Title: HD-OCT Imaging Tools for Detecting Eye Diseases

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Optical coherence tomography (OCT) is an emerging non-invasive, high speed, and high resolution imaging modality which produces cross-sectional or 3-D views of biological tissues. Since its first application in human eyes in 1991, OCT technology has been widely applied in clinical research activities, especially in ophthalmology. Current diagnostic procedures still heavily rely on manual labeling and therefore subjective biometric measurements obtained are prone to inter-observer errors.

Together with ophthalmologists from the Tan Tock Seng Hospital and the Singapore Eye Research Institute, our current research activities include the development of two automatic algorithms for detecting eye diseases. The first could automatically identify a new landmark, known as Schwalbe’s line, as illustrated in Fig.1 (a). This is used to quantify the anterior chamber angle in the eye which in turn can determine the risk of angle closure glaucoma. The second automatically segments the choroid layer, as illustrated in Fig.1 (b), from other tissues such as the retina and the sclera, so as to measure the choroidal thickness which is important for the diagnosis of glaucoma and central serous chorioretinopathy.

Figure 1: HD-OCT images of the human eye: (a) eye anterior segment indicating the automatically determined novel landmark Schwalbe’s line; (b) eye posterior segment indicating the automatically segmented choroid layer and choroid thickness measurement.