# International Journal of Robotics Research Special Issue on
Robotics to augment a human's degrees-of-freedom

October 21, 2024

Robotic body augmentation which utilises the sensing and actuation capabilities of robots to enhance human abilities, is a common theme in science fiction that recent technological advances are beginning to realise. This form of augmentation, mediated through human interaction with *supernumerary robotic limbs* (SRLs), robotic avatars, VR systems and appropriate feedback devices, enables users to perform tasks or perceive with more degrees of freedom (DoF) than their bodies and brains typically allow. This proposed special issue, guest edited by researchers with extensive experience in the field, aims to build upon the successful workshops on robotic augmentation delivered at the IEEE ICRA 2023 and 2024, focusing on the intersection of robotics, neuroscience and virtual reality that is driving the development of a new generation of robots and machines.
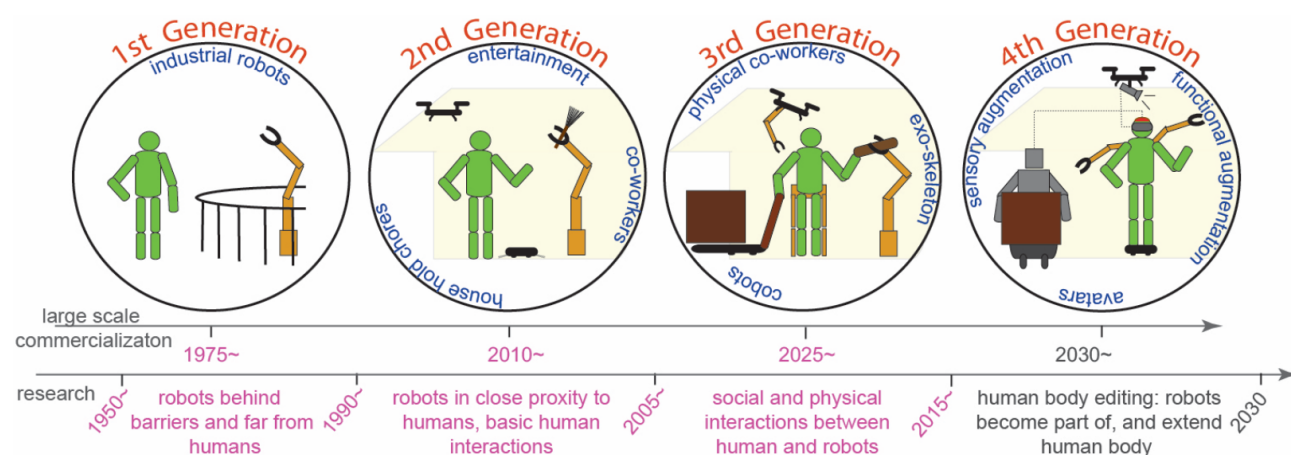
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Why this special issue and why now?

Augmentation with SRLs is a rapidly developing approach to assisting and interacting with humans, as illustrated by the continuous increase of papers published on this topic in Fig. 1. The interest of the robotic and neuroscience communities is also reflected in the success of the augmentation workshops we have organised at the last two IEEE ICRA events, which featured participation from leading researchers in the field, some of whom were invited to contribute to this special issue. There has not been a special issue covering all aspects necessary to develop truly useful human augmentation with SRLs as we propose here, including the integration of both the human considerations (neuroscience and psychology) with the robotics considerations (control, interface development and feedback).
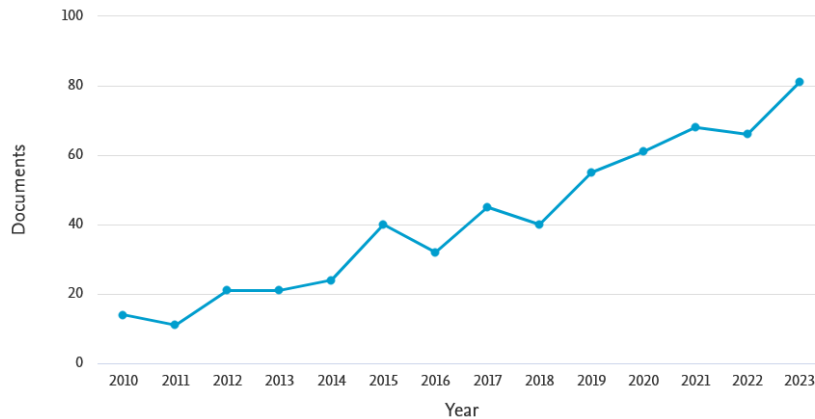

Figure 1: Number of papers on robotic augmentation per year. This figure was generated on Scopus using research functions to search titles, abstracts, and keywords of papers with the following query: (*supernumerary* OR *extra*) AND (*limb* OR *arm* OR *finger* OR *leg*) AND *robotic*. The search interval was from 2010 to 2023.

Topics

This special issue will investigate the robotics and neuroscience of augmenting human abilities to provide additional DoF to their impaired or able-bodied users, as well as the psychology and virtual reality tools to support such augmentation. The scope for papers in this special issue includes:

- Interfaces and hardware for SRLs

- Artificial somatosensory feedback for performance, ownership and agency

- Augmentation control strategies

- Training for motor augmentation and its impact on human motor control

Submission information

Submission site:

- https://mc.manuscriptcentral.com/ijrr

- Note to make a submission you must first log-in, click on the author tab, and then click "start new submission". This will then offer the option to submit to the "Robotics to augment a human's degrees-of-freedom" special issue.

Review process and requirements

- This special issue accepts top-quality original (unpublished) articles and review papers. Each submission will be peer reviewed in accordance to the standard IJRR review process. Please refer to the IJRR author instructions for more details.

- Submissions that do not fit into the scope of the special issue will be rejected by the guest editorial team.

- There is no page limit for IJRR submissions. The rule is however that a paper should be as long as necessary, and no longer: conciseness is highly valued.

- All submissions will receive a decision within approximately 3 months of submission.

- Papers will be selected based on their significance, quality, novelty and alignment with the special issue's scope. The special issue does not have a required acceptance rate or maximum number of papers.

Key dates

- Submissions open: September 13th, 2024

- Submissions close: December 1st, 2024

- Review and revision: December 2024-March 2025.

Questions and Answers

Inquiries

- Send inquiries to `ijrr.augmentation@gmail.com`. All guest editors will receive your queries.

Frequency asked questions

1. Will you accept submissions containing material previously published in conference proceedings?

   - IJRR allows submissions containing material previously published in conference proceedings. In such a case, the submission should include a substantial extension of results, methodology, analysis, conclusions and/or implications over the conference proceedings paper. An extension is considered substantial if it offers new research results, methodology, analysis, conclusions and/or implications. The mere inclusion of more details, experiments, or discussion is typically considered not substantial. The final decision on what constitutes a substantial extension will be made by the Editorial Board.

   - Details of the previous submission/s (including the DOI and licensing terms) must be openly disclosed in the Novelty Statement accompanying the submission to IJRR, and all necessary permissions to re-use previously published material and attribute appropriately must be obtained by authors. Failure to disclose previously submitted material does not comply with IJRR's code of ethics and will lead to exclusion from review.

   - The IJRR submission manuscript must contain a statement offering clarifying the differences to the previous conference paper/s, and be explicitly cited. The conference paper/s must be uploaded as accompanying material along with the journal submission.

2. Can I submit an extended version of a paper which is under review?

   - IJRR does not accept manuscripts while they are being evaluated by other archival Journals. In case of parallel submission of partly overlapping material to a non-archival conference or workshop, this should be openly disclosed at the time of IJRR submission.

   - Conferences such as IEEE ICRA and IROS, RSS, and CoRL are considered archival. Authors need to ensure any ongoing reviews at those venues are concluded before submission.

   - Manuscripts submitted elsewhere without informing the Editorial Board nor following the above practices will be editorially rejected without further review. The Editorial Board of IJRR will inform the EiC and Board of other involved Journals of such decisions.

3. Can submitted manuscripts be uploaded as preprints?

   - IJRR welcomes posting of preprint versions of an article on the author's personal or institutional website or on community preprint servers such as ArXiv. Preprints are not regarded as prior publication. Authors should disclose details (DOI, licensing terms) of preprint posting in the Novelty Statement accompanying the submission.

- Should authors post or update a preprint version of a manuscript that was revised after receiving feedback from the IJRR Board, it is expected that they acknowledge it in the preprint. When a manuscript is accepted and published in IJRR, it is required that the authors update the pre-print with a publication reference, including the DOI and a URL link to the published version of the article on the journal website.