

Precise Gait Analysis by Seismometry

This technology allows for a robust, precise monitoring of persons suffering from motor disorders without the need for direct sight contact such as existing technologies in the field.

Keywords Seismograph, Parkinson's disease, multiple sclerosis, remote observation

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Background Gait analysis is widely used in clinical diagnostics, rehabilitation, sports science, and ergonomic studies. Traditional methods, such as optical motion capture systems, pressure-sensitive walkways, and wearable inertial measurement units have however limitations like high costs, intrusiveness or/and the need for frequent medical visits or/and the help of human experts to operate this systems. There is a need for a robust, unobtrusive, and cost-effective system that can monitor gait over prolonged periods with minimized need for physician involvement and thus suited for at home uses.

Invention Novel method and system for measuring spatial, temporal, and spatiotemporal gait parameters using seismic signals. This technology employs at least three time-synchronized seismographs to acquire and process seismic signals generated by footsteps. The system provides continuous, contactless monitoring of gait parameters, offering a flexible and cost-effective solution for both clinical and residential settings. Key parameters measured include step count, stride time, walking speed, and gait symmetry

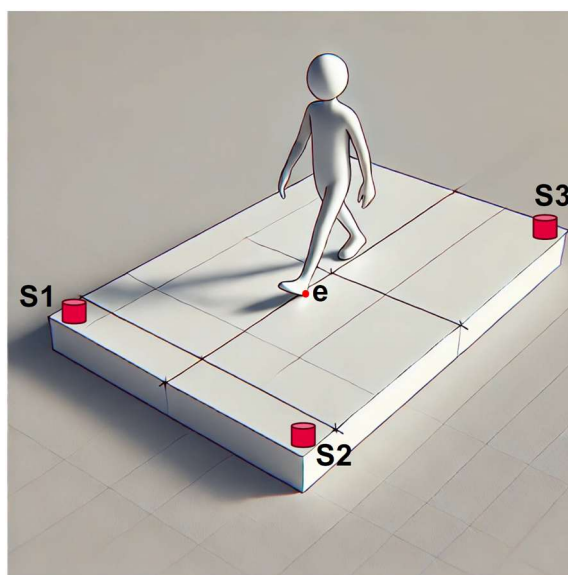


Fig: Illustration for determining the position of a step based on the localization of a seismic event (i.e., the initial contact of a footstep): Three time-synchronized seismographs S1, S2, and S3 positioned to span a triangular area enclosing the induced seismic event e. The location of the event source e can be precisely determined high precision triangulation.

Application Home monitoring of older adults/patients with motor disorders, fall prevention, alarming, gait analysis, and detection of walking anomalies.

Patent Status Priority Patent Application filed

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