**Possible Titles**

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

A Novel Fatigue Index for IoT-Enabled Wireless sEMG Networks: Signal Processing and BLE-Based Real-Time Monitoring for Health Applications

IoT-Driven Fatigue Analysis: A BLE-Enabled Wireless sEMG System with Advanced Metrics and Machine Learning Models

**Possible Abstracts**

1. Muscle fatigue analysis plays a pivotal role in optimizing athletic performance and rehabilitation. Surface electromyography (sEMG), when integrated into wireless sensor networks, offers immense potential for real-time physiological monitoring. However, conventional methods often rely on predefined fatigue indicators, lacking adaptability to dynamic fatigue patterns. This study presents an advanced framework for wireless sEMG-based muscle fatigue monitoring, emphasizing novel metrics and regression modeling techniques.  
     
   The system collects sEMG signals during sustained isometric contractions and implements a suite of time-domain and frequency-domain metrics to capture fatigue progression. A novel fatigue index is proposed, leveraging regression models trained on hypothetical fatigue trends to quantify fatigue with unprecedented precision. Key innovations include robust noise-reduction techniques, the fusion of multifractal and empirical mode decomposition analyses, and seamless wireless integration using Bluetooth Low Energy (BLE). Experimental results demonstrate the reliability and efficiency of the developed system, highlighting its potential to revolutionize athlete management and rehabilitation protocols through real-time, accurate fatigue assessments.
2. Muscle fatigue analysis is vital for enhancing athletic performance and rehabilitation. This study presents an IoT-enabled wireless system leveraging Bluetooth Low Energy (BLE) for real-time surface electromyography (sEMG) monitoring. A novel fatigue index is developed using advanced signal processing techniques, including multifractal and empirical mode decomposition analyses, and regression models. These methods ensure accurate and adaptive fatigue monitoring while maintaining energy efficiency. Validated through controlled experiments, this system offers a robust and scalable solution for health monitoring applications, demonstrating its potential to revolutionize athlete training and rehabilitation through precise physiological insights.
3. Muscle fatigue monitoring has gained critical importance in health and sports applications. This study introduces an IoT-enabled system leveraging Bluetooth Low Energy (BLE) for real-time surface electromyography (sEMG) signal acquisition and fatigue assessment. The system employs advanced signal processing techniques, including multifractal and empirical mode decomposition analyses, to extract meaningful fatigue metrics from sEMG data. A novel fatigue index is developed using regression models trained on hypothetical fatigue trends, offering enhanced accuracy and adaptability. By combining energy-efficient wireless communication with robust data analytics, the proposed system sets a new standard for real-time physiological monitoring in wearable technologies.
4. Surface electromyography (sEMG) is a powerful tool for muscle fatigue analysis, yet conventional methods lack the precision needed for real-time applications. This study develops a novel fatigue index using advanced signal processing techniques, including multifractal analysis and empirical mode decomposition, to identify reliable fatigue metrics. Regression models trained on diverse fatigue trends enable adaptive monitoring and quantification of fatigue progression. Integrated with Bluetooth Low Energy (BLE) technology, the system ensures seamless wireless communication and low-power operation. Experiments conducted on isometric contractions validate the index, highlighting its potential to advance wearable physiological monitoring systems in sports and rehabilitation.