

# Guest Editorial

## Special Issue on Recent Advances in Power Electronics and Internet of Things

Akhtar Kalam, Anand R, and G. R. Kanagachidambaresan

*Editorial Letter*

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**P**OWER management and the Internet of Things (IoT) are essential parts of the modern cyber physical system. This field is in rapid change in terms of technology, devices and future trends. Nowadays, the IoT and power management are prevalent in daily life, from cell phone to household applications. An individual's quality of life mainly depends on the amount of electrical power consumption. The energy resource usage has been considered as the most important and ubiquitous issue of the present era. This special issue focuses on improving the aspects of renewable energy generation using power electronic devices and better computational algorithms. *Artificial Intelligence* (AI) based switching algorithms are commonly used in DC/DC converters and the *Maximum Power Point Tracking* (MPPT) algorithm found its way into the solar energy conversion systems. The AI also has the capability to understand and react to faults in hybrid systems. The capability of a remote monitoring and surveillance is achieved with tiny wireless embedded systems commonly referred to as *sensor nodes*. The mobility of such sensor nodes is enabled through wireless connectivity protocols such as Bluetooth, ZigBee, WiFi, WiMAX, etc. This special issue includes the papers that bring enhancements to the lifetime of a network through the AI based intelligent algorithms. It mainly focuses on solutions to problems identified in smart grid, renewable energy supplies, power electronics and the IoT applications.

The paper "A Study of Inverter Drives and Its Ride Through Capabilities in Industrial Applications" provides a study view about the inverter drives and their capabilities in industrial applications. The industrial operating drives provide wide disturbances and, hence, a study on controlling and providing better results is discussed in this article.

The paper "An Enhanced Incremental Conductance Algorithm for Photovoltaic System" considers the incremental

conductance of a photovoltaic cell. The renewable energy is the major upcoming research area. In that regard, the efficiency improvement of such systems is considered and an algorithm to address this issue is framed in this article.

In the paper "Drift Free Variable Step Size Perturb and Observe MPPT Algorithm for Photovoltaic Systems Under Rapidly Increasing Insolation", the Perturb and Observe based MPPT algorithm is investigated. The algorithm concentrates on obtaining maximum power from limited input power supply. It also investigates the operation during rapidly increasing insolation.

Energy efficient and load balancing routing is necessary in *Mobile Ad Hoc Networks* (MANETs). An intelligent hybrid routing protocol is designed in the paper "An Intelligent Hybrid Protocol for Effective Load Balancing and Energy Efficient Routing for MANETs". The algorithm provides better load balancing and serves to be energy efficient in nature.

Monitoring of patients with remote sensors using wireless networks has become more famous. The paper "Epilepsy Detecting and Halting Mechanism Using Wireless Sensor Networks" provides an efficient epilepsy detection mechanism for patients in a hospital. The application could provide better care to patients in developing countries.

DFIG (*Doubly Fed Induction Generator*) is mainly used in wind based power plants. The paper "Research Issues in DFIG Based Wind Energy System" investigates the issues persisting in DFIG wind energy systems in different approaches.

The wireless smart metering concepts have got its own role in modern smart power system. The increased usage of smart meters and, consequently, the interference created due to the dense nodes distribution are thoroughly studied in the paper "A Collaborative Framework for Avoiding Interference Between Zigbee and Wifi for Effective Smart Metering Applications."

We would like to thank Editor-in-Chief of the *Electronics* journal for providing us an opportunity to edit a special issue in this esteemed journal.



**Akhtar Kalam** has been at Victoria University since 1985 and was a former Deputy Dean of the Faculty of Health, Engineering and Science for 7 years. He has wide experience in educational institutions and industry across four continents.

He received his B.Sc. and B.Sc. Engineering from Calcutta University and Aligarh Muslim University, India in 1969 and 1973, respectively. He completed his M.S. and Ph.D. at the University of Oklahoma, USA and the University of Bath, UK in 1975 and 1981, respectively.

He has worked with Ingersoll Rand and other electrical manufacturers. He has held teaching appointments at the University of Technology, Baghdad, Iraq and Capricornia Institute of Advanced Education, Rockhampton, Queensland. He is regularly invited to deliver lectures, work on industrial projects and examine external thesis overseas.

His major areas of interests are power system analysis, communication, control, protection and co-generation systems. He has been actively engaged in the teaching of Energy Systems to undergraduates, postgraduates and providing professional courses to the industry both in Australia and overseas. He regularly offers professional development courses on Power System Protection, Renewable Energy and Cogeneration and Gas Turbine Operation to the Energy Supply Association of Australia (ESAA) and Australian Power Institute (API).



**Anand R** currently serves as an Assistant Professor (Senior Grade) at the Department of Electrical and Electronics Engineering at Amrita School of Engineering, Bengaluru. His area of interest in research includes Power Electronics, Electrical Drives, Renewable Energy Systems and Soft Computing.

He completed his B.E. (Electrical and Electronics Engineering) from Velalar College of Engineering and Technology, Erode, India. He then completed his M.E. (Power Electronics and Drives) from AMS Engineering College, Namakkal, India. He completed his Ph.D. in Electrical Engineering from Anna University, Chennai, India.

He has 11 years of teaching and research experience. He has published his research works in 5 national conferences, 10 international conferences and 10 international journals, out of which majority of the papers are indexed in Scopus, SCI and Web of Science. He has filed and published 3 patents. He has membership in professional bodies like IEEE and IAENG. He has guided many B. Tech. and M. Tech. student projects.



**G. R. Kanagachidambaresan** received his B.E. degree in Electrical and Electronics Engineering in 2010, and M.E. Pervasive Computing Technologies in 2012, both from Anna University, Chennai, India. He completed his Ph.D. in Information and Communication Engineering from Anna University. He is currently an Associate Professor in Department of Computer Science Engineering, "Veltech Rangarajan Dr. Sagunthala" R&D Institute of Science and Technology, Chennai, India. His main research interests include IoT and fault tolerant system design.