Summary of Res.ipynb (ResNet Embeddings from MRI Slices)

Purpose

This notebook extracts deep-learning image embeddings directly from the MRI volumes using a pretrained ResNet-18.
It does not reuse the tabular features from main.ipynb. The objective is to convert each subject's MRI into a compact
512-dimensional representation suitable for downstream analysis.

What Was Done
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1) Volume selection – Searched for anatomical MRI files (*.nii, *.nii.gz, *.img/.hdr), excluded derived/segmentation files,
and selected one best processed volume per subject (preference: t88_111_masked_gfc > t88_111 > subj_111).
2) Preprocessing – Loaded each 3D volume with nibabel, z-scored intensities, sampled a fixed set of axial slices,
converted slices to 3-channel tensors, and applied ImageNet normalization.
3) Feature extraction – Ran each slice through pretrained ResNet-18 with the final classification layer removed to obtain 512-D features,
then averaged features across slices to get one embedding per subject.
4) Saving – Wrote a CSV file with one 512-D row per subject (resnet_embeddings.csv) for use in later ML tasks.

Outcome / Results

• A subject-by-feature matrix of ResNet embeddings saved to resnet_embeddings.csv (no classifier trained in this notebook).
• A clean, reusable representation of MRI structure that can be combined with labels later for classification or regression.
• This notebook is independent of main.ipynb; it does not combine tabular data from segmentation.