

The Identification of Significant Mechanomyography Time-Domain Features for the Classification of Knee Motion



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Abstract Stroke is the third leading cause of long term disability in the world. More often than not, the patients who suffer from such cerebrovascular disease endure restricted activities of daily living (ADL). Rehabilitation is deemed necessary to improve ones ADL, especially in the early stages of stroke. This study presents the classification of knee motion; particularly extension and flexion, based on muscle signals that could be utilised by an exoskeleton for rehabilitation purpose. A total of 20 subjects participated in the present investigation. The mechanomyography (MMG) signals were collected by accelerometers placed on four of the muscles that control the knee joint, namely, Rectus Femoris, Gracilis, Vastus Medialis, and Biceps Femoris, respectively. Eight statistical features were extracted from the raw data, i.e., root mean square (RMS), variance (VAR), mean, standard deviation (STD), kurtosis, skewness, minimum, and maximum along all x, y and z-axes. The Chi-Square (χ^2) feature selection technique was used to identify significant features, in which 30 was identified amongst the 96 extracted features. A 10-fold cross-validation technique

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