

## **High resolution feature extraction from optical coherence tomography acquired internal fingerprint**

Rethabile Khutlang ; Nontokozo P. Khanyile ; Sisanda Makinana ; Fulufhelo V. Nelwamondo

### **Abstract:**

**Biometric fingerprint scanners scan the external skin features onto a 2D image. The performance of the automatic fingerprint identification system suffers if the finger skin is wet, worn out, fake fingerprint is used et cetera. Swept source optical coherence tomography (OCT) can be used to scan the internal skin features, up to the depth of the papillary layer. OCT is contactless and scans in three dimensions. The papillary contour represents an internal fingerprint, which does not suffer external skin problems. In this paper, we present a feature extraction method that extracts features at high resolution from the internal fingerprint. First curvature of an internal fingerprint cross-section is removed by fitting a third order polynomial and shifting each column in depth by the value of the fitted curve. A 2D image of the internal fingerprint is formed by concatenating the individual cross-sections, averaged across the papillary contour. The internal fingerprint image is then enhanced and features are extracted at high resolution. We have evaluated performance of feature extraction by matching extracted minutiae to those extracted manually. Matching accuracy shows that features can be extracted at high resolution from an OCT internal fingerprint.**