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Analyzing Activity of Daily Living Data Utilizing Motor Activity Log Toward Quantitative Scoring System

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Abstract

Assessment of stroke severity and recovery progress relies on a therapist's rating or score. It is typically administered manually with subjective input from therapists. This method is exposed to inconsistency, particularly when involving different therapists which depends on their own experiences and expertise. This paper presents a study on one-way ANOVA analysis to investigate the impact of force, forearm and elbow movement, Activity of Daily Living (ADL) equipment motion, and time duration on the MAL score during the execution of ADLs. A Motor Activity Log (MAL) is employed as the standard clinical assessment benchmark, where ten ADLs have been selected from the MAL standard for data collection purposes involving 30 healthy individuals and 56 stroke patients. The analyses are divided into two which are Analysis 1) focuses on the data with therapist rating 5, while Analysis 2) considers the data with therapist ratings ranging from 1 to 5. Data inputs

including force, forearm and elbow movement, ADLs equipment motion, and activity time duration have been collected using sensors of force, distance, Inertial Measurement Unit (IMU), and encoders. Output data in MAL scores are obtained manually from therapists using the current methodology. The results indicate significant differences in 19 out of 40 cases for Analysis 1) and 85 out of 100 cases for Analysis 2). This paper contributes towards an objective and accurate automatic scoring system for a more consistent and efficient assessment of stroke patients' performance and recovery progress. © 2025 The Authors.

Author keywords

Activity of daily living; ANOVA analysis; motor activity log; occupational therapy; stroke rehabilitation

Indexed keywords

Engineering controlled terms

Analysis of variance (ANOVA); Arthroplasty; Benchmarking; Risk management; Time and motion study

Engineering uncontrolled terms

Activities of Daily Living; Activity logs; ANOVA analysis; Motor activity; Motor activity log; Quantitative scoring; Scoring systems; Stroke patients; Stroke rehabilitation; Time duration

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