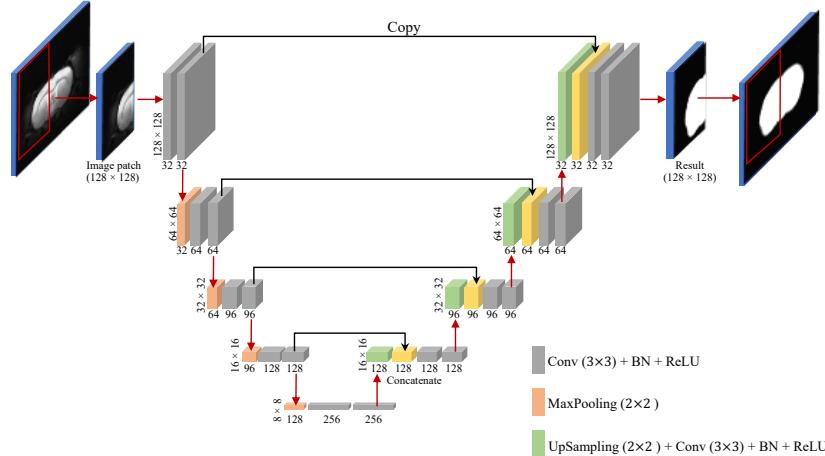
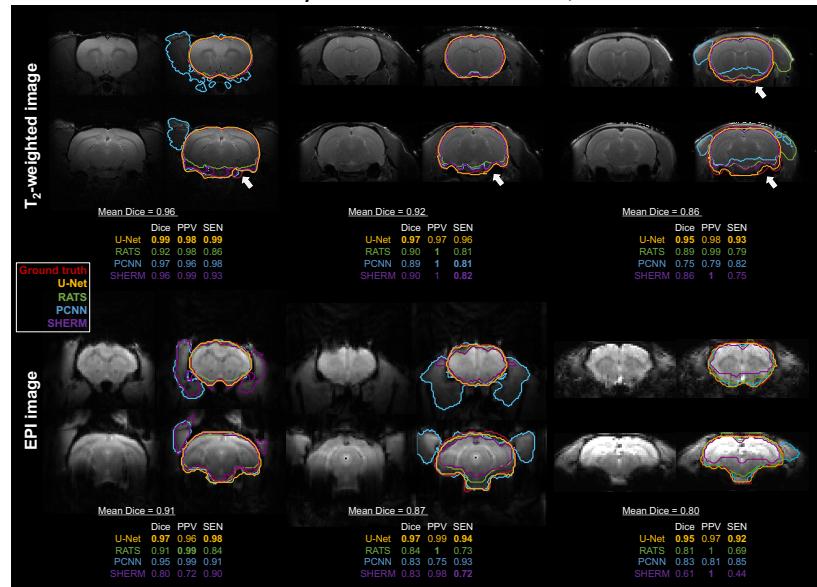


The ‘RodentMRISkullStripping’ is a python module designed to provide an automatic rodent skull stripping. This module is a deep-learning-based framework, U-Net, to automatically identify the rodent brain boundaries in MR images. The whole framework is implemented using Keras with TensorFlow as the backend.



*U-Net architecture.*

We have tested the skull stripping performance compared to current brain segmentation and skull-stripping methods (RATS (DOI: 10.1016/j.jneumeth.2013.09.021)), PCNN (DOI: 10.1109/TIP.2011.2126587), and SHERM (DOI: 10.1007/s12021-020-09453-z)). The performance is evaluated by (1) volumetric overlap assessments via Dice, the similarity of two samples; (2) Jaccard, the similarity of two samples where Dice doesn't satisfy the triangle inequality; (3) positive predictive value (PPV), the rate of true positives in prediction results; and (4) sensitivity (SEN) the rate of true positives in manual delineation; as well as (5) a surface distance assessment by Hausdorff distance, the distance of two samples.



*Segmentation comparisons. Posterior and inferior slices (arrowhead) are more susceptible to error in RATS, PCNN, and SHERM, whereas U-Net performs similarly to the ground truth.*