Contribution ID: **43** Contribution code: **S5 Quantum Technology** Type: **Oral Presentation**

Performance comparison of Amplitude-decorrelation and Speckle Variance algorithms for OCT Angiography

Friday 24 June 2022 14:30 (15 minutes)

Optical Coherence Tomography Angiography (OCTA) is a non-invasive imaging technique for microvasculature visualization. OCTA does not require injection of exogenous contrast agents, or fluorescent dye into blood circulation, which may cause allergic reactions as in fluorescein angiography (FA) and indocyanine green angiography (ICGA). OCTA differentiate blood vessel from static tissues by analyzing the variation of OCT speckle caused by moving particle in blood vessel. In this study, OCTA was implemented on a spectrometer-based spectral domain OCT that was built on Michelson interferometer. The OCT imaging systems was operated at 835 nm central wavelength with acquisition speed of 10,000 depth scans/s. Three methods of speckle analysis were implemented, i.e. Amplitude Decorrelation (AD), Speckle Variance (SV), and Intensity-to-Average Variance (IAV). Their performance for segmentation of blood vessels underneath skin were studied. In addition, the auxiliary methods of pixel averaging and split-spectrum were added to improve the signal-to-noise ratio of images. To compare the performance of the implemented algorithms, a flow phantom was constructed by embedding a capillary tube inside a petrolatum-based gel (tissue mimic material, or TMM). To mimic a blood flow beneath skin, dilute milk was pumped through the capillary with average flow speed of 2.0 mm/s by using a syringe pump system. The performances of each OCTA algorithm, in terms of signal-to-noise (SNR) ratio and contrast-to-noise (CNR) ratio, were measured and compared. The OCTA imaging system will be optimized for nailfold vasculature imaging. The ability to detect and visualize change in nailfold microvasculature pattern can help in diagnosis of many diseases, such as connective tissue disease, autoimmune rheumatic disease, ophthalmic disease, and coronary disease. Furthermore, OCTA technique is capable of in vivo volumetric imaging of capillary in real-time and hence can potentially be a powerful tool for skin diagnostics.

Author: KAMPONG, Wuttikorn

Co-authors: SAETIEW, Jadsada; LENAPHET, Yutana; PALAWONG, Kunakorn; MEEMON, Panomsak

Presenter: KAMPONG, Wuttikorn

Session Classification: S5 Quantum Technology

Track Classification: Quantum Technology