# SNImagingLab\_STEP1\_ct\_preprocess.sh

# CT Image Preprocessing Script

## Overview

This Bash script performs a series of preprocessing steps on CT images to prepare them for further analysis. The steps include reorienting the images, reslicing, smoothing, skull stripping, and bias field correction.

### Output

The primary output of interest is:

- <`\_restore\_native`>: A bias field corrected brain image using the most complete brain extraction mask.

## Requirements

Before running the script, ensure that you have the following installed:

- FSL (FMRIB Software Library)

- Bash shell (for executing the script)

- `iso.sh` script (from Dianne Patterson - https://bitbucket.org/dpat/tools/raw/master/LIBRARY/iso.sh)

- Proper directory structure and input files as specified in the script

## Directory Structure

The script assumes the following directory structure:

-Image Directory: parent directory

- Input Directory: `Image\_dir/raw\_input` (contains raw NIfTI images)

- Working Directory: ` Image\_dir /work` (temporary files during processing)

- Smooth Directory: ` Image\_dir /smooth` (smoothed images)

- Output Directory: `Image\_dir /restore` (final output images)

## Usage

1. Update the `image\_dir` variable in the script to point to your dataset's root directory.

2. Run the script in a terminal:

```bash

bash SNImagingLab\_STEP1\_ct\_preprocess.sh

3. Monitor the terminal for processing progress and completion time.

##Script Workflow

Step 1: Reorient to Standard Orientation

Step 2: Reslice to Isotropic 1mm x 1mm x 1mm Voxel Size

Step 3: Remove Neck Tissue

Step 4: Smooth Images

Step 5: Threshold to Remove Bone and Fat (Threshold to 120 HU)

Step 6: Skull Stripping using FSL's BET

Step 7: Bias Field Correction using FSL's FAST

## Notes

Parallel Processing

The script is designed to run multiple jobs in parallel to optimize processing time. You can adjust the number of concurrent jobs by changing the value of N in the script.

The script processes files matching the pattern \*bwct\*.nii.gz within the input directory. Modify this pattern as necessary to include other file types.

Temporary files created during processing will be cleaned up automatically at the end of the script.

## Resources

For additional processing tips and best practices, refer to the following resources:

Neuroimaging Core Documentation <https://neuroimaging-core-docs.readthedocs.io/en/latest/>

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Additionally, refer to the FSL (FMRIB Software Library) license posted at https://fsl.fmrib.ox.ac.uk/fsl/docs/#/license

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