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FEATURE EXTRACTION AND SELECTION AS A CRUCIAL STEP IN MODERN BIOMEDICAL SIGNAL PROCESSING, BASED ON THE ANALYSIS OF SELECTED USE CASES

Keywords: Biomedical Signal Processing, Feature Extraction, Biomedical Electronics.

The presented research work is related to a problem, that has now become relevant - whether to carry out a separate feature extraction and selection stage in the analysis of signals, which are then fed to the input of learning systems - Machine Learning (ML) approach vs directly feed the AI system with the raw measurement data, like in a structure of Deep Learning (DL) systems.

The methodology for extracting relevant diagnostic features from multi-modal, multi-channel biomedical signal measurement systems is presented using real-world use cases from R&D projects carried out by the authors in the recent 2020-2023 period on BE faculty of SUT.

The paper also presents the state-of-the-art personalized data acquisition systems, which the authors have adapted and used in data recording processes – modern System on Integrated Chip (SoIC) type systems: Analog Front-End (AFEs) chips.

This study presents developed by the authors advance digital signal processing solutions, implemented for multimodal data from the area of physiological signals, among others: EMG, ECG, HR, SpO2, SmO2 and impedance rheography.