

Topics and Abstracts of Three Potential DLP talks

(1) Convolutional Networks for Medical Image Analysis: Its Past, Future, and Issues

Recent 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. While researchers on video/image analysis have jumped on the bandwagon of deep learning networks, medical image analyzers would be the coming followers. The characteristics of medical images are extremely different from those of 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.

(2) Gait and Balance Analysis for the Elderly Using an Inertial-Sensor-Based Wearable Device

Gait and balance patterns are two major measurements for the evaluation of the elderly's physical conditions and are therefore often used in the early detection of certain diseases. For example, patients with Alzheimer's disease (AD) were reported of revealing gait disorders and balance problems. In this talk we will present an inertial-sensor based wearable device, which are designed for objective quantitative measurement of gait patterns and balance capabilities. Accompanied with the device are the algorithms and CI models, which integrally provide the quantitative evaluations. We will also discuss several essential indicators from gait and balance patterns for AD diagnosis. The gait analyzing algorithm, which is composed of stride detection followed by gait cycle decomposition, and the balance analysis algorithm, which is measured by the sway speed in anterior-posterior (AP) and medial-lateral (ML) directions of the projection path of body's center of mass (COM), will also be introduced.

(3) Recent Development of Deep Learning Neural Networks for Image Analysis: An Overview

While understanding an image is an easy task for human, it is a great challenge for machine. Despite of the decades efforts on the development of image analysis, current techniques are still far behind human capability in the perception or understanding of an image. Recently deep learning networks have been applied for image recognition and have achieved remarkable success compared to traditional image analysis approaches. Such a result has attracted the tremendous researchers on image analysis to be devoted on deep learning based approaches and several deep learning models which incorporate the knowledge about human perception of images are developed. In this talk we will introduce the recent development and discuss about the challenges and issues, as well as the adopted model revision, on image understanding. Several unsolved problems will also be discussed in this talk.