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Quantifying skin stretch induced motion artifact from an electrocardiogram signal

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This work presents a 2D quantification of strain field caused due to the motion artifact in an Electrocardiogram (ECG) measurement. The objective of this work is to estimate the skin stretch induced motion artifact in an ECG signal. An ECG measurement was obtained from a subject for 10 seconds using standard Ag/AgCl electrodes by continuously moving the arm back and forth during the measurement. The motion artifact produced due to the arm movement was emulated using a Poly dimethyl siloxane (PDMS) patch of dimensions 40mm x 45mm x 0.254mm adhered to the arm. The movement of the PDMS patch during the ECG measurement was recorded in a video and motion artifact was quantified in terms of normal and shear strain components ε_x, ε_y and ε_{xy}. These values were derived using feature detection and Euclidean distance feature mapping. The obtained motion artifact can be eliminated from the ECG signal using adaptive filtering or other techniques such as Extended Kalman Filtering (EKF). This method of evaluation of the strain components was validated against a finite element analysis SolidWorks®.

Biography

Anubha Kalra is curently a Doctoral candidate at Institute of Biomedical Technologies (IBTec), AUT University. Her research interests include ambulatory ECG monitoring and analysis, artifact detection, adaptive analysis for artifact reduction and biosignal data filtering and acquisition.

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