Guest Editors' Introduction:

Special Issue on Instrumentation, Control & Automation

THIS special issue in the Internetworking Indonesia Journal (IIJ) represents the extended version of selected papers presented in the *International Conference on Instrumentation, Control and Automation* (ICA 2009) held on 20-22 October 2009 in Bandung, Indonesia. The international conference was organized by the Instrumentation and Control Research Group, Faculty of Industrial Technology, Bandung Institute of Technology (ITB). The conference is the tenth conference in the series, with the last event being the 9th Conference of Instrumentation and Control (CIC'2007) and the national Seminars on Instrumentation and Control. These were regularly hosted by the Instrumentation and Control Laboratory, Department of Engineering Physics, Faculty of Industrial Technology, Bandung Institute of Technology since 1988.

The international conference addresses the most recent topics in instrumentation, control and automation, both in research stages and industrial developments. It is the goal of the conference to become the scientific forum for academics, researchers, and practitioners, to share ideas, experiences, vision and information in this field. For over the 20 years of the running of these seminars and conferences, the group has fostered a solid community of instrumentation, control and automation in Indonesia.

In this special issue, five papers were selected to represent the investigation, the development and the application of information and communication technology in the area of instrumentation, control and automation.

The title of the first paper is the Construction and Operation of the MARS-CT Scanner. This paper presents the development of a spectroscopic CT scanner with capability of taking multiple energy CT images of small animal and pathology specimen. The researchers designed and constructed a gantry with corresponding control electronics and software to drive a conventional x-ray tube and a Medipix2 x-ray detector around an object of up to 100 mm diameter. The scanned images subsequently reconstructed into a 3D spectroscopic projection data. This study successfully takes 3D images at 43 μm resolution for small objects such as mice.

The second paper proposes the utilization of a random access scheme Slotted ALOHA (S-ALOHA) to improve the performance of multi-code multi-carrier code-division multiple accesses (MC-MC-CDMA) systems. The improvement is demonstrated in forms of the increase of number of assigned codes and sub-carriers, higher throughput for high bit rate signal transmission.

The third paper presents the Intelligent Learning Objects (LOs) Through Web Services Architecture. The authors has identified and created common Web services, which essential for the creation and authoring stages of typical e-Learning system architecture by utilized Learning Objects (LOs). These services provide a common interface between various components leading to the platform independence, the interoperability between learning systems and the function reusability of e-Learning platform.

The fourth paper presents the improvement of industrial control quality by using a statistical process control method. The authors uses the classical Tennessee Eastman Process Simulation Case to demonstrate the advantage of using the statistical process control module to evaluate the operation cost, the product quality, process pressure, and production rate, as well as to tune the control parameters.

The fifth paper demonstrates the utilization of ISE Simulator version 9.2i (Xilinx) and the very high integrated circuit hardware description language (VHDL) programming to evaluate the use of Field Programming Gate Array (FPGA) in a circuit for the detection and counting of partial discharge signals in underground cable.

The guest editors would like to thank to Editorial Board of IIJ and especially Dr. Thomas Hardjono as the Chief Editor for his support and encouragement from preparation until finalization of the selected papers of the International Conference on Instrumentation, Control and Automation (ICA) 2009 in the Internetworking Indonesia Journal (IIJ). The contribution from the invited authors is gratefully acknowledged. The guest editors would like to congratulate all authors for their efforts in preparing such excellent extended papers. The editors wish that the readers will find this issue not only stimulating but also helpful and practicable in instrumentation, control and automation areas.

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