IEEE SMC Hiroshima Chapter Invited Special Talk

Date:
7 Nov. 2015

Time:
13:00 to 14:15

Location:
Lecture Building, Room 504
Hiroshima City Univ.

3-4-1, Ozuka-higashi, Asaminami-ku, Hiroshima, Japan
http://www.hiroshima-cu.ac.jp/english/category0029.html

Space is limited
Free to participate, but the registration is required. Please contact us by e-mail:

ieee-smc-hiroshima-exec@smc-hiroshima.info.hiroshima-cu.ac.jp

Medical Image Understanding and Computational Anatomy

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Abstract

By the rapid development of medical imaging equipments such as X-ray CT, MRI, PET, etc., data quantity yielded in hospitals is still explosively increasing. For instance, it often reaches to more than 1000 slices of X-ray CT and MRI images in a single examination. This is mainly due to improvement in spatial and temporal resolution of images, and acquisition of multi-modal information from various imaging physics. In contrast to such rich information, image-reading workload for radiologists becomes extremely heavier. In some cases, radiologists can take only less than one second per slice image in average and oversights of abnormalities may possibly occur. Therefore, full or partial automation of such image-reading tasks is a natural demand. Generally, image-reading task includes visual search of abnormalities in images such as tumors, deformation or degeneration of tissues. The computational support technology for assisting radiologists, so-called "Computer-Assisted Diagnosis/Detection (CAD)", based on image analysis and pattern recognition have a long history over 30 years. In the early phases of CAD technology development, simple schemes such as search of round-shaped structures were employed to obtain limited success due to lack of anatomical information. Recently, information of shape and structure of the inner organs as image analysis priors becomes indispensable for reliable results. That is, computational image understanding with anatomical knowledge is a certain standard of medical image analysis. Especially, thanks to machine learning approaches with high computational powers and large database, studies on statistical analysis and mathematical description of anatomical structures opened a new discipline called "Computational Anatomy". In this lecture, several examples of state-of-the-art techniques and systems are introduced and discussed with the practical problems in clinical situations.

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