

Response to Reviewer 2 Comments

Dear Reviewer:

Thank you for your letter and for the reviewers' comments concerning our manuscript entitled "Trajectory planning for Spray Painting Robot Based on Point Cloud Slicing Technique" (ID: electronics-797882). Those comments are all valuable and very helpful for revising and improving our paper, as well as the important guiding significance to our researches. We have studied these comments carefully and have made corrections which we hope meet with approval.

Point 1: The abstract should be completely restructured. It is hard to understand what authors are investigating. Authors, after 1 or 2 lines introducing the problem, should quickly describe what they propose and their aim. a glimpse of the results should be reported. I short discussion and the take-home message should be provided.

Response 1: Thank you for your instructive suggestions. Depending on your helpful suggestions, we have restructured this part in the new manuscript.

Point 2: Lines 52-54: I think that what is missing here is the introduction of the potentiality of biology inspirations and biorobotics. Authors should introduce here or in the discussion section the potentiality of these approaches. For instance, a spray painting robot could be improved by using goal-directed neural circuits such as central pattern generators. Also, concerning the trajectory, many organisms can be used as model to optimize the performances of this tasks in robotics (both for robot movements or for spraying materials).

This can also increase the general interest for the wide readership of this Journal.

Some useful examples that authors may appreciate to discuss and include in their work are:

A bioinspired autonomous swimming robot as a tool for studying goal-directed locomotion. *Biological Cybernetics*, 107(5), 513-527. (2013)

Biorobotics: Using robots to emulate and investigate agile locomotion. *science*, 346(6206), 196-203. (2014).

Impact of Aging and Cognitive Mechanisms on High-Speed Motor Activation Patterns: Evidence from an Orthoptera-Robot Interaction. *IEEE Transactions on Medical Robotics and Bionics*.(2020).

A review on animal-robot interaction: from bio-hybrid organisms to mixed societies. *Biological Cybernetics*, 113(3), 201-225. (2019).

In the model, it is not included a part concerning the coordinated work of different robotic arms

painting the same object, that is crucial in industrial applications.

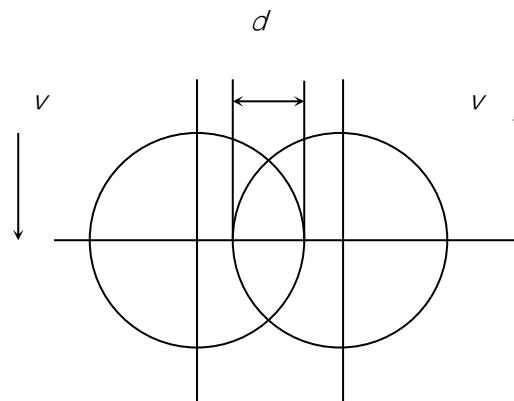
Response 2: That's a good idea. We have added some of these and other references to the new manuscript.

Point 3: How do you address the overlapping issue? This would create different shades of colours on the object and a waste of material would also occur. This would produce a low quality manufacture and a non-cost effective work process.

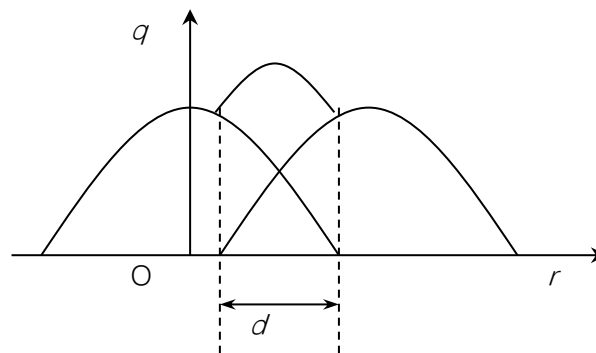
Response 3:

In order to ensure the full coverage of the coating in the spraying process, the overlap between the spraying tracks is unavoidable, but it will not affect the uniformity of the coating.

As shown in Figure 1 (a) is the top view of the overlapping area on two adjacent paths, and (b) is the profile view of the coating on the overlapping area. d is the width of the overlapping area of the coating between the two spray paths. When the value of d is determined, the coating thickness of the overlapping area is obtained by superimposition of the coating thickness of two sprays in the algorithm.



(a) Top view of overlapping areas on two adjacent paths



(b) the profile view of the coating on the overlapping area

Figure 1. Coating distribution in overlapping areas

When establishing the coating thickness accumulation function, d will be taken into account as the key parameter and the value of d will be optimized to ensure that the coating thickness is within the standard range.

Point 4: A deep English revision is needed.

Response 4: Thank you for your careful reading of our manuscript. We have revised them in the new manuscript.