle detection and avoidance is presented.

We hope that the readers of this Special Issue would find it interesting, inspiring and useful in their theoretical and practical research and engineering development work. We would be glad to hear from the audience with their comments on this Special Issue as well as with recommendations and proposals on how the sensor technology community could be served better.

We would like to extend our wholehearted thanks to all the contributors to this Special Issue, while our special thanks go to Liz Harris and staff of the Inderscience Publishers for their patience, professionalism and extremely efficient editorial support.