



[Back](#)

AI and RIoT for Rehabilitation: Advancing Hand Gesture Recognition and Voice Assistance

[Studies in Computational Intelligence](#) • Conference Paper • 2026 •

DOI: [10.1007/978-3-032-00232-7_28](https://doi.org/10.1007/978-3-032-00232-7_28)

[Islam, Md Sariful](#)^a; [Zainuddin, Ahmad Anwar](#)^a ; [Amir Hussin, Amir Aatieff](#)^a; [Hassan, Mohd Khairul Azmi](#)^a; [Puzi, Asmarani Ahmad](#)^a; [+7 authors](#)

^a Kulliyah of Information and Communication Technology, IIUM, Gombak, Malaysia

[Show all information](#)

0

Citations

[Full text](#) [Export](#) [Save to list](#)

[Document](#)

[Impact](#)

[Cited by \(0\)](#)

[References \(24\)](#)

[Similar documents](#)

Abstract

After a heart attack or a stroke, the patient needs rehabilitation; nevertheless, obviously, conventional approaches are costly, time-consuming, and need a highly qualified staff, which excludes the majority of patients. As part of the proposed solution, this research incorporates Rehabilitation Internet-of-Things (RIoT) that uses Mediapipe for hand gesture detection and voice to guide the exercises. The culmination of the system is to offer availability of computer vision coupled with speech recognition to evaluate the performance during the exercise and to report the extent of rehabilitation within the shortest time. In particular, these movements include flexion, extension of fingers, pinch using the thumb index finger, and opening/closing of the hand and full hand movement that helps in determining the degree of motion for performing movements during the rehabilitation exercises. The RIoT system acts as a voice-activated, on-the-body graphical display that helps the partly mobile users as they obtain real-time feedback from their hand gestures. The sensitivity of the deep learning-based gesture recognition and the speech synthesized is then tested

and practiced on recovering patients before testing on the system platform. Thus, the system, in the framework of utilizing assistive automation for rehabilitation, releases the necessity to use human observers while still keeping the overall control by doctors or other healthcare managers. and enables the access to the high-quality rehabilitation therapy for patients, contributes to the decreased healthcare expenditures, and improve the outcomes of the overall patient rehabilitation. © The Author(s), under exclusive license to Springer Nature Switzerland AG 2026.

Author keywords

4D Skeletal-Based Gesture Recognition; Machine Learning; Rehabilitation Internet-of-Things (RIoT); Stroke Rehabilitation; Voice AI

Funding details

Details about financial support for research, including funding sources and grant numbers as provided in academic publications.

Funding sponsor	Funding number	Acronym
Ministry of Higher Education, Malaysia See opportunities by MOHE ↗	FRGS23-307-0916, FRGS/1/2023/TK07/UIAM/02/2	MOHE
Ministry of Higher Education, Malaysia See opportunities by MOHE ↗		MOHE
National Medical Research Register	NMRR ID-24-02136-NJQ	

Funding text

This research was partially funded by the Ministry of Higher Education (MOHE), Malaysia, through the Fundamental Research Grant Scheme (FRGS) under grant numbers FRGS23-307-0916 and FRGS/1/2023/TK07/UIAM/02/2. The authors would like to express their sincere appreciation to the National Medical Research Register (NMRR) for their administrative support and facilitation, particularly under NMRR ID-24-02136-NJQ.

Corresponding authors

Corresponding
author

A.A. Zainuddin

Affiliation

Kulliyah of Information and Communication Technology, IIUM, Gombak,
Malaysia

Email address

anwarzain@iium.edu.my

© Copyright 2026 Elsevier B.V., All rights reserved.

Abstract

Author keywords

Funding details

Corresponding authors

About Scopus

[What is Scopus](#)

[Content coverage](#)

[Scopus blog](#)

[Scopus API](#)

[Privacy matters](#)

Language

[日本語版を表示する](#)

[查看简体中文版本](#)

[查看繁體中文版本](#)

[Просмотр версии на русском языке](#)

Customer Service

[Help](#)

[Tutorials](#)

[Contact us](#)

ELSEVIER

[Terms and conditions](#) ↗ [Privacy policy](#) ↗ [Cookies settings](#)

All content on this site: Copyright © 2026 [Elsevier B.V.](#) ↗, its licensors, and contributors. All rights are reserved, including those for text and data mining, AI training, and similar technologies. For all open access content, the relevant licensing terms apply.

