Contents

Part I Review

1 Deep Learning and Computer-Aided Diagnosis for Medical Image Processing: A Personal Perspective ............... 3
Ronald M. Summers

2 Review of Deep Learning Methods in Mammography, Cardiovascular, and Microscopy Image Analysis ............... 11
Gustavo Carneiro, Yefeng Zheng, Fuyong Xing and Lin Yang

Part II Detection and Localization

3 Efficient False Positive Reduction in Computer-Aided Detection Using Convolutional Neural Networks and Random View Aggregation ........................................ 35
Holger R. Roth, Le Lu, Jiamin Liu, Jianhua Yao, Ari Seff, Kevin Cherry, Lauren Kim and Ronald M. Summers

4 Robust Landmark Detection in Volumetric Data with Efficient 3D Deep Learning ........................................ 49
Yefeng Zheng, David Liu, Bogdan Georgescu, Hien Nguyen and Dorin Comaniciu

5 A Novel Cell Detection Method Using Deep Convolutional Neural Network and Maximum-Weight Independent Set ........ 63
Fujun Liu and Lin Yang

6 Deep Learning for Histopathological Image Analysis: Towards Computerized Diagnosis on Cancers .................. 73
Jun Xu, Chao Zhou, Bing Lang and Qingshan Liu
7 Interstitial Lung Diseases via Deep Convolutional Neural Networks: Segmentation Label Propagation, Unordered Pooling and Cross-Dataset Learning ................................................. 97
Mingchen Gao, Ziyue Xu and Daniel J. Mollura

8 Three Aspects on Using Convolutional Neural Networks for Computer-Aided Detection in Medical Imaging .......................... 113
Hoo-Chang Shin, Holger R. Roth, Mingchen Gao, Le Lu, Ziyue Xu, Isabella Nogues, Jianhua Yao, Daniel Mollura and Ronald M. Summers

9 Cell Detection with Deep Learning Accelerated by Sparse Kernel .......................................................... 137
Junzhou Huang and Zheng Xu

10 Fully Convolutional Networks in Medical Imaging: Applications to Image Enhancement and Recognition ................................. 159
Christian F. Baumgartner, Ozan Oktay and Daniel Rueckert

11 On the Necessity of Fine-Tuned Convolutional Neural Networks for Medical Imaging ..................................................... 181
Nima Tajbakhsh, Jae Y. Shin, Suryakanth R. Gurudu, R. Todd Hurst, Christopher B. Kendall, Michael B. Gotway and Jianming Liang

Part III Segmentation

12 Fully Automated Segmentation Using Distance Regularised Level Set and Deep-Structured Learning and Inference .................... 197
Tuan Anh Ngo and Gustavo Carneiro

13 Combining Deep Learning and Structured Prediction for Segmenting Masses in Mammograms ................................. 225
Neeraj Dhungel, Gustavo Carneiro and Andrew P. Bradley

14 Deep Learning Based Automatic Segmentation of Pathological Kidney in CT: Local Versus Global Image Context ................................. 241
Yefeng Zheng, David Liu, Bogdan Georgescu, Daguang Xu and Dorin Comaniciu

15 Robust Cell Detection and Segmentation in Histopathological Images Using Sparse Reconstruction and Stacked Denoising Autoencoders ................................................................. 257
Hai Su, Fuyong Xing, Xiangfei Kong, Yuanpu Xie, Shaoting Zhang and Lin Yang

Part IV Big Dataset and Text-Image Deep Mining

17 Interleaved Text/Image Deep Mining on a Large-Scale Radiology Image Database ........................................ 305 Hoo-Chang Shin, Le Lu, Lauren Kim, Ari Seff, Jianhua Yao and Ronald Summers

Author Index ......................................................... 323
Subject Index ....................................................... 325
Deep Learning and Convolutional Neural Networks for Medical Image Computing Precision Medicine, High Performance and Large-Scale Datasets
Le, L.; Zheng, Y.; Carneiro, G.; Yang, L. (Eds.)  
2017, XIII, 326 p. 117 illus., 100 illus. in color., Hardcover  
ISBN: 978-3-319-42998-4