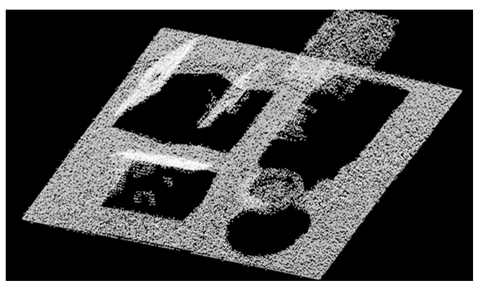
Hashimoto-Yamaguchi Laboratory / Kagami Laboratory

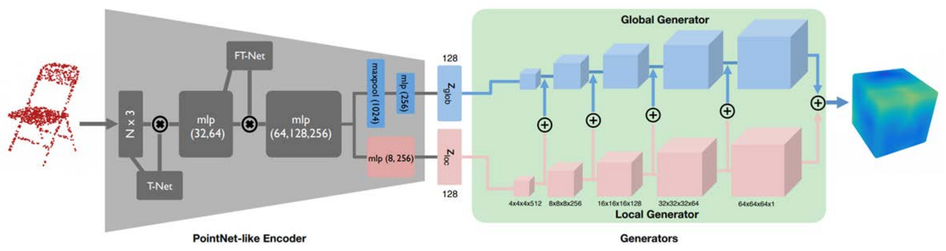
Course of Robotics, Department of Mechanical and Aerospace Engineering
(Graduate School of Information Sciences) **http://www.ic.is.tohoku.ac.jp/**

Our goal is to achieve intelligent and flexible control of high-speed sensory-motor systems. Our research activities involve both theoretical and practical studies such as visual servoing, high-speed vision systems, projection systems, 3D vision systems, system and control theory, and system biology.

3D Robot Vision

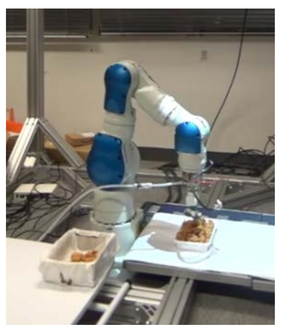
Use of 3D data is becoming popular in industrial robotics. There are many applications such as automatic assembly and handling parts. We aim to develop 3D robot vision with state-of-the-art AI technologies; for example 3D sensing with sparse estimation, efficient algorithms for processing point cloud, and 3D data analysis with deep learning.





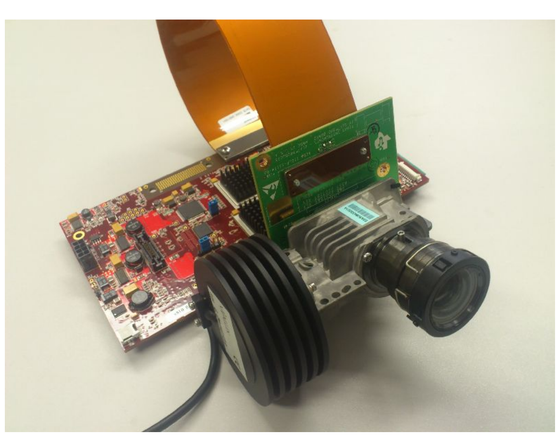
AI-based Manipulation & Tactile

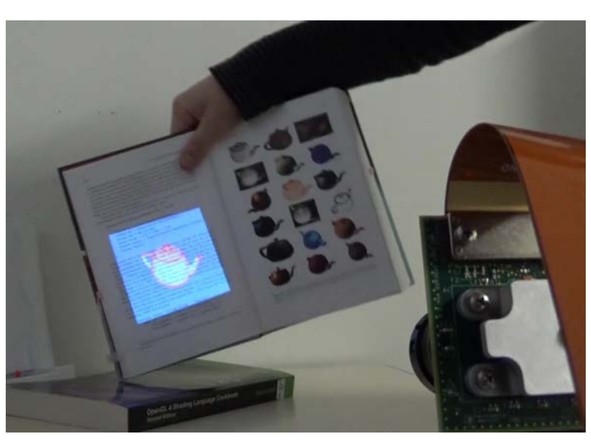
We are exploring methods to control robots for industry and everyday life with artificial intelligence technologies including machine learning, deep learning, reinforcement learning, reasoning, robotics, and computer vision. For better robotic manipulation, tactile sensing is important as well as vision. We are also working on tactile sensors for robot hands.



High-Speed Vision & Projection

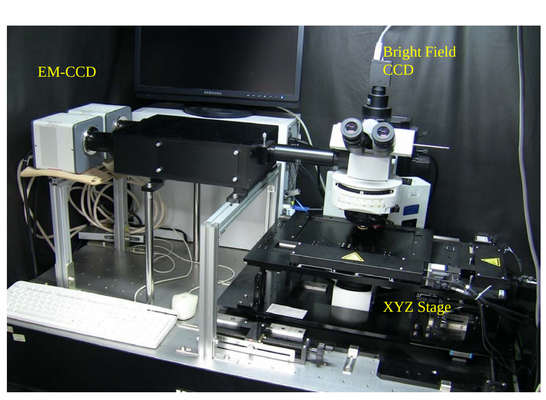
In order for machines, robots and humans to coexist and cooperate comfortably and safely, information systems must recognize and interact with the surrounding environment promptly and robustly. We are investigating systems and methods for robots and information systems to recognize the real world in real time, with high-speed visual processing technologies and high-speed projection systems as the core competence.





System Biology & Navigation Science

Ethology is the study of animal behavior. Our objective is to analyze the neural system that cause behavior change using model animals like nematoda (C. elegans) or fruit flies (Drosophilidae). We are developing systems for observing and analyzing the neural activities in these animals using high-speed vision and robotics.



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