Final Project Details

Methods in Medical Image Analysis - Spring 2024
16-725 (CMU RI) : BioE 2630 (Pitt)
Dr. John Galeotti

Choices, choices

- You can choose your own topic
- I will also give a list of example topics, such as:
  - Segment Liver Tumors
  - Segment Brain Tumors
  - Segment Vertebrae
  - Segment Lung Lesions
  - ...
- All topics in my list will apply what you learned in the homework assignments.

Code Expectations

- Use SimpleITK, ITK, and/or MONAI
- Show creativity and/or experimentation, such as (choose one or more):
  - Carefully adjust several parameters
  - Validation, etc.
  - Combine filters in a novel way
  - Write you own filter or other non-trivial piece of unique code
  - Conceive and implement a new idea for image analysis
- Insufficient:
  - Do "a little bit more" than the segmentation homework assignment
  - Just connect several filters together & wrap in a GUI
  - Copy directly from software guide with little original additional work
  - Claim to have optimized 12 parameters but don't provide sufficient evidence

Code Grading Criteria

11 points: <u>Originality</u> and/or <u>documented experimentation</u>

 7 points: Code works

 4 points: Submission details, including (but not limited to):

                            ReadMe.txt & other documentation

                            Code comments

 3 points: Wow-factor (your project stands out from the rest)

ALSO REQUIRED—May FAIL without these:

- Must use (Simple)ITK or MONAI
- If you use C++, your C++ code must successfully compile (on your system)
- Python scripts (if used) must execute without interpreter errors. (i.e., no syntax errors on your system)

Total: 25 points

Final grade based on how your code works on your data when the grader (compiles and) runs your code, unless you make alternative arrangements ahead of time or we suspect cross-platform issues and reach out to you afterwards.

Code Submission Details

- Include a README.txt file that lists:
  - *All* necessary instructions for the grader to compile (if necessary) and run your code.
  - Your desired parameters for any (command line) arguments to your program.
- Submit any data needed to run your code.
  - Unless other arrangements have been made with your grader, such as if your input images are very large.
- It is your responsibility to make it very easy for your grader to run, test, and understand your code.
- Due date: Final project code (and minimal images necessary to demo working) uploaded as zip file in Canvas by 11:59 PM Friday April 26th.

Presentations

- 2 days of presentations, each 7-10 minutes long
- Due date for presentation slides
  - Everyone's *final* slides due *first* day of presentations
  - Submitted electronically by 1pm on Tuesday April 23rd
    - firstname-lastname-presentation.pptx
  - This is *before* your code is due
  - Order of actual presentations alphabetical order
- Slides must contain partial/preliminary results
  - Results with un-optimized parameters
    —and/or—
  - Intermediate output generated part-way through your algorithm

Presentations – Contingency Plan if Remote

- If we expect to have remote presentations, then there will be additional requirements:
  - You must record your presentation in advance:
    - Both PowerPoint and Zoom make this easy.
    - I will create a shared BOX folder for everyone to upload their videos
  - Must upload your video to BOX by 1pm on the due date.

Presentation Grading Criteria

- Background (3 points, ≥ 2 minutes):
  - What is the general problem you are trying to solve?
  - Why is it interesting or important?
  - Why is it difficult? (Why is it not already solved.)
- Method (5 points for *presentation* of methods, ≥ 3 minutes)
  - What is your approach (big picture)?
  - How did you implement it in ITK or MONAI?
  - What were the main implementation challenges you faced?
    - E.g. finding parameters that worked
    - E.g. coding new functionality
  - Feel free to go over coding details as useful for the audience...
    - Don't spend much time repeating stuff we've already covered in class.

Presentation Grading Criteria, contd.

- Results (3 points for presentation of results, ≥ 2 minutes):
  - Pretty pictures, numerical results, graphs and charts, etc.
  - Is it easy to understand how you did (or will most likely do)?
  - Did you accomplish your goal for your project?
- Wow-factor (2):
  - Points reserved for exceptional presentations
- Non-technical stuff (2):
  - 6 Presentations per day, April 23rd and 25th
  - Time length: **7-10 minutes** (loose points if outside this range)
    - You will be stopped and not allowed to finish your presentation past 11.5 minutes.
  - Public speaking stuff: clarity, polish, dressed professionally, etc.
  - This is important for your overall graduate education!
- Overall general guideline: give your presentation as if you were presenting at a (hybrid) scientific conference or workshop.

Presentation: Other Details

- Your presentations will probably be posted to the password-protected part of the website
  - Unless you explicitly tell me that you either don't want it posted at all, or (contrarily) that you want it posted publicly.