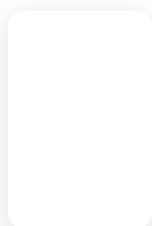


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EMG Signal Analysis and Classification Using Residual Network

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Abstract

In recent years, electromyography (EMG) signal analysis has emerged as a crucial technique for understanding muscle function and diagnosing neuromuscular disorders. Traditional methods for EMG signal classification often struggle with the complexity and variability of EMG data. This paper proposes a novel approach employing a Residual Network (ResNet) architecture for the classification of EMG signals. ResNet, known for its ability to train deep neural networks efficiently by mitigating the vanishing gradient problem, is leveraged to enhance feature extraction from raw EMG signals. Our study utilizes a benchmark EMG dataset, preprocessing the data through normalization and segmentation to create a robust input for the ResNet model. The proposed ResNet-based method is compared with conventional machine learning algorithms, demonstrating superior performance in terms of accuracy, precision, and recall. The experimental results show that the ResNet model achieves a classification accuracy of $93.24 \pm 0.23\%$, significantly outperforming traditional approaches. This advancement highlights the potential of deep learning, particularly ResNet, in EMG signal classification, paving the way for improved diagnostic tools and real-time applications in prosthetics and human-computer interaction. Future work will explore the integration of this approach with wearable EMG devices to enhance real-time signal analysis and classification.



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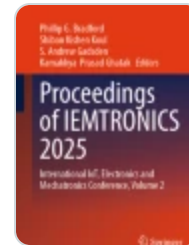
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