Comparison Of Ridge Filters Performance in Human Vein Extraction Using 850nm Near Infrared Led Illumination

ABSTRACT

Vein pattern recognition has gained significant attention in recent years due to its potential applications in various fields such as biometrics, medical diagnosis, and security systems. The vein feature extraction algorithm is a crucial factor in the vein visualisation process. This paper investigates the performance of the ridge filters algorithm for vein feature extraction by using the NIR imaging technique to visualise human vein vessels. The 850nm NIR LED spectrum was employed as the vein illumination source combined with no infrared filter camera as the image sensor device. The reflective NIR imaging method was utilised in the experimental setup. Four prominent types of ridge filters, namely Hessian, Meijering, Sato and Frangi, were evaluated in detecting the human vein vessel. Through the evaluations of the comparisons, we demonstrate that Hessian filters offer superior performance in human vein detection for feature extraction using the near-infrared LED 850nm electromagnetic spectrum as the vein illumination source.