

# HAAG Weekly Report Week 6

Mercedes Quintana

## Time-Log

What did you do this week?

- Annotated 151 images
- Discussed possible implementations of the GUI

What are you going to do next week

- Keep website updated
- Try 300 images with the model
- 

Blockers, things you want to flag, problems, etc.

- None

## Abstracts:

Link: <https://arxiv.org/pdf/2109.15283>

### Bend-Net: Bending Loss Regularized Multitask Learning Network for Nuclei Segmentation in Histopathology Images

Separating overlapped nuclei is a major challenge in histopathology image analysis. Recently published approaches have achieved promising overall performance on nuclei segmentation; however, their performance on separating overlapped nuclei is quite limited. To address the issue, we propose a novel multitask learning network with a bending loss regularizer to separate overlapped nuclei accurately. The newly proposed multitask learning architecture enhances the generalization by learning shared representation from three tasks: instance segmentation, nuclei distance map prediction, and overlapped nuclei distance map prediction. The proposed bending loss defines high penalties to concave contour points with large curvatures, and applies small penalties to convex contour points with small curvatures. Minimizing the bending loss avoids generating contours that encompass multiple nuclei. In addition, two new quantitative metrics, Aggregated Jaccard Index of overlapped nuclei (AJIO) and Accuracy of overlapped nuclei (ACCO), are designed for the evaluation of overlapped nuclei segmentation. We validate the proposed approach on the CoNSeP and MoNuSegv1 datasets using seven quantitative metrics: Aggregate Jaccard Index, Dice, Segmentation Quality, Recognition Quality, Panoptic Quality, AJIO, and ACCO. Extensive experiments demonstrate that the proposed Bend-Net outperforms eight state-of-the-art approaches.

**Summary:** This group created an architecture and new loss function for a neural network to properly segment cells.

### What did you do and prove it

I have finally been able to get a good batch of images done for the landmark augmentation. Next week I plan to also start working on GUI system so that it is ready for Ayush to demo is the our meeting on Wednesday. Once I get up to 300 images, I want to compare results on images without the new landmarking vs ones that have it. This will show me whether the extra landmarking is good use of time. Here is a snippet of the new tps file.

```
85 685.00 842.00
86 516.00 668.00
87 972.88 697.65
88 972.88 616.02
89 826.70 543.88
90 811.51 650.19
91 1693.26 690.06
92 1662.88 557.17
93 1512.91 627.41
94 1511.01 705.24
95 2006.50 2137.38
96 1714.14 2118.39
97 1736.92 2255.08
98 800.12 2247.48
99 836.19 2099.41
100 551.43 2146.87
101 IMAGE=all_auto_images/processed_May 20th 3_05-20-2024 17_02_27_1-5.jpg
```