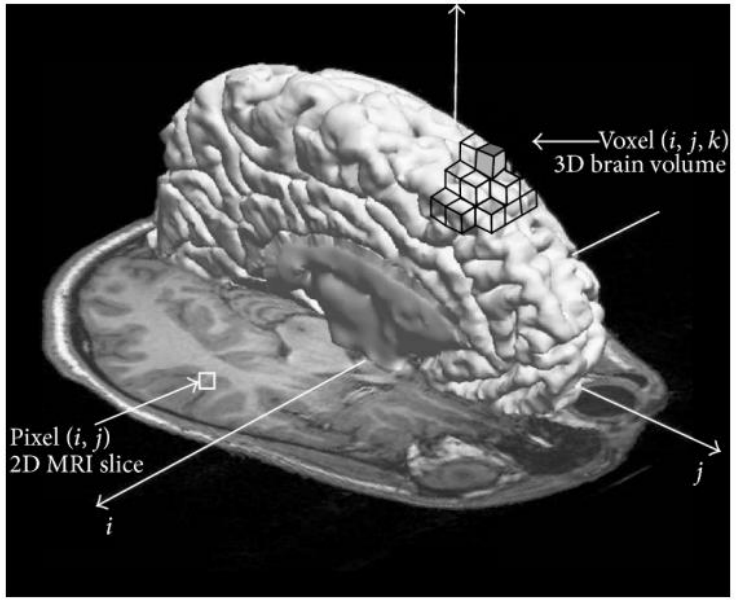
Data Preparation for Computer Vision Technical Project

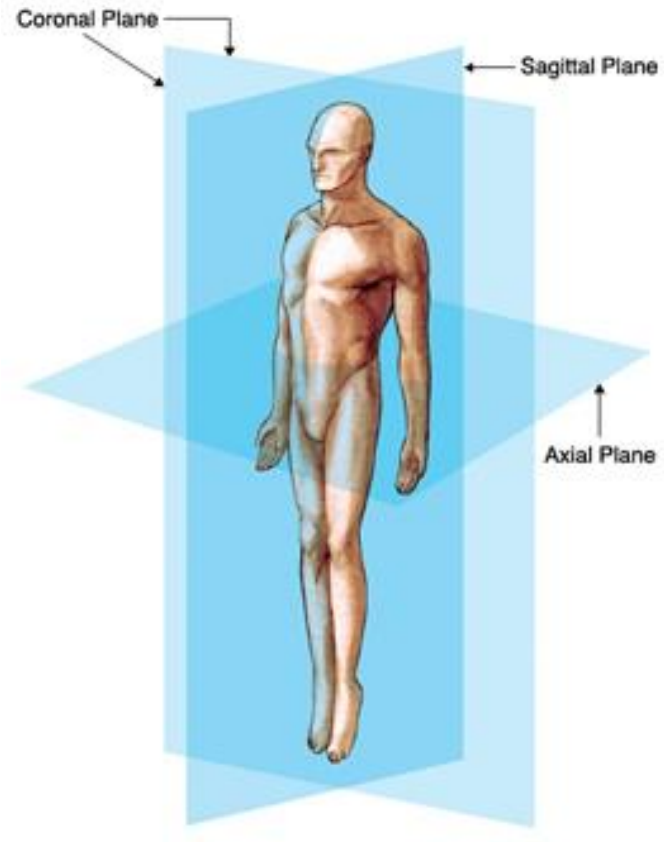
03/02/2025

Preprocessing Brain MRI Images

Image Format Conversion: Convert the MRI images to a common format that is suitable for processing. Usually, the MRI data are in NIFTI format.

Convert 3D to 2D: Extract slices from 3D volumes.





Source: Despotović, I., Goossens, B. and Philips, W., 2015. MRI segmentation of the human brain: challenges, methods, and applications. Computational and mathematical methods in medicine, 2015.

Preprocessing Brain MRI Images

Image Rescaling: Rescale the images so that all the images have the same scale. This is particularly important when the MRI scans come from different scanners or use different protocols.

Image Normalisation: Normalise the intensity values in the image. This can be as simple as dividing by the maximum intensity. The aim is to standardize the brightness and contrast across your dataset.

Noise Reduction: Apply noise reduction techniques to improve image quality. Common methods include Gaussian blurring, median filtering, anisotropic diffusion, and non-local means filtering.

Skull Stripping: Remove non-brain tissues from the MRI images.

Preprocessing Brain MRI Images

Registration: Register or align your images to a common space. Registration helps in comparing the same regions across different images.

Resampling: The resolution of the images should be made consistent across the dataset. Also, for deep learning methods, it might be necessary to downsample the images to a resolution that the model can handle.

Data Augmentation: To increase the robustness of your model, perform data augmentation like rotations, translations, and flips on your images.

What you need to do

Image Format Conversion

Convert 3D to 2D

Image Rescaling

Image Normalisation

Noise Reduction

Skull Stripping

Registration

Resampling

Data Augmentation

Get your Python environment ready…

Anaconda and Tensorflow Installation (2020.02)
https://www.h2kinfosys.com/blog/how-to-download-and-setup-tensorflow-with-anaconda/
https://repo.anaconda.com/archive/

For using Nvidia GPU
https://saturncloud.io/blog/how-to-install-tensorflow-with-anaconda-on-windows/

Download our data