Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

Smart Sensor for Motor Neurone Assessment

A compact wearable sensor system for objective, accurate and real-time measurement of hand dexterity in neurological conditions.

Overview

This invention addresses the need for objective, sensitive, and clinically accessible measurement of hand dexterity in neurological conditions such as Parkinson's disease, Multiple Sclerosis, stroke, and Motor Neurone Disease. The device digitises the widely used finger tapping test by employing a compact, wearable sensor system that directly measures the rotational movement between thumb and finger using a magnetic rotary encoder. This approach eliminates the subjectivity and insensitivity of visual grading, providing accurate, real-time data and a reproducible dexterity performance score for both clinical and remote monitoring applications.

Advantages

Objective measurement: Directly quantifies finger movement without reliance on subjective visual assessment, capturing subtle changes undetectable by traditional methods.

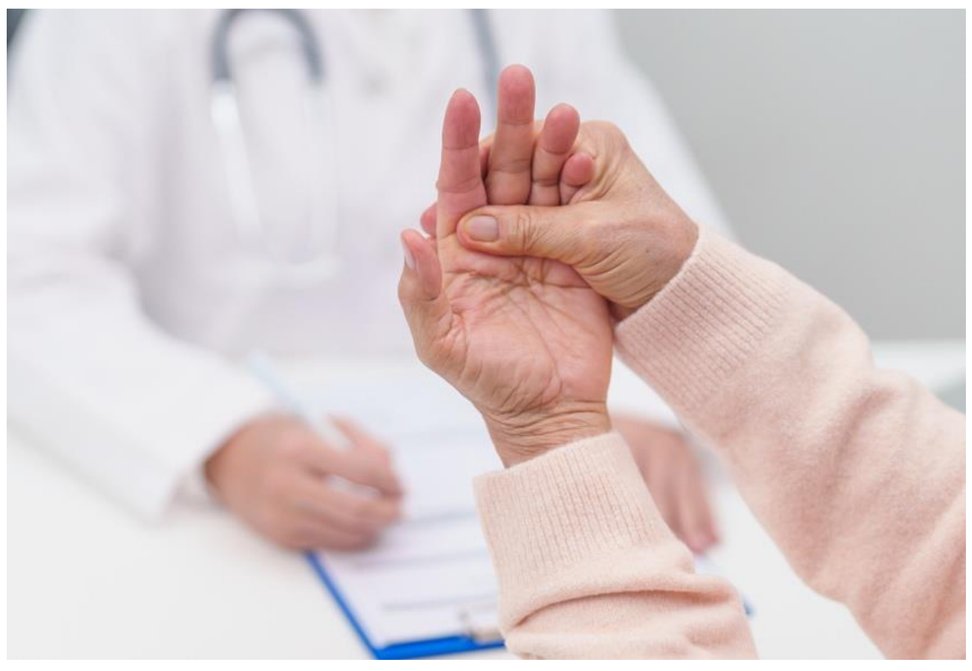
Immediate, clean data: The magnetic rotary encoder provides high-resolution, noise-free data, requiring no filtering or complex calibration.

User-friendly and portable: The device is lightweight, easy to fit, and suitable for unsupervised or remote assessments, with minimal set-up and no need for technical expertise.

Wireless and automated: Data is transmitted wirelessly to a computing device or cloud storage, supporting seamless integration with digital health platforms.

Advanced analytics: Calculates a normalised dexterity score using machine learning models, accounting for age, sex, and hand dominance, and enabling sensitive tracking of disease progression or therapeutic response.

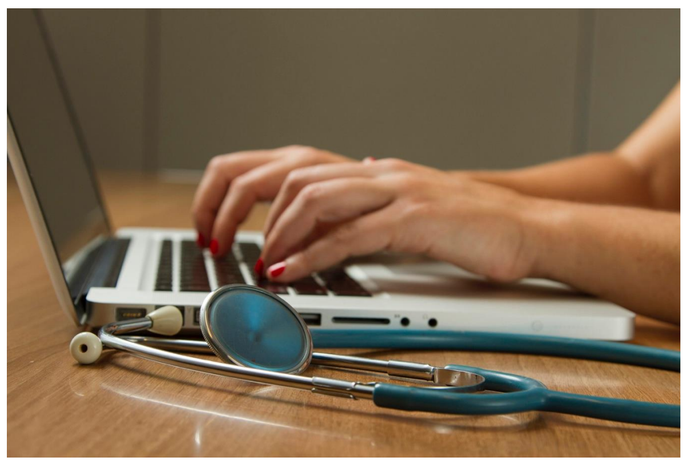
Compared to existing solutions, this device offers superior sensitivity, reliability, and ease of use, overcoming the limitations of subjective scales, mobile apps, or bulkier mechanical devices.



Applications

Primary industry classification: Medical devices – neurological diagnostics and monitoring.

Secondary application areas: Digital health, rehabilitation technology, remote patient monitoring.



Technology Status

Development stage: Fully engineered prototype, validated in a large clinical study (180 healthy controls, 51 ALS patients).

Validation status: Objective scoring system and device performance validated against gold standard clinical tests, demonstrating higher completion rates and independence from hand dominance.

Key milestones: PCT Patent Published, clinical validation completed, and scoring system established.

Market Opportunity

Target industries/applications: Neurology clinics, rehabilitation centres, clinical trials for neurodegenerative diseases, telemedicine, and pharmaceutical research.

Prevalence: Parkinson's disease affects over 10 million people worldwide.

Multiple Sclerosis impacts nearly 2.8 million globally.

Stroke is a leading cause of long-term disability, with more than 12 million new cases annually.

Motor Neurone Disease (ALS) affects approximately 350,000 people worldwide.

Market size estimate: The global neurorehabilitation devices market is projected to exceed $2.5 billion by 2028.

Unmet needs addressed: There is a strong demand for objective, sensitive, and scalable measures of hand function to support clinical trials, therapy monitoring, and early detection of neurological decline—areas where current assessment tools are often inadequate.

Technology Sector
Med Tech

Patent Details
PCT/EP2023/062682

Opportunity
Research collaboration
Available to License

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Reference:
DM03-991-01

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Rialtas na hÉireann
Government of Ireland

Co-funded by the European Union

Tionól Réigiúnach an Deiscirt
Southern Regional Assembly

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