Novel Method to establish Backward Compatibility between Time Domain Optical Coherence Tomography (TDOCT) and Spectral Domain Optical Coherence Tomography (SDOCT)

Published date: Aug. 28, 2016

Technology description

Background

Optical coherence tomography, which was developed in 1991 by D. Huang, et al at the Massachusetts Institute of Technology (MIT), Cambridge, is a low-coherence, interferometer-based, noninvasive medical imaging modality that can provide non-contact, high-resolution, cross-sectional images of biological tissue. The OCT product market is rapidly growing with more than 37,000 scans performed daily in the U.S. with OCT imaging systems. OCT can be divided into two different categories such as TDOCT (Time Domain Optical Coherence Tomography) and SDOCT (Spectral Domain Optical Coherence Tomography). Recently, SDOCT is commercialized with high resolution and faster acquisition time compared with TDOCT. The multiple B-scans with SDOCT provide volumetric data, which can be used to visualize comprehensive structural information of the retina and retinal pathologies with 3D rendering software in ophthalmology. The quantitative analysis ability of OCT is essential, especially in glaucoma assessment. Retinal nerve fiber layer (RNFL) thickness measurements using repeated OCT B-scans on the same subject enable to track developmental changes with glaucoma, which is a leading cause of blindness. Follow-up scans are needed to detect RNFL thickness change, which takes months or years. However, there is no technology or methods, which provide backward compatibility between two-dimension (2D) TDOCT scan and three-dimension (3D) SDOCT volumetric data.TechnologyThis invention is a new technique to solve the backward compatibility problem between TDOCT devices (entrenched technology) and SDOCT devices (new technology with increasing market penetration). SDOCT has higher resolution and faster acquisition times in comparison to TDOCT. There is currently no technology / methodology to provide backward compatibility between two-dimensional (2D) TDOCT scans and three-dimensional (3D) SDOCT volumetric data.

Advantages

1) Enables maintainability of patient history baseline via seamless comparison of multi-device data (i.e. methodology allows SDOCT to locate the exact scan location of past 2D TDOCT cross-sectional image

from 3D SDOCT volumetric data). Once a clinician knows the exact scan location, its possible to track, compare, and finally detect any abnormal retinal change over a long period of time without inter-device variation.
2) No other technology currently in existence that can provide backward compatibility between TDOCT & SDOCT.

Institution

University of Pittsburgh

Inventors

Chaim-Gadi Wollstein
Jongsick Kim Joel Schuman
Hiroshi Ishikawa

联系我们

叶先生

电 话：021-65679356
手 机：13414935137
邮 箱：yeyingsheng@zf-ym.com