國立中山大學資訊工程學系
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【主題】106 學年度第 2 學期資工系每週演講心得分享(09)
【TITLE】2nd semester of the 106th academic year, CSE weekly speech notes 09

【日期/時間】107 年 4 月 27 日(星期五)，14:10～15:40
【DATE/TIME】Apr. 27, 2018 (Fri.) 14:10 ~ 15:40

【主講人】熊颯柏 博士 / 國立中山大學資訊工程學系
【SPEAKER】Dr. Sebastien Bar / CSE of NSYSU
Dept. of Radiology, Medical Physics, University Medical Center Freiburg , Freiburg, Germany.

【TOPIC】Introduction to the Applications in MR

【ABSTRACT】Magnetic resonance imaging (MRI) is a very powerful tool used for medical diagnostic. With this technique, it is possible to image the inside of the human body in a non-invasive manner. The final break-through into the clinical routine took place in the early 1980's when the acquisition of appropriate images became possible in less than 1 minute. Since then, MRI advanced rapidly, allowing faster data acquisitions and significant improvements in spatial and time resolutions of MR images. Furthermore, new MR acquisition methods as well as post-processing techniques were developped enabling many new representations and interpretations of MR data.Based on examples taken from the work of the MR group of Freiburg, some typical applications of MRI will be presented here.

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【心得分享】

◎ Armacheska R. Mesa 梅紗（國立中山大學資訊工程學系博士班，影像處理實驗室）

This week's talk is all about the different typical applications in MRI. I find the talk very informative. The speaker discussed some of the research works they are doing in their MR group in Freiburg. The speaker conveyed the information in a not so technical way (only a few medical jargons) because the audience are mostly not from the field of medicine. I like the fact that he started discussing how MRI works before going through all the details of their research. The speaker presented the pros and cons of using MRI in various fields. I learned that applications in MRI is quite vast and its applications would extend into different fields. As a non-expert in MRI, I learned that it cannot only output clear images of human anatomy but it is also used in various applications like in the case of studying animals. Furthermore, I learned that MR and CT scanning are different in several ways and used in various applications. However, recent advancements in MRI would make a thin line on their differences, since there are medical breakthroughs that use MR instead of CT, although these are still in development and for further study. MR can also be used not only for medical diagnosis but also to model the brain activity, so psychologist and neurologist could use them in their study, to use it before and during medical operations. Indeed, MRI has overwhelming applications and I believe that recent innovations in technology would expand the use of MRI in multi-disciplinary domains.

◎ Cinmayii A. Garillos-Manliguez 秦瑪怡（國立中山大學資訊工程學系博士班，嵌入式系統實驗室）

Technological advancements in different disciplines inevitably need multi- and interdisciplinary research and innovations during the conception and/or utilization. In this presentation, Dr. Sébastien Bär presented the different applications of a very significant medical tool, the magnetic resonance imaging (MRI), through their projects in the Radiological Diagnostics and Therapy Laboratory in Germany. In the past 20 years of doing research on MRI, the team has already made several promising solutions to problems in medical diagnostics using MR imaging a few of those are a moving table for whole body acquisition that can help measure the amount of fat in the body, dental MRI for soft tissues, cardiovascular measurements, brain activity through visual stimulation, brain connectivity mapping, tumor analysis, among others. It is also interesting to know how MRI is becoming at par with CT scan and can even be more advantageous on certain aspects because it is non-invasive. With the current developments, the use of MRI with other data/image analysis techniques in the future will not only be limited to medical diagnostics, but can also be extended to archeology, psychology, biology, genetics, veterinary, aquaculture, and perhaps in nanotechnology. Dr. Bär also exhibited great knowledge in medical physics and discussed the technical concepts in MRI process in a simple way that is easily understood by students. Knowing how topics/techniques (e.g. Fourier Transform, compressed sensing, MR, image analysis, information systems) in computer science, medicine, and physics are interrelated motivates students to explore and learn more about our field of study. Through this seminar, students will appreciate more the importance of images and the information that can be obtained from it especially in medical research and diagnosis. This seminar also helps the students to broaden our knowledge and perspective on the applications of image processing in medical diagnostics through MRI.

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