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Scuola Politecnica e
delle Scienze di Base

Dipartimento di
Ingegneria

prof. Ciro Natale – Corso di Robotica, L.M. in Ingegneria Informatica

SEMINAR ANNOUNCEMENT

WHO: **Prof. Goro Obinata**
Chubu University
Kasugai, Aichi, Japan

WHAT: **Design of haptic display for the feedback from vision-based tactile sensor**

WHEN: Friday, 26 October 2018, 11:30 – 12:30

WHERE: Via Roma 29, Aversa, Sala del Consiglio

Abstract – Vision-based sensors with soft surface were proposed to achieve tactile sensation like the ones observed in human fingertips. Its design consists of a digital camera, LED light and a soft-pad for touching. The measurement is based on deformations of the pad surface, which reflects the contact surface. A very small camera captures the alterations in the pad surface, and an algorithm is able to analyze the changes in the images in order to catch the deformation of contact surface. The sensor is able to measure dynamic characteristics: multi-dimensional force and moment, degree of adhesion and shape of the contact surface. The important feature worth noting is that the sensor is able to estimate the adhesion degree with the contact surface, then determine whether the contact object moves (macro slipping) or stays with the sensor surface (incipient slip) under a certain amplitude of pressure force.
Tele-operation systems are still important even if robots with artificial intelligence are good enough to achieve many kinds of tasks. For an example, robots working in disaster sites cannot have enough chances to learn how to cope with such chaotic circumstances; therefore, it is hard for robot/AI to make the plan of behaviors in a specific disaster site. Tele-operated robots can work in such disaster sites based on human decision makings and the tele-operation. Haptic feedback may be useful for tele-operated robots in addition to visual feedback. Now, we are seeking to design a haptic feedback system with the vision-based tactile sensor. In this talk, the concept for the usage of a haptic display with the vision based tactile sensor are shown; moreover, preliminary experimental results of a display for presenting the slipperiness of a surface are given. All are welcome for discussing on the pair of the tactile sensor and the haptic display.

Bioskecth – Goro Obinata is a professor at the Chubu University. He received the M.S. and Ph.D. degrees in mechanical engineering from Tohoku University, Sendai, Japan, in 1974 and 1977, respectively. Since April 2002, he has been with the EcoTopia Science Institute, Nagoya University, Nagoya, Japan, where he was a Professor of the Integrated Research Project Division and the deputy Director of the Institute. During 1983–1990, he was an Associate Professor with the Mechanical Engineering for Production, Mining College, Akita University, Akita, Japan, and as a Professor during 1990–2001. During 2001–2003, he was a Professor with the Department of Mechanical Engineering, Graduate School of Engineering, Nagoya University. His research interests are in the areas of control theory, analysis of human sensory/motor systems, and assistive devices and robots for human movements. He was Editor-in-Chief of the Japanese Society of Automotive Engineering International Journal of Automotive Engineering until 2016.

Scuola Politecnica e delle Scienze di Base
Dipartimento di Ingegneria

Real Casa dell'Annunziata
Via Roma 29
81031 Aversa (CE)

T.: +39 081 5010204/362
F.: +39 081 5010463/290

dip.ingegneria@unicampania.it
dip.diii@pec.unina2.it
www.ingegneria.unicampania.it