YAMAKAWA LAB.

High-speed Robot Beyond Human

Department of Mechanical and Biofunctional Systems
Harmonic Mobility Research Center

Department of Interdisciplinary Information Studies, Graduate
School of Interdisciplinary Information Studies, and Department   High-speed Flexible Robotics
of Mechanical Engineering, Graduate School of Engineering   http://www.hfr.iis.u-tokyo.ac.jp/index-e.html
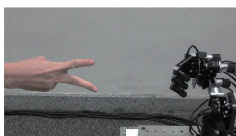
High-speed Robot System

We have been developing high-speed robot system including high-speed vision, high-speed image processing, sensor network and sensory feedback. For example, we developed a high-speed robot hand, which can perform speed of 180° / 0.1 s, and a high-speed hand-arm system. Then, we have achieved tasks with these systems and new methods.
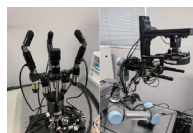

High-speed Robot

Human-Robot Interaction

Janken Robot

By using a high-speed vision and a high-speed robot hand, we have constructed super low-latency and real-time human-robot interaction system. As concrete tasks, we have achieved Janken (rock-paper-scissors) robot with 100% winning rate, human-robot cooperation, assistance system and enhancement of human motion.

Dynamic Manipulation

We focus on flexible object manipulation which is considered to be difficult to perform robots, and we aim to achieve dynamic and high-speed manipulation of flexible objects. In the previous researches, we achieved one-handed knotting of a flexible rope and dynamic folding of a cloth using a high-speed robot hand system.
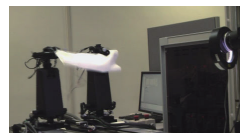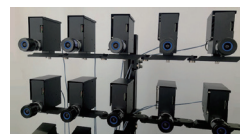

Dynamic Folding

Intelligent Transport Systems

Onboard High-speed vision

We investigate sensing technologies for vehicles through high-speed, high-accuracy recognition of the vehicle and its surrounding environment using high-speed vision. For example, we propose a novel approach to help vehicles react more quickly when a pedestrian suddenly appears out of a blind spot.

High-speed Sensor Network

We are developing a measurement system that captures and processes 1,000 images per second, enabling stable tracking of multiple objects over a large area. Its high-speed imaging and networking capabilities allow seamless spatiotemporal observation of dynamic motion, with applications in IoT and security.

High-speed Camera Network