

Supplementary Material for Unwind: Interactive Fish Straightening

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Extra Results

Below are more results of fishes straightened using unwind by a marine-biologist expert user.

Transcript of Interview With Expert User

What follows is the transcript of an interview with one of our expert users in the Tytell Lab at Tufts University.

Q: *How long did it take you and your student to get familiar with the workflow?*

A: We chatted about it and I showed her some stuff for maybe 5-8 minutes. It was pretty quick!

Q: *What were any difficulties that you and your student faced to begin with, is that now resolved or do you still have any issues?*

A: The only issue she ran into was with saving. Since it just kind of closes, she thought it didn't save and started to re-do it. I had to explain that closing wasn't crashing, that's what it does when saving. For me, the only issue I was having was with missing parts of fish, but I think that's been solved.

Q: *What do you guys like about this tool?*

A: I like that it's easy to use and a lot more intuitive than the segmenting tool (which I also liked but I was one of the only people who could figure out how to use it).

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Q: *How does having this tool make your lives easy?*

A: The tool is really useful for doing morphometrics analysis, especially when we are trying to look at things in a specific anatomical plane. Before, we had to have versions of the scan rotated at different angles to measure things in a somewhat straight line. Now we can just straighten a single scan which saves a lot of time, storage space, and confusion with different versions of files. On a less scientific note, it makes creating figures a lot easier. We don't have to spend hours looking for the perfect scan, we can just fix any one we have.

Q: *How frequently do you plan to use this tool?*

A: I would use it every time I go to analyze CT scans of my fish. My species especially are really bendy and flexible, so

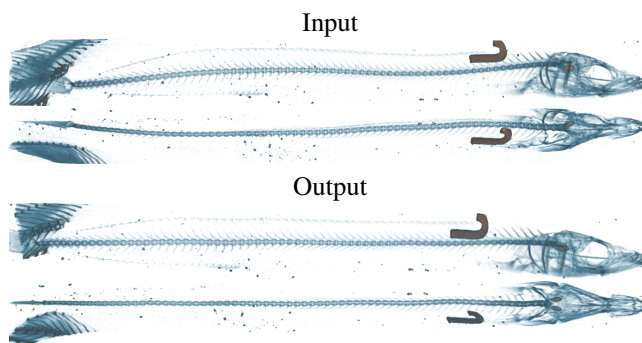


Figure 1: Input and output of our pipeline. The top image shows a side view and the bottom shows a top view.

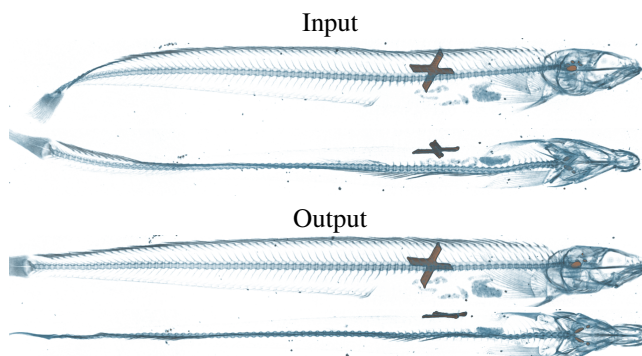


Figure 2: Input and output of our pipeline. The top image shows a side view and the bottom shows a top view.

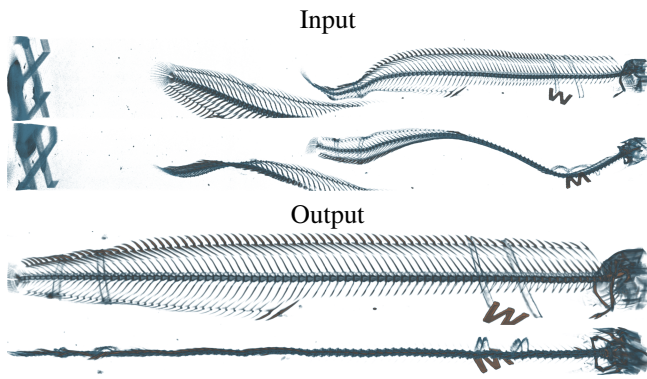


Figure 3: Input and output of our pipeline. The top image shows a side view and the bottom shows a top view.

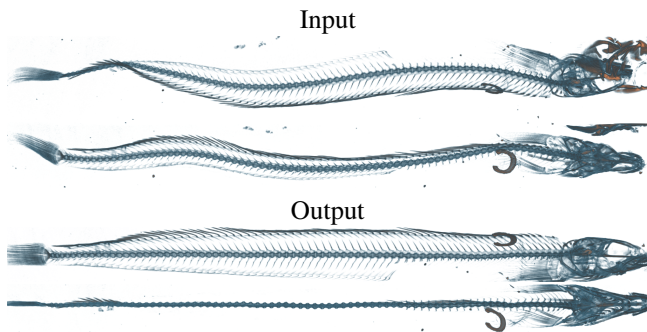


Figure 4: Input and output of our pipeline. The top image shows a side view and the bottom shows a top view.

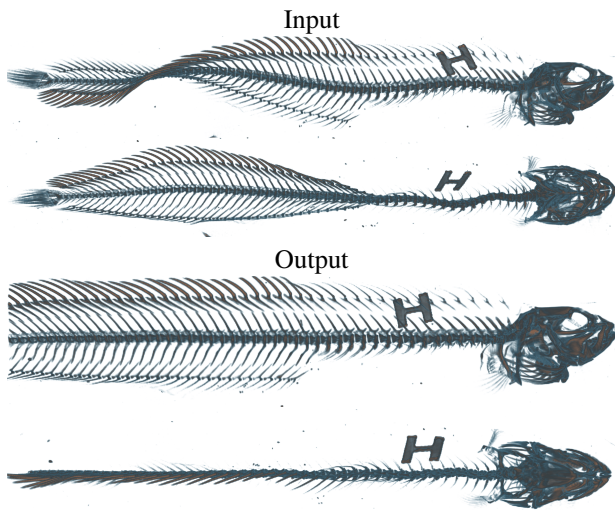


Figure 5: Input and output of our pipeline. The top image shows a side view and the bottom shows a top view.

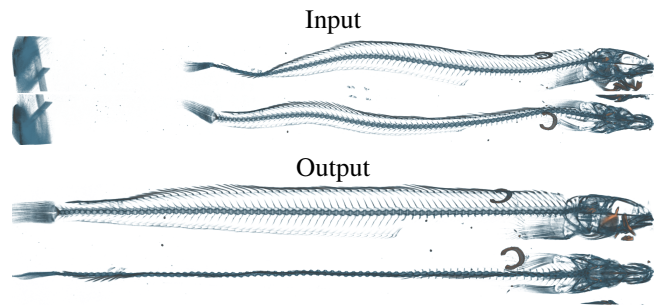


Figure 6: Input and output of our pipeline. The top image shows a side view and the bottom shows a top view.

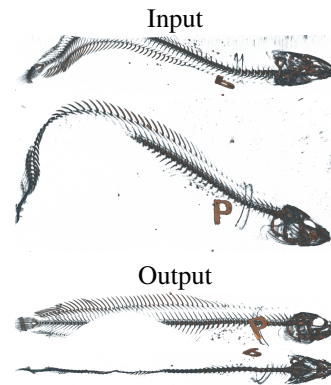


Figure 7: Despite missing parts of the scan, our system can produce a straightened exemplar.

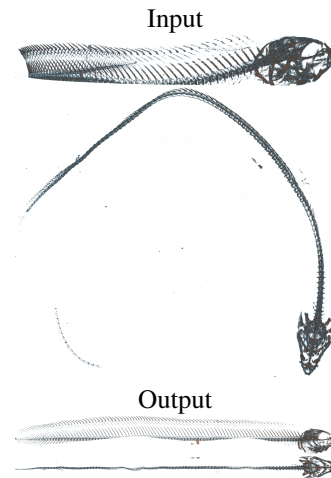


Figure 8: This fish was purposefully bent to an extreme position to evaluate the capabilities of our system in the presence of large deformations .

it's not hard to accidentally bend or twist parts while preparing a scan. So for me I'll use it all the time.

Q: *Suggestions on what to improve?*

A: I think the biggest thing would be the option for different import and export formats. Lots of people end up with tiff stacks, so being able to import them would be awesome. For export, being able to save a DICOM stack or a NRRD files would be useful.

Q: *Any other thoughts / feedback etc?*

A: I was talking to my adviser and he was saying another thing folks might actually find useful is the ability to actually bend fish to specific angles. For example, my adviser has scans of fish with muscle fibers stained. It might be interesting to take a straight fish, and then see what the difference in muscle fiber length would look like in a bent fish. Just as an interesting "future directions" thing.