

The Development of a New High Performance Fundus Camera for Automated Medical Diagnosis and Monitoring (PI: Prof. You Jia Jane; 2009/10)

Retinal images provide crucial observable features for diagnosing many kinds of pathologies such as diabetes, hypertension, arteriosclerosis. Fundus camera is one of the important devices used by ophthalmologists to diagnose retinal diseases. However, the existing models of fundus camera only offer simple functions for retinal image acquisition and pre-processing without any capacity for automated diagnosis and monitoring. This project aims to develop a new high-performance fundus camera for computer aided automated medical diagnosis and monitoring by integrating the unique and innovative techniques for optical design and image analysis, which includes 1) a new fundus camera with special design of lighting and position alignment, 2) new algorithms and methods for optimized feature extraction, fusion, categorization and classification for medical diagnosis and monitoring by hierarchical retinal image analysis. The output throughout this project has wide applications, and in particular, its feasibility to computer aided medical diagnosis will be demonstrated by a prototype system to diagnose diabetic retinopathy. Our previous work with international recognition of outstanding performance has laid the basis to achieve our goals in the following aspects: 1) advanced technology, 2) innovative product, 3) excellent market potential, which will have significant contribution to the society.