

Learning from Real Issues

-Toward New Generation of Industrial Robots-

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Abstract:

The increase in the number of industrial robots used in factories is modest compared to the current needs of the industrial robots in many different fields. It is partially because we do not have enough number of systems integrators/engineers, who design robot systems or cells in order to install the robots for specific applications. Different from human workers, the industrial robots require a lot of peripheral systems specifically designed for given tasks, such as robot hand(s)/gripper(s), fixture(s), parts feeders, smart tools, etc. The current industrial robots, originally designed for universal automation, are far from the “universal.” In this presentation, we are going to introduce the concept of the Universal Manipulation and some of the recent research results. The ultimate goal of the Universal Manipulation is to create a robot system, which executes different tasks using general-purpose tools without designing peripheral systems for each task, without using parts feeders, and without programming of the robots. We discuss the issues for realizing the universal manipulation and introduce some of the solutions for the issues, which include new design of multi-purpose robot hands, integrated control system of visual and impedance servo, teaching by demonstration and so on.

Kazuhiro Kosuge is a Professor in the Department of Bioengineering and Robotics at Tohoku University, Japan. He received the B.S., M.S., and Ph.D. in Control Engineering from the Tokyo Institute of Technology, in 1978, 1980, and 1988 respectively. From 1980 through 1982, he was a Research Staff in the Production Engineering Department, Nippon Denso Co., Ltd. (DENSO Co., Ltd. at present). From 1982 through 1990, he was a Research Associate in the Department of Control Engineering at Tokyo Institute of Technology. From 1990 to 1995, he was an Associate Professor at Nagoya University. From 1995, he has been at Tohoku University. He received the JSME Awards for the best papers from the Japan Society of Mechanical Engineers in 2002 and 2005, the RSJ Award for the best papers from the Robotics Society of Japan in 2005. He is an IEEE Fellow, a JSME Fellow, a SICE Fellow, and a RSJ Fellow. He was President of IEEE Robotics and Automation Society for 2010-2011. He was IEEE Division X Director for 2015-2016.