

# Deep Learning Networks for Medical Image Analysis: its past, future, and issues

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## Abstract

The advancement of image understanding with deep learning neural networks has brought great attraction to those in image analysis into the focus of deep learning networks. The demonstrated capability triggers broad interests of its application into medical image analysis. The characteristics of medical images are extremely different from photos and video images. The application of medical image analysis is also much more critical. For achieving the best effectiveness and feasibility of medical image analysis with deep learning approaches, several issues have to be considered. In this talk we will give a brief overview of the development of neural networks for medical image analysis in the past and the future trends with deep learning. Several issues in regard of the data preparation, techniques, and clinic applications will also be discussed.

## Bio



**Pau-Choo (Julia) Chung** (S'89-M'91-SM'02-F'08) received the Ph.D. degree in electrical engineering from Texas Tech University, USA, in 1991. She then joined the Department of Electrical Engineering, National Cheng Kung University (NCKU), Taiwan, in 1991 and has become a full professor in 1996. She served as the Head of Department of Electrical Engineering (2011-2014), the Director of Institute of Computer and Communication Engineering (2008-2011), the Vice Dean of College of Electrical Engineering and Computer Science (2011), the Director of the Center for Research of E-life Digital Technology (2005-2008), the Director of Electrical Laboratory (2005-2008), and the Director of Computer and Network Center, NCKU. She was elected Distinguished Professor of NCKU in 2005 and received the Distinguished Professor Award of Chinese Institute of Electrical Engineering in 2012. She also served as Program Director of Intelligent Computing Division, Ministry of Science and Technology (2012-2014), Taiwan. She was the Director General of the Department of Information and Technology Education, Ministry of Education (2016-2018). She served the Vice President for Members Activities, IEEE Computational Intelligence Society (CIS) (2015-2018). Currently she is the Vice President for Education, IEEE CIS. She is also the Dean of College of Electrical Engineering and Computer Science, and the Dean of Miin Wu School of Computing, NCKU.

Dr. Chung's research interests include computational intelligence, medical image analysis, video analysis, and pattern recognition. Dr. Chung participated in many international conferences and society activities. She served as the program committee member in many international conferences. She served as the Publicity Co-Chair of WCCI 2014, SSCI 2013, SSCI 2011, and WCCI 2010. She served as an Associate Editor of IEEE Transactions on Neural Network and Learning Systems (2013-2015) and the Associate Editor of IEEE Transactions on Biomedical Circuits and Systems. Currently she is an Associate Editor of IEEE Transactions on Artificial Intelligence.

Dr. Chung was the Chair of IEEE Computational Intelligence Society (CIS) (2004-2005) in Tainan Chapter, the Chair of the IEEE Life Science Systems and Applications Technical Committee (2008-2009). She was a member in BoG of CAS Society (2007-2009, 2010-2012). She served as an IEEE CAS Society Distinguished Lecturer (2005-2007) and the Chair of CIS Distinguished Lecturer Program (2012-2013). She served on two terms of ADCOM member of IEEE CIS (2009-2011, 2012-2014), the Chair of IEEE CIS Women in CI (2014). She is a Member of Phi Tau Phi honor society and is an IEEE Fellow since 2008.