Title:

Super Sensing and Manipulation for Dynamic Intelligent Robots

- We can build a robot too fast to see.

Abstract:

High-speed vision or high-speed image processing can be implemented by using parallel processing vision chips and opens new applications in robotics and related research fields. We developed a pixel wise fully parallel processing vision chip and a stacked CMOS vision chip which has a layer of a high-speed CMOS imager and a layer of a column parallel processing element array (1,304 PEs). Those chips can carry out high-speed image processing at 1,000 fps with low latency in the chips.

As the video rate is not enough for controlling dynamics of intelligent robots, so high-speed vision is a key technology for realizing high-speed and low latency intelligent robots based on visual feedback.

In this talk, high-speed vision devices and systems, hierarchical parallel processing architecture for intelligent robots, high-speed robots controlled by high-speed vision such as throwing and batting robots, a dexterous hand, a bipedal running robot, and game playing robots will be shown. In addition, demonstrations of dynamic projection mapping will be shown as examples of interactive reality with robots.

Biography:

Masatoshi ISHIKAWA received the B.E., M.E. and Dr. Eng. degrees in mathematical engineering and information physics in 1977, 1979 and 1988, respectively, from the University of Tokyo. He was a researcher at Industrial Products Research Institute, Tsukuba, Japan, from 1979 to 1989. He moved to the University of Tokyo as an associate professor in 1989. He was a professor of information physics at University of Tokyo from 1999 to 2020. He was an executive adviser to the president, a vice-president and an executive vice-president of the University of Tokyo, from 2002 to 2004, from 2004 to 2005, and from 2005 to 2006, respectively. He is a project professor at the Data Science Division, Information Technology Center, University of Tokyo from 2020. His current research interests include high-speed vision, sensor fusion, high-speed intelligent robots, visual feedback, dynamic intelligent systems, and dynamic interaction.

URL (Laboratory): http://ishikawa-vision.org/

YouTube Channel: https://www.youtube.com/IshikawaLab