Advances in Intelligent Systems and Computing

Volume 550

Series editor

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About this Series

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Roman Szewczyk · Cezary Zieliński
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Editors

Automation 2017

Innovations in Automation, Robotics and Measurement Techniques

Springer

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Foreword

For many years, industrial automation, robotics, and measuring techniques have been the key factors determining industrial development, creation of wealth, and improvement of quality of life both of individuals and whole nations. Creation of knowledge and deeper understanding of these fields is even more important nowadays, when we are participating in the fourth industrial revolution, associated with the ideas standing behind INDUSTRY 4.0. As a result of this revolution, sooner than we can expect, we will see the vanishing of the border between artificial intelligence, embedded in cyber-physical systems, and human beings. Hence, the current industry, managed by people, will be transformed into industry managed jointly by people and IT systems, pushing the efficiency of production to the levels never observed before.

This book presents the results of research presented during the International Conference Automation 2017. Top experts involved in research in the fields of industrial automation, robotics, and measuring techniques describe new developments in those fields. Each chapter presents theoretical analysis of specific technical problems, numerical analysis, and simulation results, as well as the implementation of the outcomes of this research applied to real-world problem.

We strongly believe that the presented theoretical analyses and models, practical solutions and guidelines will be useful for both the researchers working in the area of engineering sciences and the practitioners solving industrial problems in our world subjected to current technological transformation.

December 2016

Roman Szewczyk
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Editors

Prof. Roman Szewczyk received both his Ph.D. and D.Sc. in the field of mechatronics. He is specializing in the modelling of properties of magnetic materials as well as in sensors and sensor interfacing, in particular magnetic sensors for security applications. He is the leading the Development of Sensing Unit for a mobile robot developed for the Polish Police Central Forensic Laboratory and of methods of non-destructive testing based on the magnetoelastic effect. Professor Szewczyk has involved in over 10 European Union funded research projects within the FP6 and FP7 as well as projects financed by the European Defence Organization. Moreover, he has led two regional and national scale technological foresight projects and has been active in the organization and implementation of technological transfer between companies and research institutes. Roman Szewczyk is Secretary for Scientific Affairs in the Industrial Research Institute for Automation and Measurements PIAP. He is also Associate Professor at the Faculty of Mechatronics, Warsaw University of Technology and a Vice-chairman of the Academy of Young Researchers of the Polish Academy of Sciences.

Prof. Cezary Zieliński received his M.Sc./Eng. degree in Control in 1982, Ph.D. degree in Control and Robotics in 1988, the D.Sc. (habilitation) degree in Control and Robotics in 1996, all from the Faculty of Electronics and Information Technology, Warsaw University of Technology, Warsaw, Poland, and Full Professorship in 2012. Currently he is Full Professor both in the Industrial Research Institute for Automation and Measurement PIAP and the Warsaw University of Technology, where he is Director of the Institute of Control and Computation Engineering. Since 2007 he has been a member of the Committee for Automatic Control and Robotics, the Polish Academy of Sciences. Professor Zieliński is Head of the Robotics Group in the Institute of Control and Computation Engineering working on robot control and programming methods. His research interests focus on robotics in general and in particular include robot programming methods, formal approach to the specification of architectures of multi-effector and multi-receptor systems, robot kinematics, robot position-force control, visual servo control, and design of digital circuits. He is the author/co-author of over 180 conference and

journal papers as well as books concerned with the above-mentioned research subjects.

Dr. Małgorzata Kaliczyńska received her M.Sc. Eng. degree in cybernetics from the Faculty of Electronics, Wrocław University of Technology, and her Ph.D. degree in the field of fluid mechanics from the Faculty of Mechanical and Power Engineering in this same university. Now she is Assistant Professor in the Industrial Research Institute for Automation and Measurement PIAP and Editor of the scientific and technological magazine "Measurements, Automation, Robotics". Her areas of research interest include distributed control systems, Internet of Things, Industry 4.0, information retrieval, and webometrics.