

Combining Computer Vision and Wearable Sensors to Assess Upper-Limb Movement Quality After Stroke

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1 INTRODUCTION – RESEARCH QUESTION

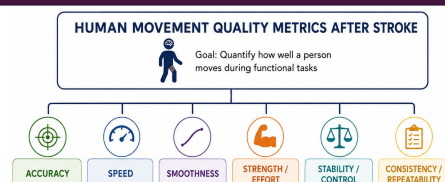
Upper-limb recovery is a major rehabilitation goal after stroke. Wearable sensors can quantify arm use and provide some indicators of movement quality in everyday life. Recent advances in computer vision offer new opportunities to extract kinematic information from simple video recordings. However, it remains unclear whether video-derived and wearable-derived indicators provide similar or complementary information.

Can computer vision and wearable sensing be combined to improve the assessment of upper-limb movement quality after stroke?

2 AIMS OF THE INTERNSHIP

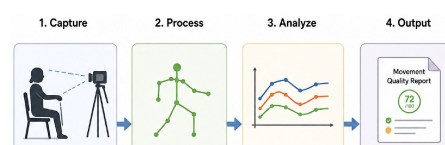
Phase 1 (M1 + M2) : Define the assessment framework

- Select tasks, movement-quality indicators, and the most suitable pose-estimation framework.
- Outcome: Standardized protocol and selected computer vision framework.



Phase 2 (M1): Develop and validate a computer vision pipeline

- Develop a video-based pipeline and extract movement-quality indicators from healthy participants.
- Outcome: Validated video-based movement quality assessment pipeline.



Phase 3 (M2): Compare video and wearable sensor indicators

- Compare video and wearable-derived movement-quality indicators in stroke patients.
- Outcome: Identification of complementary movement-quality metrics.



3 INTERNSHIP KEY POINTS

M1 Track :

- Computer Vision
- Python Programming
- Signal & Image Processing
- AI / Machine Learning
- Pipeline Development

M2 Track :

- Data Analysis
- Biomechanics
- Rehabilitation Sciences
- Clinical Research
- Multimodal Assessment

Research Environment

- Interdisciplinary research combining movement science, computer vision, and wearable sensing
- Clinical applications in stroke rehabilitation and digital health

4 ABOUT SUPERVISION

Joint supervision by researchers from the NeuroRehab group (EuroMov DHM, UM) and IMT Mines Alès, bringing complementary expertise in neurorehabilitation, human movement analysis, wearable technologies, and computer vision.

EuroMov
Digital Health in Motion



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