

## Abstract View

### DATA MINING OF NEURONAL STRUCTURAL AND PROTEIN LOCALIZATION DATA USING THE CELL CENTERED DATABASE.

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The Cell Centered Database (CCDB) is a web-accessible database (<http://ncmir.ucsd.edu/CCDB>) built on Oracle 9i for high resolution 3D light and electron microscopic images, including large scale brain maps of protein distributions, intracellularly labeled neurons and reconstructions of synaptic components using electron tomography. All steps of the reconstruction are modeled in the CCDB, including image acquisition, reconstruction and segmentation. Segmented objects include surfaces derived from 3D reconstructions, protein distribution data and neuronal branching patterns. In its initial implementation, the CCDB provided textual and numeric description of segmented objects to allow for query of image content. Recently, we have extended the analytical capabilities of the CCDB by adding new data types for segmented object classes. For neuronal branching data, we created a tree structure object type where each neuron segment is stored as a tree node in the database. For protein distribution data contained in large scale brain maps, a spatial histogram object type was created by dividing the image into a series of regular blocks and storing the number of labeled pixels per block. Each brain map is spatially registered to a brain atlas so that protein distributions can be queried by region. These data types allow users to query for properties of segmented objects not explicitly represented in the CCDB schema by incorporating additional analyses built into the Oracle search engine. We are currently utilizing these capabilities to analyze cell and tissue characteristics of mouse models of neurologic disease as part of the Biomedical Informatics Research Network (BIRN).

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