



Diagnostic Requirements in Multi-Robot Systems

CEZARY ZIELIŃSKI

Warsaw University of Technology, Warsaw, Poland

C.Zielinski@ia.pw.edu.pl

robot programming methods, kinematics and force control, multi-robot system controllers, visual servo control, sensors utilisation in robot control, digital circuits design

Abstract

A general model of an agent based multi-robot system will be presented. Robots are treated as embodied agents composed of effectors, receptors and a control subsystem. Agents can communicate with each other directly. Distinction between hardware and software components is made. The behaviors of the agents as a whole and their components are expressed in the form of appropriate transition functions. They take as arguments the information produced by components of the agent or the other agents and produce values for those entities. On the one hand this approach is susceptible to mathematical formalization and enables the distinction of design patterns useful in the construction of single- and multi-robot control systems. Such complex systems are prone both to faults and errors. Based on the proposed model the current state of diagnostics in such systems and the requirements that should be fulfilled in the future shall be discussed.

Biography

Cezary Zieliński received the M.Sc./Eng. degree in control in 1982, the Ph.D. degree in control and robotics in 1988 and the D.Sc. (habilitation) degree also in control and robotics in 1996, all from the Warsaw University of Technology (WUT), Faculty of Electronics and Information Technology, Warsaw, Poland. In 2012 the professorial title was conferred upon him. He is a professor of the WUT, employed by the Institute of Control and Computation Engineering (IAIS). He spent 9 months as a visiting researcher at the Mechanical Engineering Department of the Loughborough University of Technology, Loughborough, United Kingdom, in 1990 and 1992, working on robot programming methods. In the years 1999-2001 he was employed as a senior fellow at Nanyang Technological University, Singapore, where he was involved in robotics research and mechatronics education. In the years 2002-2005 he served as the vice-dean for research and international cooperation at the Faculty of Electronics and Information Technology of the WUT. In the years 2005-2008 he served as the deputy director for research at the Institute of Control and Computation Engineering. Currently he is the director of this institute. In the years 2004-2008 he was a board member of the EURON II Network of Excellence within the FP6. He is a senior member of the IEEE and was the information officer in the Polish Section of the IEEE (2002-2006). In the years 2003-2007 he was a member of the Forecast Committee of the Polish Academy of Sciences: Poland 2000 Plus. Since 2007 he has been a member and was the secretary of the Committee on Automatic Control and Robotics of the Polish Academy of Sciences. Moreover, in the WUT he heads the Robotics Group in the IAIS, working on the design of special purpose robot manipulators, their controllers and programming methods. His research interests focus on robotics in general and especially include robot programming methods, multi-robot system controllers, robot kinematics, robot force control, visual servo control, utilisation of sensors in robot control, design of digital circuits. He is the author/coauthor of over 150 conference and journal papers as well as books concerned with the above mentioned research subjects.