

MASTER THESIS

2D fingerprint extraction from 3D volumetric data captured using Optical Coherence Tomography

Motivation & Goal The classical 2D fingerprint sensors are susceptible to spoofing by means of fakes produced by using widely available and inexpensive materials. The Optical Coherence Tomography is a 3D volumetric imaging technology that can capture both the surface and the inner structure of the fingertip, as a 3D volumetric model that provides a promising basis for reliable fingerprint presentation attack detection. The goal of the proposed topic is to construct a robust and efficient algorithm for extraction of a high-quality 2D fingerprint from 3D volumetric data, which would enable for processing by standard 2D fingerprint identification pipelines.

Task The main task is to use the 3D curved representation of the fingertip surface along with the 3D version of the fingerprint from the OCT scan (Fig. 1), and transform these into a 2D fingerprint image. The algorithm should properly handle shape irregularities on a surface of a real human finger, and extract a 2D fingerprint image (Fig. 2).

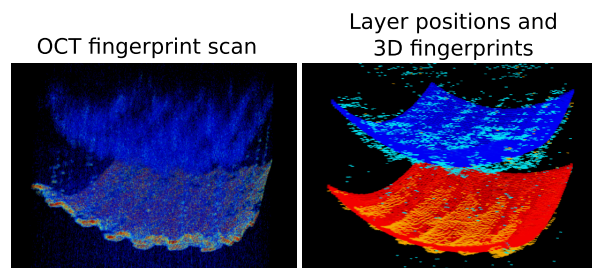


Fig. 1 - OCT scan data provided

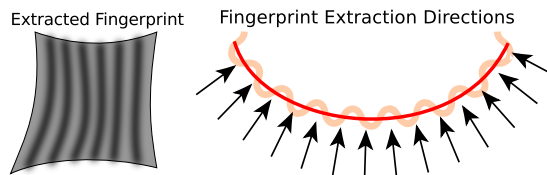


Fig. 2 - fingerprint extraction

Prerequisites

- good programming skills
- interest in graphics and image processing

Contact

Ctirad Sousedik
ctirad.sousedik@hig.no

Christoph Busch
christoph.busch@hig.no

Norwegian Biometrics Laboratory, Nislab, Gjøvik University College

Reading and Other Material

Sousedik, C.; Breithaupt, R.; Busch, C., "Volumetric fingerprint data analysis using Optical Coherence Tomography," International Conference of the Biometrics Special Interest Group (BIOSIG), 2013