WB Related Works

Mikołaj Spytek, Andrzej Pióro, Kinga Ułasik

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1 Related works

In our work we try to recreate the model described by Pan et al. [1] and perform some experiments using it. They propose a new multitask learning network architecture for blood vessel segmentation and centerline extraction. Their work is based on a paper by Ma et al. [3] which applied multitask learning methods to retinal images. The architecture resembles a cross-stitch neural network first established by Misra et al. [5], however the authors of the article we're working on made changes to the cross-stitch cell architectures. The parts of the model which are responsible for the standalone task, that is segmentation and centerline extraction are similar to the U-net networks developed by Ronneberger et al. [2].
The architecture described in the paper consists of convolutional layers with skip connections and relies on on the strong use of data augmentation. Such architecture proved efficient and suitable for segmentation tasks in biomedicine, where large labeled datasets are rare.
Another major change to the architecture is the change of the loss function to one specifically designed to work well on similar tasks – segmentation of tubular structures, which was first described by Shit et al. [4]. The function characterized in the article is distinct from other approaches in that it is differentiable, thus making it suitable as a loss function. Moreover, this loss function preserves the topology of analysed structure, a crucial assumption in biomedicine.

References

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