

IROS 2018 with RA-L

Title: Soft Wearable Augment Walking Suit with Pneumatic Gel Muscles and Stance Phase Detection System to Assist Gait

RA-L Submission-ID: 18-0260**Summary of Changes:**

Firstly, we would like to thank esteemed reviews, associate editors and editor for their time to review our manuscript and provide valuable comments and feedback. This manuscript is revised based on the constructive comments and part of the document revised corresponding to each comment has been highlighted to identify individual changes.

Dear Reviewer 1 (Reviewer Id: 41593)

Firstly, Authors show gratitude for the valuable comments based on which authors have significantly revised the paper.

(R1-1) As with the first version some improvements can be made to make the paper easier to understand. These details are outlined in the comments in the attached pdf. The authors should make sure that when corrections/revisions are made these are fully checked for language and clarity.

(A1-1) We addressed all the comments outlined in the reviewed manuscript and through check of language and clarity was conducted.

Dear Reviewer 2 (Reviewer Id: 41591)

Firstly, Authors show gratitude for the valuable comments based on which authors have significantly revised the paper.

(R2-1) In the new figure 5, it could be also interesting to include a graph with the activation of the FSR sensors. An real reading, as the one in figure 10, or an ideal reading.

(A2-1) We have now added ideal reading of FSR sensor in the figure 5, to describe the stance phase on the right limb assist swing phase in the left limb. This is done to match with the figure of standard gait and region of assist mentioned in the figure.

(R2-2) In section II-C, there is a short introduction to the previous section. This is probably not necessary, since it was the immediate previous text. A liaise between sections can be good, but without incurring in over repeating. A similar situation can be seen in section III when the authors refer to section I and II-C.

(A2-2) We understand the concern here. In the updated manuscript we removed unwanted cross references between section.

(R2-3) The new table II makes the results more understandable. However, the corresponding text in section III-B is now not necessary. Maybe just a few key results, but not the repetition of all the data of the table.

(A2-3) In the results section we removed the repetition of the data in the table and key results.

(R2-4) In section II-B, there is a missing reference to a figure.

(A2-4) We fixed the missing reference to a figure

(R2-5) In general, the reading of the text has been significantly improved, however there are still a few typos and grammatical errors which should be corrected for the final version of the paper.

(A2-5) The updated manuscript is thoroughly reviewed for English and grammatical errors.

Dear Reviewer 3 (Reviewer Id: 41589)

Firstly, Authors show gratitude for the valuable comments based on which authors have significantly revised the paper.

(R3-1) Fig. 10 shows the FSR profile for walking. The authors do not explain why there are two individual spikes or peaks in the FSR plots for a single sensor.

(A3-1) We have added explanation for the two spikes in the Conclusion and future work section.

(R3-2) Fig. 10 also shows the sEMG activity for various muscle groups contributing to human walking. These plots do not match with healthy individuals' walking patterns. It seems as though the curves have been shifted towards the right. As the graphs are now, it depicts that the muscles generate higher activity during swing phase of walking, which is not possible. Please correct this.

(A3-2) We are sorry for the confusion here. In the updated manuscript we added description about segmentation of gait cycle which explains why the graphs look and feel the way reviewer feels. In brief, ideally the segmentation of the sEMG of gait cycle is done stance to stance of the same limb. But in our research, we segmented sEMG based on stance to stance of contralateral limb because we use stance to assist swing phase of contralateral limb.

(R3-3) Depicting sEMG activity of all three trials overlaid on one plot might help with visual comparison of the three conditions.

(A3-3) Thank you for your suggestive comments. We tried to follow the suggestion, however we found that the standard deviation of sEMG becomes very difficult to see when the three conditions are overlapped. Adding another figure is also difficult due to the page limitation. Although we agree the overlapped figure is helpful for readers, we believe Fig.10 is necessary to provide the detailed discussion of the results. Please understand we keep the figure 10 as it is.

(R3-4) The introduction section need not detailed. Grouping different types of assistive devices might help make the manuscript more concise.

(A3-4) In the updated manuscript we have grouped the assistive devices in two types i.e. exoskeleton and exosuits which was missing earlier.

(R3-5) Some images in this version of the manuscript are very large (Fig. 10 and Fig. 11). Perhaps these images can be reduced in size such that they are clearly visible but yet not too large.

(A3-5) We have updated these figures to be visible and not too large.

(R3-6) Thorough proofreading of the paper is required.

(A3-6) Thorough proofreading was conducted for the updated document.
