

Clinical Investigations Using Hyperspectral Imaging

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Hyperspectral imaging (HSI) is a contact-less and non-invasive technology, originally deriving from remote sensing. The technique, that uses light from the visible and near-infrared spectrum, has recently been introduced to medicine, where it proofed to be useful in the characterization of wounds and the detection of cancerous tissue. Preliminary studies showed its potential in the assessment of tissue perfusion, e.g. the monitoring of flaps and the assessment of peripheral artery disease.

Hyperspectral imaging to monitor perfusion parameters during the Allen test was performed. Clear differences in tissue oxygenation and hemoglobin index during rest, occlusion and reperfusion were visually and computationally evident. As remissionspectra from skin were influenced by the skin tone and melanin concentration, investigations on artificial phantoms were performed to study such impacts. In neurosurgery it is challenging to clearly identify tumor margins. In preliminary tests the potential of HSI will be shown. Finally, HSI was used to distinguish blood strains from other reddish agents. Furthermore, time dependent changes could be derived from spectral changes showing the potential of this technique for contactless trace recording in criminal cases.

HSI holds potential to be widely used for various medical issues.