บทสรุปสำหรับผู้บริหาร

During the past decades, Medical Imaging has played major roles in Computer-Assisted Diagnosis (CAD). With the recent advances in computational capability, imaging is now moving from being primarily diagnostic modality to therapeutic and interventional aid. Furthermore, with the recent developments in minimal access and Robotic Assisted Surgery (RAS), inline with the rapid emergence of biomechanic and heamodynamic modeling paradigms, the requirements for computational imaging has now reached the new height. Thus far, the state-of-the-art in these fronts has taken a long process from R&D to actual commercialization, putting CAD in full clinical environments on hold. In bridging this gap, our unit, supported by The Innovation Development Fund, in Her Royal Highness Princess Maha Chakri Sirindhorn, has developed a computational framework, which contains basic functional features frequently required in clinical practices. A set compatibility protocols have been defined such that novel CAD algorithms can be readily interfaced with minimal turn-around. As a result, with the perceptions of rapid technology transfer, medical personals are encouraged to fully participate in this challenging multi--disciplinary collaboration, and thus further enhancing the real progress in the fields.

In recent academic realm, we have seen a rapid surge in CAD research activities, mainly in terms of ideas and published articles. Despite its rapid emergence, CAD has unfortunately faced difficulties in attracting interests and participation from its targeted customers, e.g., medical personnel. Only few grounds - breaking research has, to date, made it off the shelf to software actually used in clinical environment. One of the major barriers is the fact that implementing CAD algorithms draws expertise from both clinical and computing areas. The lacks of investments on this human factor as well as the infrastructure required to commercialize the software into used has, so far prevented smaller research institutes to get involved. Moreover, attracting medical research partners is also a challenge. Although their experiences are most valuable in the design process of CAD software, they are, on many occasions reluctant to commit based primarily on computer simulations. On the other hand, many research centers that develop the software do not have access to state-of-the-art imaging facilities nor the patient imaging data in order to perform in vivo experiments as do the medical institutes.

To bridge the gap and encourage the collaboration between the computational and clinical fronts we have developed a computational framework that can integrate the new CAD algorithms, based on the PACS (Picture Archiving and Communication System) technology. The framework can launch the CAD software into clinical practices with only fraction of conventional turn-around. In its simple form, it contains the imaging functions frequently required, e.g., browsing, enhancing and annotating ROIs. Based on DICOM interface, it provides the socket for the third party software developers to incorporate their algorithm with minimal access to its internal mechanism.