

Extraction of multipoint pulse wave and evaluation of subcutaneous hemodynamics by analysis of facial videos

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In recent years, video plethysmography (vPPG) which is pulse wave derived from the skin video image has attracted attention as a non-contact heart rate measurement technique. vPPG may be used to evaluate not only heart rate but also local hemodynamics by simultaneously obtaining vPPG from multiple regions. In this study, a two-dimensional evaluation of facial subcutaneous hemodynamics was performed by means of the features of vPPG. The facial video and ear PPG were measured before and after facial massage in experiments. The facial video was divided into small grid regions of interest (ROI), and vPPGs were extracted at each ROI using repetitive periodic component analysis (r-PiCA). PiCA is a technique to extract the most periodic components from a set of multichannel recordings. The three features which were crest time, the time to reach 50% of the pulse wave area and lag of vPPG from PPG were calculated from vPPG of each ROI. The feature values wave changed significantly with facial massage. The results indicate the possibility to evaluate of subcutaneous hemodynamics aspects of face using vPPG.