



School of Integrated Technology (SIT)

SIT SEMINAR

- Energy Technology(ET)
- Culture Technology(CT)
- Intelligent Robotics Technology(RT)
- Common Subject

Friday, May 12th, 2017, 2:30 PM.
Room No. 105, RISE bldg. 1st Floor

(Host: Prof. Mun Sang Kim / Language: English)

Force Sensing and control for Medical Applications

Noh Yohan, Ph.D

Department of Biomedical Engineering, KCL



Cutting-edge breakthroughs in force/torque sensing and control has opened up the way for a wide variety of robotic applications including surgical operations, medical training, and health care. The surgical robotic manipulators are integrated with force/torque and tactile sensors which enable them not only to interact with surgical environments using haptic interfaces, but also to detect tumor's location by generating a stiffness map during surgical operations. The force/torque sensing and control enables robotic or prosthetic hands to manipulate and grasp an object dextrously, and to stably follow a certain trajectory whilst maintaining a pre-defined indentation depth. In addition, an impedance control using the feedback from torque sensors can simulate a variety of stiffness profiles in medical training systems, and assist patients in selfrehabilitation by tuning the values of joint stiffness according to their body condition. I have studied and proposed a great number of the robotic systems for use in medicine and healthcare in Japan, Korea, and UK as follows: 1) medical training robots for airway management and upper limb neurologic examination training systems, 2) a palpation device for localising tumor in robot-assisted Minimally Invasive Surgery (MIS) using an optoelectronic tactile sensing array, 3)bespoke miniaturised force/torque and tactile sensors for catheter ablation and MIS devices, 4) a soft manipulator for MIS, 5) a safety algorithm for robot-assisted ultra sound diagnostic systems. This seminar will provide an overview of my research, as outlined above, on force/torque and tactile sensing and control. In addition, I will also discuss my future research plans and possible future collaboration with China, Japan, and UK.