Computing Methods for Experimental Physics and Data Analysis

Data Analysis in Medical Physics

Lecture 3: Hands-on on medical data import and visualization

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Todays' objectives

- Download MANGO and visualize medical images

- Read image data in Matlab, visualize, browse multidimensional data array

- Visualize image overlays

Sample DICOM/NIfTI images

- You can download the DATASETS directory, which contains a sample of publicly available medical images, from:
  - https://pandora.infn.it/public/cmepda/DATASETS

- Example of open repositories of medical data
  - https://openneuro.org
  - http://fcon_1000.projects.nitrc.org
  - https://nihcc.app.box.com/v/ChestXray-NIHCC
  - https://www.cancerimagingarchive.net
  - http://www.oasis-brains.org
  - http://adni.loni.usc.edu

- Additional data samples (medical images/image features) for hands-on sessions will be distributed later on during the course through:
  - https://pandora.infn.it/public/cmepda/DATASETS

Hands-on materials

On GitHub https://github.com/retico/cmepda_medphys

- Read and display 3D data (DICOM dir)
  - Lecture3_exercise1.m
- Read and display 4D data (NIfTI file)
  - Lecture3_exercise2.m
- Visualization of image overlays
  - Lecture3_exercise3.m

Image display and image overlay in Mango:

- Visualize and make an overlay of the segmented brain tissues on a brain MRI with data on DATASETS/IMAGES/NIfTI_Examples/Brain_segment/

Check the exercise solutions on GitHub:

Lecture3_exercise1_solution.m, Lecture3_exercise2_solution.m, Lecture3_exercise3_solution.m