TECH OFFER

Make Invisible Muscle Visible: A Full-Spectrum Muscle Activity Monitoring System

KEY INFORMATION

TECHNOLOGY CATEGORY:
Healthcare - Diagnostics
Energy - Sensor, Network, Power Conversion, Power Quality & Energy Management

TECHNOLOGY READINESS LEVEL (TRL): TRL5
COUNTRY: JAPAN
ID NUMBER: TO175339

OVERVIEW

The Make Invisible Muscle Visible (MIMV) System is a non-invasive platform designed for full-spectrum muscle activity monitoring with high spatial and temporal precision. At its core lies a 20-channel high-density surface electromyography (HD-EMG) sensor array that wraps around a limb—such as the arm or leg—like a flexible brace, enabling comprehensive capture of both superficial and deep muscle activity. Real-time amplification and analog-to-digital conversion are embedded within the wearable unit, eliminating signal degradation and motion artifacts. This allows dynamic, wireless monitoring via Wi-Fi during actual movement, setting a new benchmark for muscle analytics in both research and applied settings.

What sets the MIMV System apart is its ability to estimate deep muscle activation from surface-level data, enabled by a proprietary model-based signal processing algorithm. This makes the technology exceptionally versatile for diverse use cases—from analyzing intricate muscle coordination in elite athletes, to diagnosing and rehabilitating patients with neurological or movement disorders, to preserving and transmitting expert motor skills in traditional craftsmanship and skilled labor training.

To maximize its potential impact, the technology owner is actively seeking collaborative partners such as clinical researchers in neurology and rehabilitation, companies developing wearable medical or sports performance technologies, and organizations dedicated to skilled labor education and movement training. These partners will play a critical role in co-developing real-world applications, validating performance in clinical and athletic contexts, and accelerating market deployment across healthcare, sports science, and vocational training sectors.

TECHNOLOGY FEATURES & SPECIFICATIONS

- **20-channel EMG sensor** array **adaptable** to limbs (arm, leg, thigh) - enabling the measurement of muscle activity from all directions
- **Real-time signal amplification** and A/D conversion within the wearable device
- **Wireless transmission** via Wi-Fi for untethered, high-fidelity monitoring
- **Model-based estimation algorithm** reconstructs deep muscle activity
- **Compact, lightweight, and suitable for dynamic use** in clinical, athletic, and training environments

POTENTIAL APPLICATIONS

- **Sports and Fitness:** Integrated into wearable performance tech to optimize elite athletic training and reduce injury risk
- **Healthcare and Rehabilitation:** Diagnostic and rehabilitative use for neurological and musculoskeletal conditions such as stroke, dystonia, and Parkinson's disease
- **Craftsmanship and Skilled Labor:** Capture and documentation of expert motor skills for training, simulation, and education

MARKET TRENDS & OPPORTUNITIES

The growing global focus on athletic performance, movement disorders, and remote diagnostics is driving demand for intelligent, wearable muscle assessment tools. The MIMV System offers a scalable solution that aligns with healthcare digitalization, the quantified-self movement in sports, and industry 4.0 training platforms.

UNIQUE VALUE PROPOSITION

The MIMV System offers a breakthrough in muscle activity monitoring by enabling **full-circumference, high-resolution measurement of both superficial and deep muscles in real time**. Unlike traditional EMG systems that are limited to surface data and often rely on wired setups, the MIMV System features a 20-channel wearable sensor array with integrated amplification and

wireless transmission. This allows it to capture clean, synchronized data even during dynamic movement. Its model-based algorithm reconstructs muscle activation patterns based on anatomical structure, enabling non-invasive estimation of deep muscle activity—something conventional systems cannot achieve. With its compact, user-friendly design and comprehensive data output, the MIMV System is ideally suited for applications in sports science, clinical rehabilitation, diagnostics, and the transfer of skilled motor techniques.

Why the MIMV System Stands Out:

- Captures both surface and deep muscle activity in real time
- Wearable and wireless, suitable for movement and dynamic use
- Accurate and clean signals with built-in processing (even during complex motion)
- Enables **non-invasive insight into deep muscle activation patterns** (not achievable with traditional methods)
- Supports sports training, clinical rehab, diagnostics, and skill learning