Convolutional Neural Networks for cytoarchitectonic brain mapping at large scale - supplementary material

Christian Schiffer[1,2], Hannah Spitzer[3], Kai Kiwitz[4], Nina Unger[4], Konrad Wagstyl[5], Alan C. Evans[6], Stefan Harmeling[7], Katrin Amunts[1,4], and Timo Dickscheid[1,2]

[1]Institute of Neuroscience and Medicine (INM-1), Research Centre Jülich, Germany
[2]Helmholtz AI, Research Centre Jülich, Germany
[3]Institute of Computational Biology, Helmholtz Zentrum München, Germany
[4]Cécile & Oscar Vogt Institute for Brain Research, University Hospital Düsseldorf, Heinrich-Heine-University Düsseldorf, Germany
[5]Wellcome Centre for Human Neuroimaging, University College London, London, United Kingdom
[6]Department of Neurology & Neurosurgery, Montréal Neurological Institute (MNI), McGill University, Montréal, Canada
[7]Institute of Computer Science, Heinrich-Heine-University Düsseldorf, Germany

Screenshots of the web-based interactive mapping tool

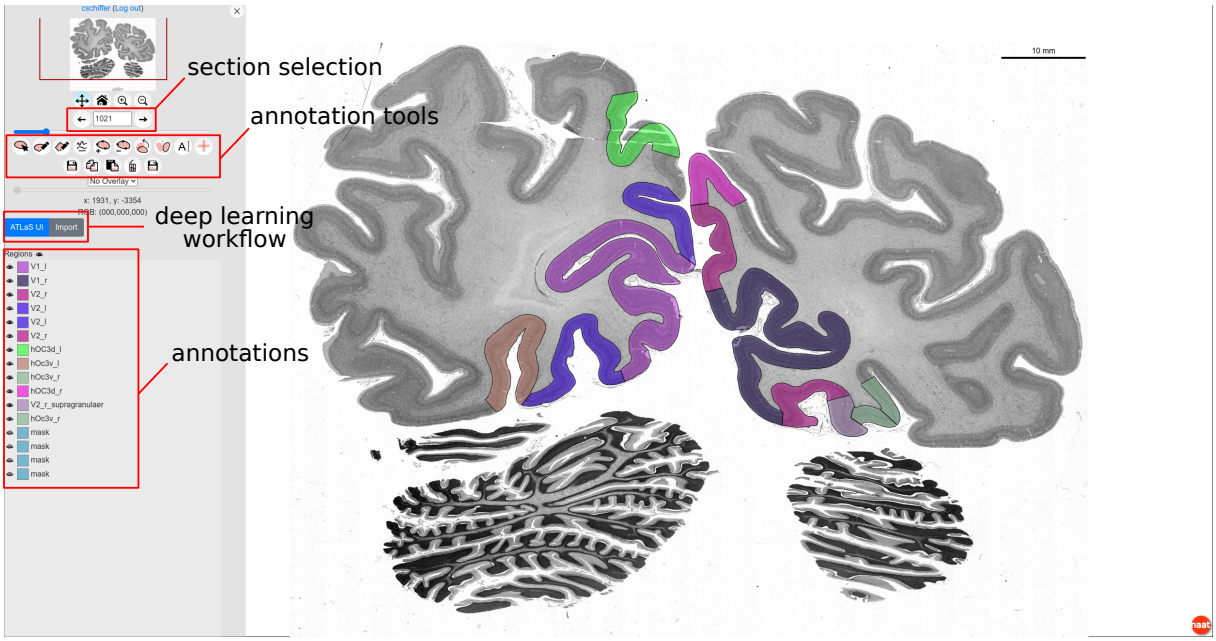

Figure 1: Main page of the web-based interactive mapping tool. The tool extends the web-based annotation tool *microdraw*, reusing it's rich capabilities for creating and managing annotations. Users can create and save annotations in their user account. Alternatively, an import function can be used to import annotations created using other annotation tools.

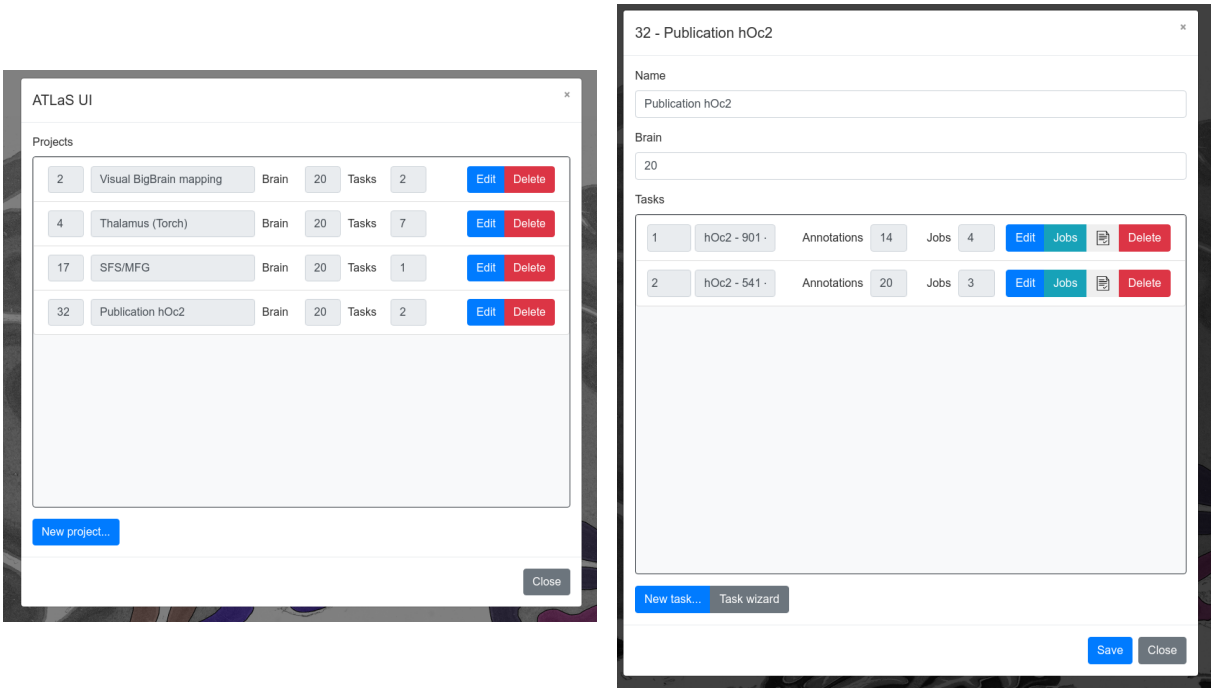

Figure 2: *Left:* The web interface enables organization of mapping tasks into projects (e.g. one project per brain area). *Right:* Each project can consist of multiple tasks. One task corresponds to the training of one neural network model.

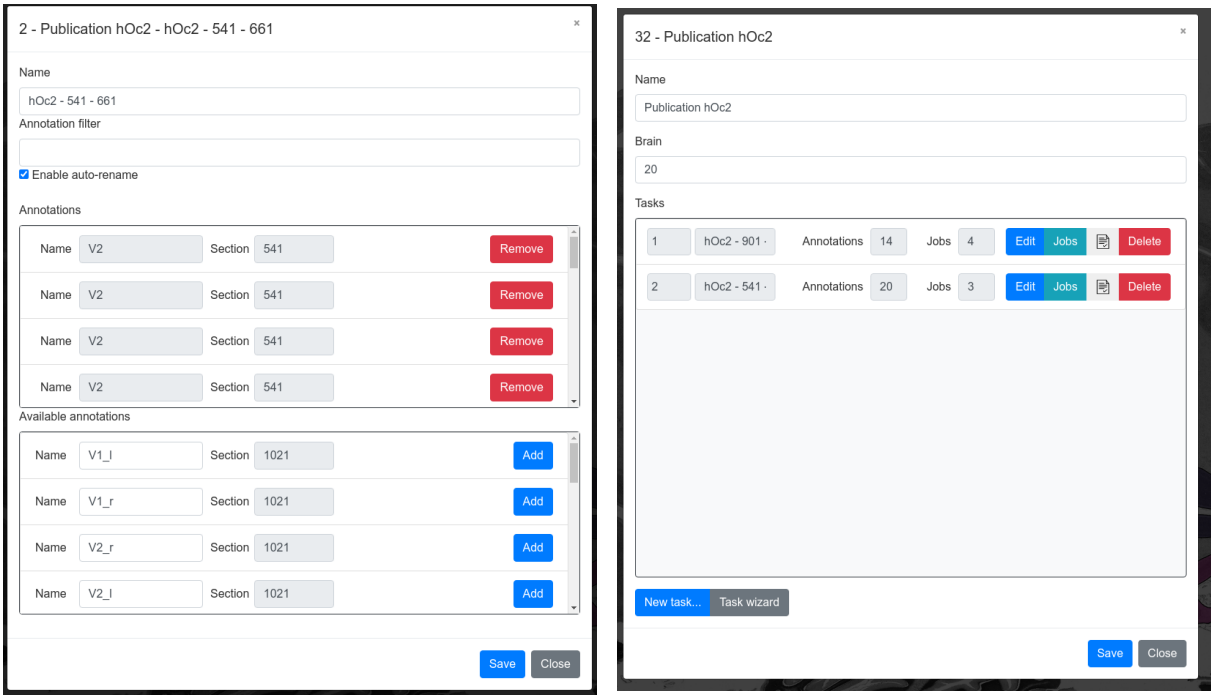

Figure 3: *Left:* User interface used to associate annotations with a task. Annotations added to a task will be used as training data for neural network training. Filters assist the user in selecting the wanted annotations, and automatic renaming ensures consistent naming. *Right:* User interface to control jobs running on a connected HPC system. Users can submit training jobs or trigger predictions for already trained models. Users can further monitor the status of running jobs or cancel them. Requests to the connected HPC system are relayed through a backend service.

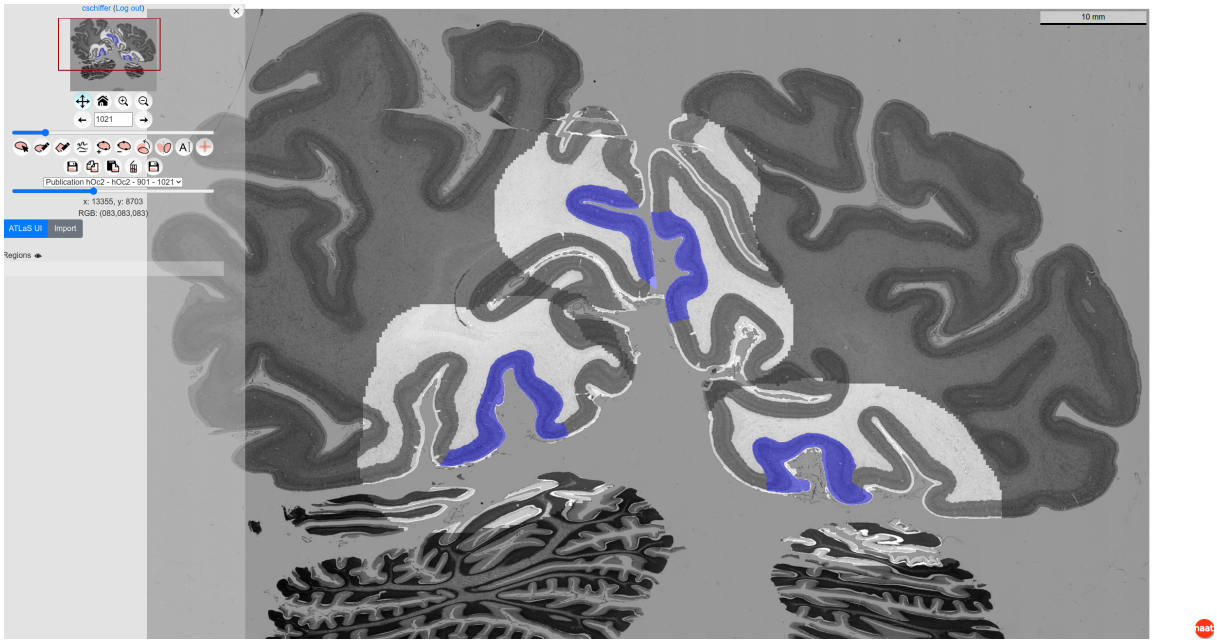

Figure 4: Predictions created by a trained neural network model displayed as overlay within *microdraw*. Predictions associated with a task can be accessed directly through the user interface.

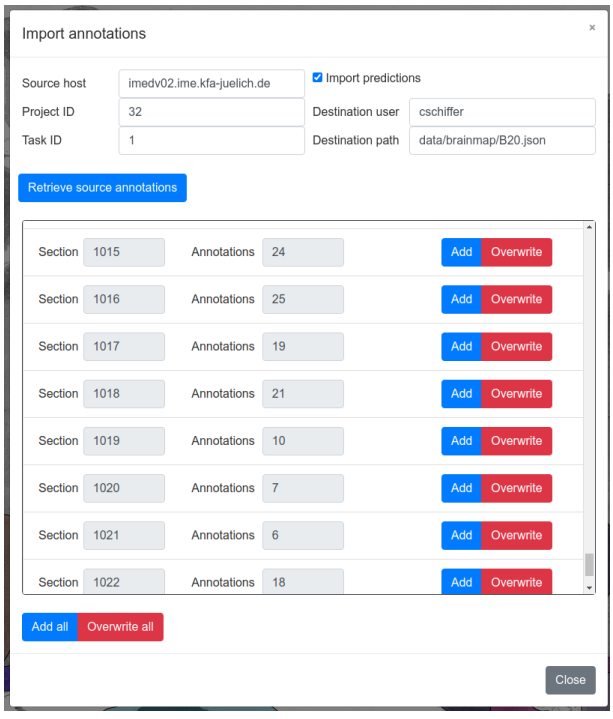

Figure 5: The import function enables automatic import of annotations created using other annotation tools. It further enables users to import predictions created by models of arbitrary tasks as editable annotations into *microdraw*, which allows manual refinement and correction of predictions for later use.

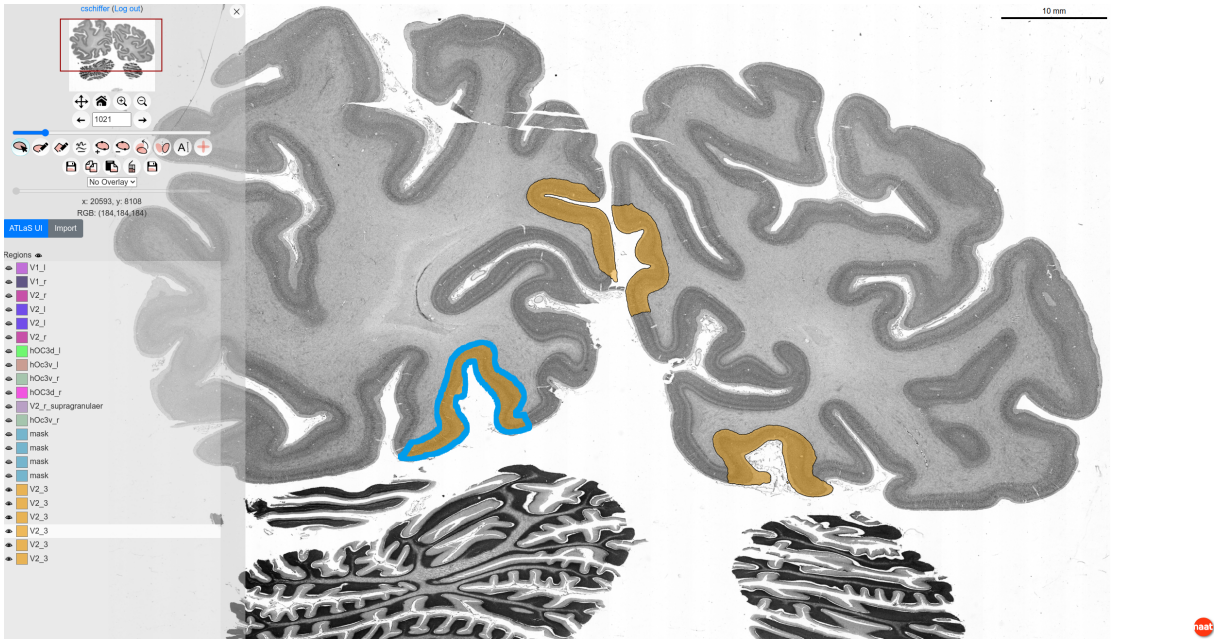

Figure 6: Predictions of a trained model shown in Fig. 4 which where imported as editable annotations into *microdraw* using the import functionality shown in Fig. 5. Imported predictions can be modified to correct errors, or to be used as input for the training of further models.