

Intelligent Medical Image Processing and Analysis with Deep Learning

Kenji Suzuki, Ph.D.

Professor & Director
Biomedical Artificial Intelligence Unit
Institute of Innovative Research
Tokyo Institute of Technology, Japan

Abstract

Deep learning in artificial intelligence (AI) becomes one of the most active areas of research in pattern recognition, image processing, and medical imaging fields, because “learning from examples or data” is crucial to handling a large amount of data (“big data”) coming from imaging and vision systems. I invented ones of the earliest deep-learning models for image processing, semantic segmentation, object enhancement, and classification of patterns in medical imaging. My group has been actively studying on deep learning in medical imaging in the past 25 years. In this talk, intelligent medical image processing and analysis with deep learning are introduced, including 1) virtual medical imaging for separation of bones from soft tissue in chest x-ray images, 2) virtual medical imaging for converting low-radiation-dose images to virtual high-radiation-dose images to reduce radiation dose in computed tomography (CT), 3) semantic segmentation of lesions and organs in medical images, and 4) AI-aided diagnosis for lesions in CT and x-ray images.

Biography

Kenji Suzuki, Ph.D., (Nagoya University) worked at Hitachi Medical Corp, Aichi Prefectural University, Japan, as a faculty member, in Department of Radiology, University of Chicago, as Assistant Professor, and Medical Imaging Research Center, Illinois Institute of Technology, as Associate Professor (Tenured). He is currently a Professor (Tenured) at Institute of Innovative Research, Tokyo Institute of Technology, Japan. He published more than 340 papers (including 115 peer-reviewed journal papers). He has been actively researching on deep learning in medical imaging and AI-aided diagnosis in the past 25 years, especially his early deep-learning model was proposed in 1994. His papers were cited 13,000 times, and his h-index is 52. He is inventor on 36 patents (including ones of earliest deep-learning patents), which were licensed to several companies and commercialized. He published 14 books and edited 12 journal special issues. He has been awarded numerous grants including NIH, NEDO, and JST grants, totaling \$17M. He served as Editors of 40 leading international journals including Pattern Recognition. He chaired 98 international conferences. He received 21 awards, including 3 Best Paper Awards in leading journals.