

Title: Recent Advances in Medical Image Analysis Using Deep Learning

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Summary

Recently, deep learning (DL) plays important roles in many academic and industrial areas especially in computer vision and image recognition. Deep learning uses a neural network with deep structure to build a high-level feature space. It learns data-driven, highly representative, hierarchical image features, which have proven to be superior to conventional hand-crafted low-level features and mid-level features. Deep learning (DL) has also been applied to medical image analysis. Compared with DL-based natural image analysis, there are several challenges in DL-based medical image analysis due to their limited number of labeled training samples, high dimensionality and multimodality. In this talk, I will talk about several solutions for these challenges. I will first introduce deep atlas prior, in which we combined semi-supervised deep learning with anatomic atlas as prior information to solve the problem of limited annotated data. Then I will introduce VolumeNet, in which we proposed an efficient but accurate lightweight 3D network for medical volumetric data analysis. As third topic, I will introduce genotype-guided radiomics signature (GGR), in which we used gene information as a guidance for accurate CT-based recurrence prediction of lung cancer. I will also discuss futures of DL in medical imaging.

Biography



Yen-Wei Chen received the B.E. degree in 1985 from Kobe Univ., Kobe, Japan, the M.E. degree in 1987, and the D.E. degree in 1990, both from Osaka Univ., Osaka, Japan. He was a research fellow with the Institute for Laser Technology, Osaka, from 1991 to 1994. From Oct. 1994 to Mar. 2004, he was an associate Professor and a professor with the Department of Electrical and Electronic Engineering, Univ. of the Ryukyus, Okinawa, Japan. He is currently a professor with the college of Information Science and Engineering, Ritsumeikan University, Japan. He is the founder and the first director of Center of Advanced ICT for Medicine and Healthcare, Ritsumeikan University, Japan.

His research interests include medical image analysis, computer vision and computational intelligence. He has published more than 300 research papers in a number of leading journals and leading conferences including CVPR, ICCV, MICCAI, IEEE Trans. Image Processing, IEEE Trans. Medical Imaging. He has received many distinguished awards including ICPR2012 Best Scientific Paper Award, 2014 JAMIT Best Paper Award. He is/was a leader of numerous national and industrial research projects.