

Automated Cell Counting and Region-specific Mapping in Whole Mouse Brain Light Microscopy Data

ariadne.ai offers tailored solutions for the analysis of increasingly demanding high-throughput light and electron microscopy datasets by combining the state-of-the-art convolutional neural networks with the experience of our professional image annotator team. Fed with high quality ground truth, our novel machine-learning tool for the automated segmentation of somata analyzes whole mouse-brain imaging data. In a second step, all detected somata were mapped onto distinct brain regions in correspondence to a neuroanatomical reference atlas.

In one of our test datasets, we automatically counted more than 1.8 million cfos-expressing neurons in a single brain, distributed across many brain regions. Quality scoring yielded an F1-score of greater than 0.97 and a false merger rate of less than 5% for both low- and high-density regions. In contrast to that, more than 500 hours of manual work would have been necessary to achieve comparable results, even if performed by highly motivated and skilled professionals at an annotation rate of one soma per second.

Here, we present our workflow, detailed accuracy measurements and 3D reconstructions of the analyzed data.

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Terms and Conditions

Yes

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