

TECH OFFER

Ultra-Thin, Stretchable And Sensitive Fabric Sensor For Sports Monitoring



KEY INFORMATION

TECHNOLOGY CATEGORY:

Electronics - Sensors & Instrumentation

Materials - Plastics & Elastomers

Infocomm - Artificial Intelligence

TECHNOLOGY READINESS LEVEL (TRL): **TRL6**

COUNTRY: **SINGAPORE**

ID NUMBER: **TO174837**

OVERVIEW

The rise in health consciousness has accelerated the development of sports wearable devices. Currently, most common sports wearables are physiological indicators for monitoring vital signs (e.g., heart rate, blood pressure, SpO2, etc.) and metabolites (e.g., glucose, pH, lactic acid, etc.). However, these devices cannot quantitatively analyse the force-generating process. The existing kinematical indicators monitoring posture and motion also have limitations, such as poor wearing comfort, low sensitivity, and weak capacity for real-time data analysis.

The technology is an ultra-thin microfiber strain sensor that has superior elasticity, durability, and sensitivity. Using this proprietary technology, the technology owner has developed a comfortable fabric wearable to monitor muscle activities during sports and rehabilitation. By incorporating machine learning algorithms, more than 15 data metrics are being analysed in real-time to accurately characterise sports performance, optimise training standards, and prevent fatigue or injury.

This technology is available for licensing and R&D collaborations with partners in the sports, fitness, healthcare, and rehabilitation areas, e.g., sportswear and smart wearable companies, gyms, healthcare providers, sports training institutes, etc.

TECHNOLOGY FEATURES & SPECIFICATIONS

The technology owner has developed a full technology suite for sports monitoring, consisting of the following modules:

1. Wearable Band:

- Fabric band woven with a microfiber sensor capable of tracking motions, forces, and pressure
- Lightweight and comfortable band with similar dimensions to a smartwatch (< 35g)
- Highly stretchable sensor to be stretched to more than 200% of its original length
- Wireless transmission unit to provide real-time Bluetooth data transmission to the mobile app
- Utilises a rechargeable battery capable of lasting more than 7 hours upon fully charging

2. Mobile User App:

- Ready App for Android and Windows PC
- Home screen with multiple functions:
 - Select the type of training: workout, power, time, etc.
 - Track the history of previous workouts
 - Sensor calibration to ensure accurate tracking and analytics

3. Cloud Server (AI / ML):

- Derive more than 15 data metrics, e.g., muscle expansion/contraction, speed, power, range of motion, workout consistency, fatigue level, muscle stability, etc.
- Machine learning algorithms to evaluate the user's health profile and provide recommendations

POTENTIAL APPLICATIONS

The potential applications include but are not limited to:

- Sportswear (sports apparel, smart socks, footwear)
- Wearable devices (smart watches, smart glasses)
- Training equipment (gym armbands, intelligent coaching systems)
- Training institutes (athlete training, sports schools, military)

UNIQUE VALUE PROPOSITION

- Lightweight and comfortable
- Washable sensor allows for regular laundering
- Superior sensing performance (fast and accurate response)
- In-depth data analysis to characterise sports performance
- Machine learning to provide intelligent recommendation

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