Plenary Abstracts

Robotics: The New Emerging Applications

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The discipline of robotics has emerged from developments in industrial robots where precision is of primary importance. Robotics research continues to contribute to the creation of objects and robotic systems that improve the quality of our lives. However, the body of knowledge generated in robotics is making an impact beyond robot applications. Recent developments coupled with advancement of computing technology facilitated the application of robotics knowledge to create robotic systems that can operate in unstructured environments occupied by humans, providing service and assisting humans. Furthermore, robotics as a science is being applied and contributing to the development of other disciplines not traditionally associated with robotics. These include computer graphics and animation towards realistic physical simulations of motions and interactions of moving bodies as they collide and interact with each other. Other applications include the study of motion-based behaviors of biological/organic materials including humans. The development of dynamic models of articulated bodies is central for achieving realistic motions and for the design of effective controllers with the needed performance in motions and interactions. These models are especially useful in simulation environments. At the same time, advancements in biology and other disciplines are having a significant influence on the developments in robotics. This synergy between robotics and emerging applications is resulting, for example, in biomimetic robotic systems with mechanical designs closer to biological beings and their learning capabilities. In this presentation, we will discuss models and algorithms in robotics and highlight examples showing their diverse applications.

Biography

Marcelo H. Ang, Jr. is associate professor in the Department of Mechanical Engineering, National University of Singapore. He received the B.S. degrees (Cum Laude) in Mechanical Engineering and Industrial Management Engineering from the De La Salle University, Manila, Philippines, in 1981; the M.S. degree in Mechanical Engineering from the University of Hawaii at Manoa, Honolulu, Hawaii, in 1985; and the M.S. and Ph.D. degrees in Electrical Engineering from the University of Rochester, Rochester, New York, in 1986 and 1988, respectively. His work experience include heading the Technical Training Division of Intel's Assembly and Test Facility in the Philippines, research positions at the East West Center in Hawaii and at the Massachusetts Institute of Technology, and a faculty position as an Assistant Professor of Electrical Engineering at the University of Rochester, New York. In 1989, Dr. Ang joined the Department of Mechanical Engineering of the National University of Singapore, where he is currently an Associate Professor. He also holds a joint appointment with the Division of Engineering and Technology Management as Deputy Head. In addition to academic and research activities, he is actively involved in the Singapore Robotic Games as its founding chairman. His research interests span the areas of robotics, mechatronics, and applications of intelligent systems methodologies. He teaches both at the graduate and undergraduate levels in the following areas: robotics; creativity and innovation, applied electronics and instrumentation; advanced computing; product design and realization, and special topics in mechatronics.