

Tentative Title

Developing a Novel Muscle Fatigue Index for Wireless sEMG Sensors: Metrics and Regression Models for Real-Time Monitoring

Short Abstract

Muscle fatigue impacts performance in sports, rehabilitation, and daily activities, with surface electromyography (sEMG) widely used for monitoring. In this study, we analyzed sEMG signals, evaluating time, frequency, and combined-domain metrics to identify reliable fatigue indicators. Using these metrics, we developed a novel fatigue index through regression modeling, capturing fatigue progression and enabling personalized muscle-specific assessment. Integrated into a wireless BLE-enabled sensor platform, the system combines seamless body placement, mobility, and real-time data transmission. An initial calibration phase ensures adaptation to individual muscle profiles, enhancing accuracy. By balancing on-device processing with efficient wireless communication, this platform delivers scalable, real-time fatigue monitoring across diverse applications.