Active Surface Tracking Algorithm for All-Fiber Common-Path Fourier-Domain Optical Coherence Tomography

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Abstract : A conventional optical coherence tomography (OCT) system has limited imaging depth, which is 1-2 mm, and suffers unwanted noise such as speckle noise. The motorized-stage-based OCT system, using a common-path Fourier-domain optical coherence tomography (CP-FD-OCT) configuration, provides enhanced imaging depth and less noise so that we can overcome these limitations. Using this OCT systems, OCT images were obtained from an onion, and their subsurface structure was observed. As a result, the images obtained using the developed motorized-stage-based system showed enhanced imaging depth than the conventional system, since it is real-time accurate depth tracking. Consequently, the developed CP-FD-OCT systems and algorithms have good potential for the further development of endoscopic OCT for microsurgery.

Keywords : common-path OCT, FD-OCT, OCT, tracking algorithm
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