High-speed Robot, HRI, Dynamic Manipulation, ITS, High-speed Sensor Network

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Yamakawa LAB.

[High-speed Robot Beyond Human]

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High-speed Flexible Robotics

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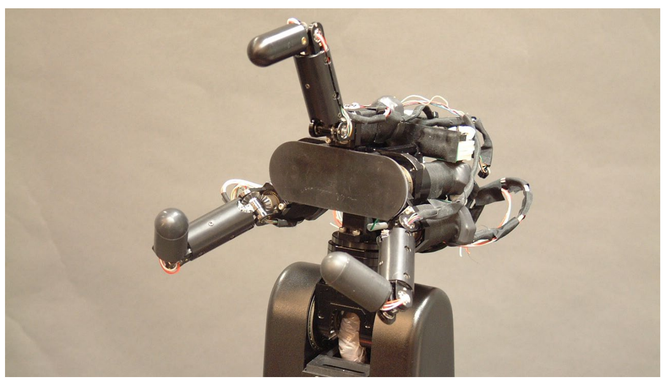
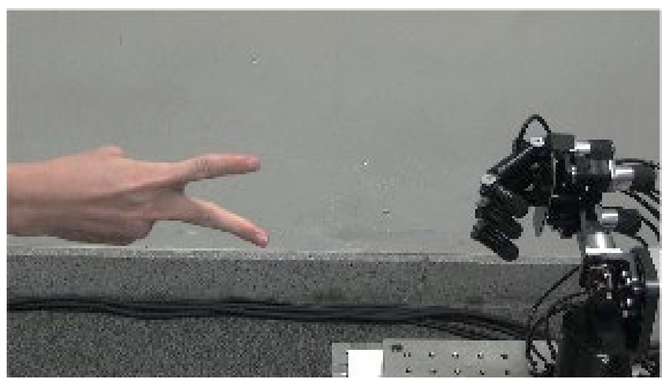
High-speed Robot System

Our laboratory has 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° / 0.1s.



High-speed Robot Hand



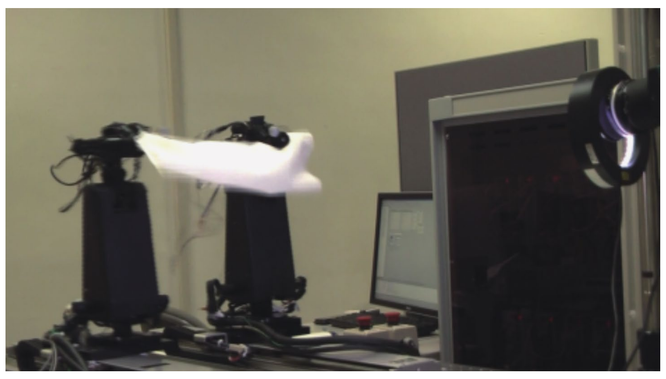
Janken Robot

Human-Robot Interaction

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

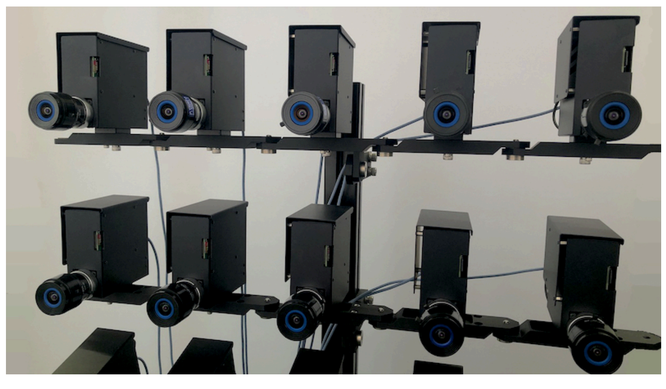
Road Surface Vision

Intelligent Transport Systems

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 are developing systems for vehicle's posture estimation and localization by capturing and analyzing proximate road surface.

High-speed Sensor Network

We have developed a measurement system that can capture and process 1,000 images per second and are studying how to detect and stably track multiple objects in a large area. The features of high speed and networking make it possible to observe the dynamic motion of objects with seamless spatiotemporal information.



High-speed Camera Network