

The Department of Mechanical Engineering
College of Engineering and Applied Sciences
Stony Brook University

Mechanical Engineering Seminar



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Lecture Title: Intelligentized Technologies for Welding Manufacturing Process

Wednesday, Sept. 09, 2015 at 11:00 AM, Room 173 Light Engineering Building

Abstract

This talk presents newest developments in novel technologies for intelligent manufacturing welding at Shanghai Jiao Tong University (SJTU). In particular, multi-source information of various types from dynamical arc welding processes, including joint seam, weld pool geometry, arc spectrum, arc acoustic signal, welding current and voltage, is acquired and fused in innovative ways. Novel methods are developed to extract characteristics from and model welding systems and manufacturing processes. Welding processes are controlled to better assure weld quality by using intelligent control methods such as neural network, fuzzy logic and adaptive learning. The welding work-piece and joint gap are successfully recognized through novel visual analysis. Challenges in autonomous guiding, real-time adaptive seam tracking, real-time adaptive robotic welding programming, etc. are all successfully addressed. To summarize, future directions in intelligentized technologies for modern welding manufacturing and their perspective applications are also systematically analyzed.

Biography

Dr. Shanben Chen (S.B. Chen) received his B.S. degree in industry automation from Dalian Railway Institute (Dalian Jiao Tong University) in 1982, and received his M.S. and Ph.D. degree in control theory and application from Harbin Institute of Technology, P. R. China, in 1987 and 1991 respectively. He worked as postdoctoral fellow at The National Key Laboratory of Advanced Welding Production of China in Harbin Institute of Technology (HIT) from 1993 to 1995, as professor and supervisor for doctoral candidates from 1995 to 2000, at HIT. From Apr. 2000 to present, he has been awarded the Special Professor position, Cheung Kong Scholar Program of Ministry of Education of P. R. China & Li Ka Shing Foundation, Hong Kong, and engaged in Shanghai Jiao Tong University, P. R. China. He is the director of Intelligentized Robotic Welding Technology Laboratory, School of Material Science and Engineering, Shanghai Jiao Tong University. Currently, Prof. Chen is a senior member of IEEE, the Chair of Robotics & Automation Committee of Chinese Welding Society (CWS), and a standing member of board of directors, CWS. Prof. Chen's research interests include intelligentized technologies for welding robot, intelligent control of welding dynamical process, modeling and control of complex systems, robust control of uncertain systems, and relevant ranging in welding automation and advanced welding manufacturing. Prof. Chen is the author or co-author of 10 academic books and more than 300 magazine papers. Prof. Chen has been charged with more than 30 research projects from National Natural Science Foundation of China (NSFC) and other chinese national scientific and technology program, he has hold more than 30 National invent patents of China in the field of information sensing, modeling and intelligent control of robotic welding Process. Prof. Chen has received 8 main scientific and technological awards authorized by National Sciences and Technology Ministry or other Ministries of China.

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