Advances in Intelligent Systems and Computing

Volume 351

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About this Series

The series “Advances in Intelligent Systems and Computing” contains publications on theory, applications, and design methods of Intelligent Systems and Intelligent Computing. Virtually all disciplines such as engineering, natural sciences, computer and information science, ICT, economics, business, e-commerce, environment, healthcare, life science are covered. The list of topics spans all the areas of modern intelligent systems and computing.

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Roman Szewczyk · Cezary Zieliński
Małgorzata Kaliczyńska
Editors

Progress in Automation, Robotics and Measuring Techniques

Volume 2 Robotics
Control, automation, robotics and measuring techniques have been paramount to the development of industry in the last few decades. As currently the process of reindustrialization of European Union has gained importance, so have the mentioned disciplines. For this reason, both theoretical and application oriented developments in automation, robotics and measuring techniques are at the focus of interest of the scientific and engineering community.

It should be underscored that automation, robotics and measuring techniques have a significant innovative potential. In the case of automation and control, currently this potential is mainly connected with discrete systems, emergence of new actuators and sensors, new diagnostic methods, as well as modern design approaches exemplified by fuzzy logic, evolutionary computation, neural networks, probabilistic methods etc.

Development of field and service robots is still the most important part of theoretical and application development in widely perceived robotics. Crucial problems and challenges are associated with control of mechatronic systems in general, perception, navigation, manipulation and grasping, locomotion and reasoning.

Elements of measuring systems are recently developed on the base of such modern and advanced materials as graphene. Moreover, increase in computational power of modern computers fosters new approaches to advanced signal processing and experimental verification of sophisticated problems of the theory of metrology.

This book presents the recent progress in control, automation, robotics, and measuring techniques that are jointly trying to meet those challenges and to fulfil technological, economic and social needs of European Union. It presents the contributions of experts in those fields. Their work is concerned both with theory and industrial practice. Individual chapters present the theoretical analysis of specific technical problems, often supplemented by numerical analysis and simulation and real experiments on prototypes. The implementation of the research results in industrial practice is also reported.
We hope that the presented progress in theoretical analysis and practical solutions will be useful to both the researchers working in the area of engineering sciences and to practitioners solving industrial problems.

Warsaw, January 2015

Roman Szewczyk
Cezary Zieliński
Małgorzata Kaliczyńska
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About the Editors

Professor Roman Szewczyk received both his PhD and DSc 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 a 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 was 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 was leading two regional and national scale technological foresight projects and was 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.

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