

# **Assessment of Walking Ability in Parkinson's Patients using Three- dimensional Plantar Pressure Sensors**

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## **Abstract**

Human Factors, Ergonomics and Healthcare Systems and Entrepreneurship and Innovation: As the world population enters an aging era, the situation of Parkinson's disease is becoming increasingly severe. The clinical manifestations of Parkinson's patients mainly include tremors, walking disorders, muscle rigidity, and bradykinesia, among which walking disorders and bradykinesia are the more obvious features of Parkinson's patients. The existing gait analysis methods mainly include image analysis, wearable sensor analysis, and plantar pressure testing platform analysis. Among them, wearable sensor analysis is expected to solve the long-term and low-cost gait detection needs. However, currently wearable sensors cannot measure the tangential force on the sole of the foot, resulting in the inability to obtain complete plantar force information of patients, which poses difficulties for more accurate gait analysis. This project designs a three- dimensional force sensor and measurement method for the sole of the foot, and uses machine learning algorithms to evaluate the walking ability of Parkinson's patients.

## **Keywords**

Parkinson's disease, 3D force, plantar pressure

## **Biography**

Tianrui (Terry) Zhang is a current Grade 11 student at Kent School in Connecticut, beginning in Fall 2025. Growing up in Hong Kong, he later moved to the United States to attend Kent School as a boarding student. Passionate about supporting the Parkinson's community and working with robotics and engineering technology, Terry has connected multiple Parkinson's communities in Mainland China with his research. Prior to this, Terry also worked in materials science, conducting research on replacing plastic bags with corn starch and other 100% biodegradable materials.