Smart Gadget for Finger Movements and Handwriting Understanding

Health & Wellness

Manufacturing

Computer/AI/Data Processing and Information Technology

Consumer Electronics

Opportunity

The current technology in the art is able to detect hand gestures and finger motions using an Inertial Measurement Unit (IMU) such as a gyroscope and an accelerometer. This technology is able to capture sensitive handwritten signals, thanks to being attached near the user's fingernail, thus offering high sensitivity. However, hindrance to the user is also a critical concern, especially about weight. Therefore, these devices do not include a battery module but utilize a wireless charging module. Despite the convenience of not requiring an onboard battery, the power received is generally low and managing power becomes challenging. Moreover, balancing the IMU's power requirements in order to achieve a high Signal-to-Noise Ratio (SNR) becomes difficult. Thus, the challenge lies in creating a device capable of high SNR sensing while eliminating battery hindrance during handwriting.

Technology

The invention presents a fingertip-motion sensing device that balances the need for high SNR while reducing hindrance to the user. This wearable device comprises two body parts and a connecting bridge that can accommodate the motion of the finger while providing a stable platform for the accelerometer module. The first body part, worn on the fingertip, houses an accelerometer module for precise measurement of fingertip motion. The second body, containing a battery module, delivers electrical power to the accelerometer module via the connective, flexible bridge. This effectively eliminates the need for the accelerometer to carry its power source. By separating the battery from the accelerometer, the invention successfully retains user convenience while ensuring high SNR handwriting signal detection.

Advantages

- Seamless handwriting analysis with minimal user hindrance due to detached battery module

- Delivers high Signal-to-Noise Ratio (SNR) thanks to the separation of power and accelerometer module

- The device accommodates finger motion with the help of a retractable and extensible bridge

IP Status
Patent granted

Technology Readiness Level (TRL) ❓ 7

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Develop Concept

Proof Concept

Follow-on Funding

Build Value

- Integrates all components as one piece through a Flexible Printed Circuit Board (FPCB)

- Proactively combats interference due to unwanted finger movements

Applications

- Handwriting recognition systems for enhanced readability

- Applicable in gadgets requiring touchless control via finger gestures

- Potential use for patients recovering from motor skill loss for finger motion tracking

- Helpful for educators in virtual learning environments for handwritten input

- Offers practicality in graphics and animation industry for more precise sketching