

TECH OFFER

Sensing Technology for Detecting Muscle Training Effectiveness



KEY INFORMATION

TECHNOLOGY CATEGORY:

Electronics - Lasers, Optics & Photonics

Electronics - Sensors & Instrumentation

TECHNOLOGY READINESS LEVEL (TRL): TRL2

COUNTRY: SINGAPORE

ID NUMBER: TO174842

OVERVIEW

Strength training is beneficial for a person's overall health and wellness. There is increasing demand for strength training used in rehabilitation aimed at restoring the day-to-day functionality of elderly persons. Currently, continual adjustment and improvement to the strength training and rehabilitation plan is carried out using feedback based on visual analysis. This may be time consuming, and has to be based on the experience of the rehabilitation therapist.

This technology offer is a near-infrared spectroscopy (NIRS) technique used to detect the effectiveness of strength training. By using the technology, muscle oxygen consumption information can be acquired and mapped as a two-dimensional distribution without the need of direct skin contact. As such, it is possible to accurately evaluate the effectiveness of strength training on a site-by-site basis.

In-vivo changes in oxygen concentration in muscles during strength training can be determined by detecting changes in oxyhemoglobin and deoxyhemoglobin. In this technology offer, these changes are presented by variations in amplitudes of

refracted content of an incidental NIR light directed into the skin. This method of analysing the changes in intramuscular blood flow is effective for understanding the muscle condition during strength training, and hence can be used to determine the effectiveness of the training.

The technology owner is keen to out-license the technology to application developers from the physical training and rehabilitation industry.

TECHNOLOGY FEATURES & SPECIFICATIONS

This technology offer uses near-infrared spectroscopy (NIRS) to measure hemoglobin changes before and after training to detect effectiveness of physical training. The method:

- uses the near-infrared region of the electromagnetic spectrum from 780nm to 2500nm.
- does not need to have direct contact with the user's skin
- captures two-dimensional distribution of muscle oxygen consumption level
- detects surface scattering and internal scattering components
- uses precision shutter control technology

POTENTIAL APPLICATIONS

This technology offer can be adopted in various industry such as:

- Physical education
- Training and rehabilitation
- Medical and physiological diagnostics and research

UNIQUE VALUE PROPOSITION

This technology offer uses non-contact, near-infrared spectroscopy (NIRS) to measure muscle oxygen consumption in a targeted area of the muscle activity. It has a proprietary method used to trigger the electronic shutter to accurately extract the internal scattering of NIR light.

By displaying the measured oxygen consumption as a two-dimensional distribution, the operator can easily evaluate the effectiveness of muscle exercise over time. This method is efficient and removes the need for the operator to be experienced in visual evaluation of muscle condition; it is expected that this technology can be applied to various fields such as physical training and rehabilitation services.

The technology owner is keen to out-license the technology to application developers from the physical training and rehabilitation industry.