Demo 3

November 26 2021

Materials Needed

MRI/Scan Data Files

Python (Jupyter)

GitHub Code:

Click Here

Itkwidgets:

Click Here

Allows for the 2D/3D images, point sets and geometry for Jupyter as well as other imaging functions.

Nibabel:

Click Here

Allows to write and access medical and neuroimaging files.

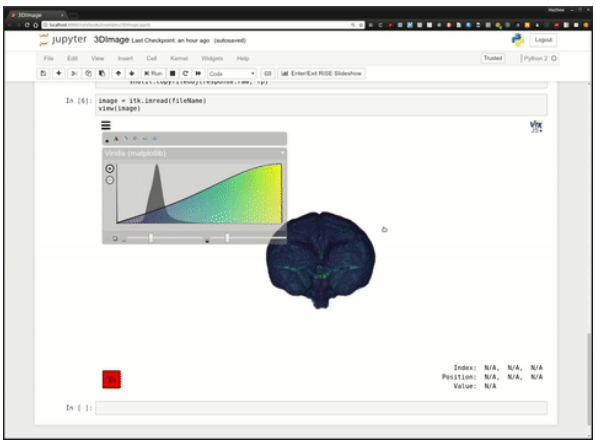
Neuroimaging and Python

Neuroimaging (3D) brain Scans with Python.

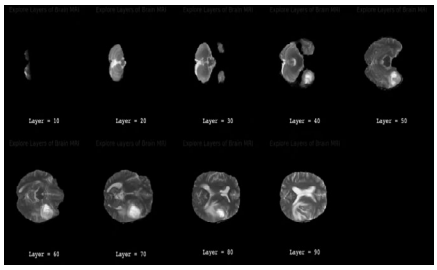
Video Link

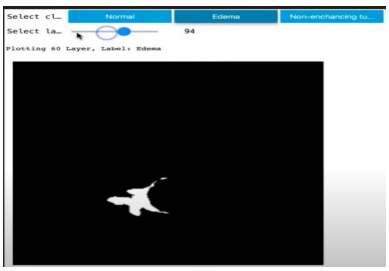
The tutorial will walk you through on how to make an interactive display of brain images over layers and conditions. There is a slider bar, image display as well as a small title that indicates what layer and image you are viewing. The Gif below is an advance output from iktwidgets that can be created using the modules/packages. The video tutorial however creates a simplified version of this, seen at the bottom.

Advanced Functions for itkwidgets in Brain Scans



The modules and packages needed for importing are: numpy, nibabel, itk, itkwidgets and ipywidgets. You can get the MRI data right from the Github link for this tutorial so you don't need to worry about not having the right data files for this. The tutorial is very easy to understand and even without audio the code is clearly written to help you understand what's going on. The best parts of this tutorials is visualizing the data and creating labels to help you navigate the images.





MRI Data & output in Video Tutorial

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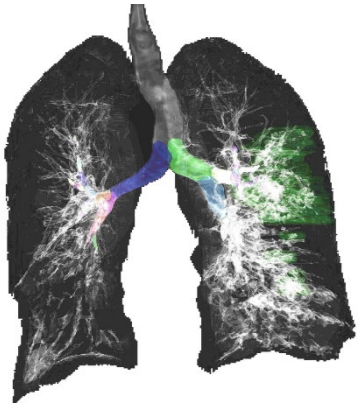
Where can I go to develop these skills?

Check out: Grand Challenge

https://grand-challenge.org



Developing machine learning solutions for biomedical imaging. You can participate (Solo/teams) for posted challenges. This platform allows people to test their algorithms and find solutions to clinical questions on their imaging data

One example is COVID-19 Lunt CT lesion segmentation (link here). People were tasked to create a platform to evaluate methods for segmentation and quantification of lung lesions. This was posted last year and it looks like they are creating a new challenge for code that can detect mitotic figures within histopathology images via object detection.

Further Readings

An introduction to MRI Data and Python.

This is written similarly to how our textbook shows coded examples. Also a good exposure to the names of the neuroimaging file formats (NRRD, DICOM etc).

Python Cheat Sheets

(Never hurts to have a good reference sheet)

Python Basic Cheat Sheet

Python Data Cheat Sheet

Numpy Cheat Sheet

Thank You for Viewing My DEMO 3!