

'Tingle' wearable device improves position tracking accuracy utilizing thermal sensors

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In a new study published in *npj Digital Medicine*, a team led by Child Mind Institute researchers report that a wearable tracking device they developed achieves higher accuracy in position tracking using thermal sensors in addition to inertial measurement and proximity sensors. The wrist-worn device, called Tingle, was also able to distinguish between behaviors directed toward six different locations on the head. The paper, "Thermal Sensors Improve Wrist-worn Position Tracking," provides preliminary evidence of the device's potential use in the diagnosis and management of excoriation disorder (chronic skin-picking), nail-biting, trichotillomania (chronic hair-pulling), and other body-focused repetitive behaviors (BFRBs).

The researchers, led by Arno Klein, Ph.D., Director of Innovative Technologies, Joseph Healey Scholar, and Senior Research Scientist in the Center for the Developing Brain at the Child Mind Institute, collected data from 39 healthy adult volunteers by having them perform a series of repetitive behaviors while wearing the Tingle. The Tingle was designed by the Institute's MATTER Lab to passively collect thermal, proximity and accelerometer data.

Dr. Klein and colleagues found that the thermal sensor data improved the Tingle device's ability to accurately distinguish between a hand's position at different locations on the head, which would be useful in detecting clinically relevant BFRBs. BFRBs are related to a variety of mental and neurological illnesses, including autism, Tourette Syndrome and Parkinson's Disease.

"Body-focused [repetitive behaviors](#) can cause significant harm and distress," said Dr. Klein. "Our findings are quite promising because they indicate that the [thermal sensors](#) in devices like the Tingle have potential uses for many different types of hand movement training, in navigation of virtual environments, and in monitoring and mitigating repetitive, compulsive behaviors like BFRBs."

More information: Jake J. Son et al, Thermal sensors improve wrist-worn position tracking, *npj Digital Medicine* (2019). [DOI: 10.1038/s41746-019-0092-2](#)

Provided by The Child Mind Institute

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