東京大学グローバルCOEプログラム　機械システム・イノベーション国際拠点

東京大学 THE UNIVERSITY OF TOKYO

GMSI Global Center of Excellence for Mechanical Systems Innovation

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Fusional-aid for Diagnosis and Surgery Based on Computational Anatomy Model
- Toward New Era of Computer Assisted Surgery -

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会場：東京大学工学部2号館 2F 221 講義室

This presentation gives overview of our research project titled “Fusional-aid for diagnosis and surgery based on computational anatomy model.” Medical imaging devices such as multi-detector CT scanner have made remarkable progress in recent years. Such imaging devices can give us very precise representation of human anatomy. If we could effectively retrieve anatomical information of a patient from such images, it would be very helpful not only for assisting diagnostic process based on medical images (Computer-aided diagnosis: CAD) but also for assisting surgical procedures (Computer-assisted surgery: CAS.) For example, anatomical structure information, which is extracted from pre-operative images based on CAD techniques, greatly help a surgeon to understand anatomy of a patient and to plan a surgical procedure. Furthermore, such information can be used for navigating a surgeon by displaying anatomical structures in synchronization with endoscope motion during surgery. Also lesion detection such as enlarged lymph node detection gives important information. This mean it is necessary to develop a system that can fuse CAD and CAS techniques to achieve better surgical assistance environment. In such system, understanding and recognition of a patient anatomy are key issues.

Computational anatomy model, which assists a computer to understand and recognize patient anatomy, plays core role in the system. In our talk, we will give recent techniques for automatically understanding and recognizing patient anatomy from medical images. Also we will show examples of utilization of such information for pre-operative and intra-operative diagnosis for endoscopic surgery. The examples include automated segmentation of abdominal organs based on large-scale medical image database and automated recognition of anatomical names that are essential information to understand human anatomy. Virtual navigation based on patient anatomy information will be demonstrated.

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