

Non-invasive Thermal Sensor Using Zero Heat Flux Method

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Core body temperature is a vital parameter in diagnosing various diseases. It is important to monitor core body temperature during activities that cause hyperthermia or hypothermia, such as surgeries or sports. The zero heat flux method is a promising solution to monitor core body temperature. Two arrays of thermal sensors detect the heat flux coming through tissues and calculate the temperature deep in the body. This approach is non-invasive, reliable, fast response, and simple. Thermocouples are arranged in an array, sandwiched with an insulating layer to measure the heat flux temperature. The processing unit calculates core body temperature from temperature measurements obtained from thermocouple arrays. In this study, a specially designed and built experimental setup was used as an experimental setup. The device was compatible with a Wi-Fi facility to share temperature data with a medical platform. Results show that the developed zero heat flux sensor module gives accurate and reliable measurements in hot and stable ambient conditions. As a wearable medical device, the proposed sensors could be used in hospitals, sports fields, military-grade operations, and day-to-day life.

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