

Neuroimaging techniques, such as MRI, fMRI, EEG, DTI, and PET, are widely used in neuroscience and clinical research to understand the brain's connectivity, function, dynamics, anatomy, and pathology. As each human brain has some differences and the process of recording brain images is not always constant, it is necessary for researchers to preprocess, denoise, and control the quality of the imaging data before analyzing the data. In this project, we introduce the fMRIPrep pipeline to preprocess structural MRI and functional MRI with FSL, AFNI, FreeSurfer, and ANTs on UNC Lingleaf. We further present the steps of conducting manual brain masking for quality control and the importance of this step in denoising the data and ensuring the accuracy of further analyses. Our project highlights the importance of carefully designing the pipeline and preprocessing neuroimaging data to ensure the accuracy and reliability of second-level analyses, encouraging neuroimaging-related research projects to pay attention to the data preprocessing step.