Division of Mechanical Science and Engineering	Research field	Intelligent Mechanical System	Lab. ID MS20
Laboratory web site	http://zkks.w3.kanazawa-u.ac.jp/watanabe/		

Research subjects

We are developing intelligent informative mechanical system, based on robotics technology. First example is robotic hand system whose fingertip is a rubber bag filled with viscoelastic fluids. We are developing strategies for grasping and manipulating fragile objects via the robotic hands. Another example is medical systems. We are developing endoscopes and retractors having force and softness measuring functions, collaborating with neurosurgeons. We also measure human motion, in order 1) to identify causative disease, 2) to evaluate fall risk in walking, 3) to evaluate performance in manipulation of user interfaces. Based on the evaluation, we also try to develop control system of human performance by five senses stimuli.

Master/Doctor course: Education policy, curriculum, typical activity in the laboratory

We have weekly meetings where every student make a presentation about her/his research progress, and discuss the contents. The topics are widely speeded, and every student can learn how to see things from many kinds of viewpoints. Every student has to have at least one question at the meeting, in order to improve activity. We encourage to submit a paper and to make a presentation at a conference, especially international conference. Therefore, the schedule for research usually depends on the deadline for conferences. Through the presentations at conferences, Students learn how to make a presentation.

Daily life in the laboratory, etc.

The duties for students are presentation at weekly meeting and to meet deadlines for submission of papers. We do not impose when students should be at Laboratory. But, almost of the students come to the laboratory before noon, and have a lunch together. There are almost always several foreign students, and we have welcome/farewell parties to make a good friendship.

Message or comments by the laboratory faculty staffs

Our goal is to make human resource whose international activity is very high. However, do not have anxiety about own ability, because students can spontaneously learn how to be globally active if doing our program. We saw several students who firstly do not have confidence while finally do have it. We hope students will succeed in future carrier, thanks to the confidences in their own ability which are gotten through their research activities.

Recent Master theses in these 3 years (+ more if appropriate)

year.month	Thesis title (including English translation of Japanese thesis title)
2017.3	Processing facilitation of laser processing machine based on registration between 3D cad model and actual parts.
2017.3	Development of robotic hands with softness changeable skins and joints
2017.3	The effect of behavior preference on learning in humanoid robot manipulation
2017.3	Wheelchair control based on a polynomial function approximating gaze curves
2016.3	Tofu grasping based on viscoelasticity analysis for contact area
2016.3	Development of stiffness sensor system attachable to endoscope
2016.3	Development of human area detectable safety system utilizing visual sensors
2015.3	Development of softens display system in manipulator system for neurosurgery
2015.3	Visualization of fall risk assessment based on gait analysis
2015.3	Effect of display information in human performance control
2014.3	On contact matching mechanism in object grasping
2014.3	Robotic hand with viscoelastic surface
2013.3	Stiffness changeable artificial skin for robotic hand
2013.3	Robotic system for neurosurgery
2013.3	Feature extraction for Identification of the Causative Disease of Intermittent Claudication

Recent Doctoral theses in these 3 years (+ more if appropriate)

year.month	Thesis title (including English translation of Japanese thesis title)
2016.3	Study on Object Grasping taking into Consideration Deformation of Fingertips and Grasped Object
2012.9	Unknowns and Uncertainties Handling Method for Object Manipulation with Robotic Hand

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