Cutaneous Feedback for Teleoperation in Medical Robotics

Morning Workshop
IEEE World Haptics Conference
June 22, 2015
Organizers

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Schedule

• 9.05 – 9.25  Dr. Antonio Gangemi (Univ. of Illinois Medical Center)
  “Robotic Training for General Surgery Residents at UIC”

• 9.25 – 9.45  Dr. Lawton Verner and Dr. Ryan Steger (Intuitive Surgical, Inc.)
  “Challenges to Adding Haptic Feedback to Surgical Robots”

• 9.45 – 10.05  Prof. Cagatay Basdogan (Koç Univ.)
  “Challenges in Characterization of Soft Tissue Material Properties”

• 10.05 – 10.15  Panel discussion

• 10.15 – 10.30  Coffee Break

• 10.30 – 10.50  Prof. Domenico Prattichizzo (Univ. of Siena and Italian Inst. of Technology) and Dr. Claudio Pacchierotti (Italian Inst. of Technology)
  “Cutaneous Feedback of Fingertip Deformation and Vibration for Palpation in Robotic Surgery”

• 10.50 – 11.10  Prof. Allison M. Okamura (Stanford Univ.)
  “Tactile Skin Deformation Feedback for Conveying Environment Forces in Teleoperation”

• 11.10 – 11.30  Prof. Dong-Soo Kwon (KAIST)
  “A Novel Surgical Pen-type Master Device using Vibrotactile Feedback”

• 11.30 – 11.50  Prof. Katherine J. Kuchenbecker (Univ. of Pennsylvania)
  “Tactile Feedback of Tool Vibrations in Robotic Surgery”

• 11.50 – 12.00 Panel discussion
Workshop Website

[Image of the Workshop Website]

Half-day workshop on "Cutaneous Feedback for Teleoperation in Medical Robotics"

The workshop will take place on Monday, June 22, 2015 during the 2015 IEEE World Haptics Conference in Chicago, USA.

Abstract

Telerobotic surgical systems involve a slave robot, which interacts with the patient, and a master console, operated by the human surgeon. The slave robot reproduces the hand movements of the surgeon, who in turn needs to observe the operative environment with which the robot is interacting. The latter can be achieved by a combination of visual and haptic cues that flow from the operating table to the surgeon. Visual feedback is already available in commercial robotic surgery systems (e.g., the Intuitive Surgical da Vinci Si), but current surgical robots have very limited haptic feedback.

This omission is due to multiple reasons, from the negative effect that haptic feedback has on the stability of the system to the difficulty of including accurate sensors in the robotic instruments due to sterilization and cost requirements. However, haptic feedback is still widely considered a valuable addition to teleoperated surgical systems.

For this reason, it is paramount to study and develop new systems to provide surgeons with haptic feedback from the operating tools, while guaranteeing the safety of the patient. In this sense, cutaneous feedback has recently received great attention from researchers; delivering ungrounded haptic cues to the surgeon’s skin conveys rich information and does not affect the stability and the safety of the teleoperation system.

The aim of this workshop is to bring together researchers from haptics and surgical robotics to discuss current research and future directions, to bring haptics in the operating room and improve the performance of current surgical robotic systems.

Audience

Topics include, but are not limited to: cutaneous haptic sensing and rendering systems, robotic teleoperation, safety and ethical issues in robot-assisted surgery and related medical scenarios. The workshop is open to any student, researcher as well as developer and end user interested in the design, development, and use of cutaneous feedback for teleoperated medical procedures.

http://sirslab.diism.unisi.it/whc15-cutaneous-in-medicine/

Slides and other material presented by the speakers will be made available on the website.
Please ask questions and join the discussion!