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Collaborative segmentation and analysis of histological data on the Web using MicroDraw

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High resolution histological data provides a unique perspective on the cellular structure of the brain. Histological data is available for a large number of species, and the possibility of staining for particular aspects of the tissue allows the researcher to formulate an extremely rich range of questions. It presents, however, several challenges which make its analysis difficult. In particular, the data is affected by various types of artefact, and the subtle differences that distinguish one structure from the other require a well trained human eye. In addition, scanned at very high resolution, the file sizes involved become difficult to manipulate. These may be in part the reasons why the expert segmentation of histological material is often performed by a single researcher.

MicroDraw is an online tool for the collaborative segmentation of high-resolution histological data. MicroDraw uses deepzoom to enable rapid access to high-resolution data without limits in image size. Images can be manipulated in any Web browser, in computers, tablets or even smart phones. MicroDraw provides a growing number of tools for vectorial annotation, which allow us to segment data at any resolution. MicroDraw greatly simplifies distributed collaboration, by providing researchers access to the same dataset independently of the computer where the data is hosted. MicroDraw provides simple tools for the definition of collaborative projects, and helps coordinate access to data and results. Finally, MicroDraw implements a RESTful API, which allows researchers to programmatically query the segmentations performed in a project and use sophisticated image analysis tools for their analysis.

In this tutorial we will show how to encode data and host it to make it accessible. We will use the BigBrain data as an example. We will then show how to visualise data and annotate it using the different vectorial annotation tools. We will show how to create a project to centralise a set of annotations. Finally we will show how to query that data using a Python script, display the data obtained and compute some simple measurements.

MicroDraw is open source and we invite you to contribute to its development either as a user or as a developer.

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