AI Application in Medicine: Liver

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Introduction

Introduction

- MeDA Lab: https://sites.google.com/view/aimiahub/aimia

- Team members:
  - Che-Yu Hsu (NTUH)
  - Cheng-En Lee (NTU AM)
  - Yueh-Chou Lee (NTU Math)

- Forecast Project
  - Brain Tumor
  - Hypopharyngeal Cancer
  - Hepatocellular Carcinoma

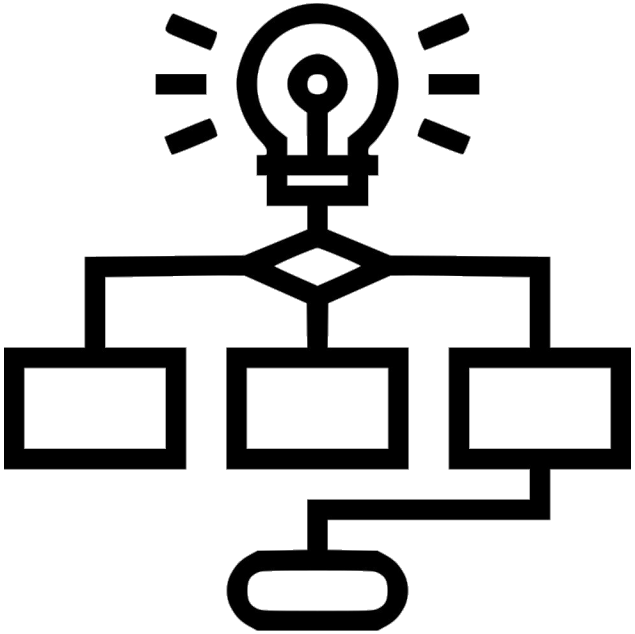
Introduction (Goals)

- To reduce the workload of doctors
- To avoid doctors doing repetitive work
- To improve doctor-patient relationships

Tools

Tools

- Python
- 3D Slicer
- SimpleITK
- Radiomics



Tools (Python)

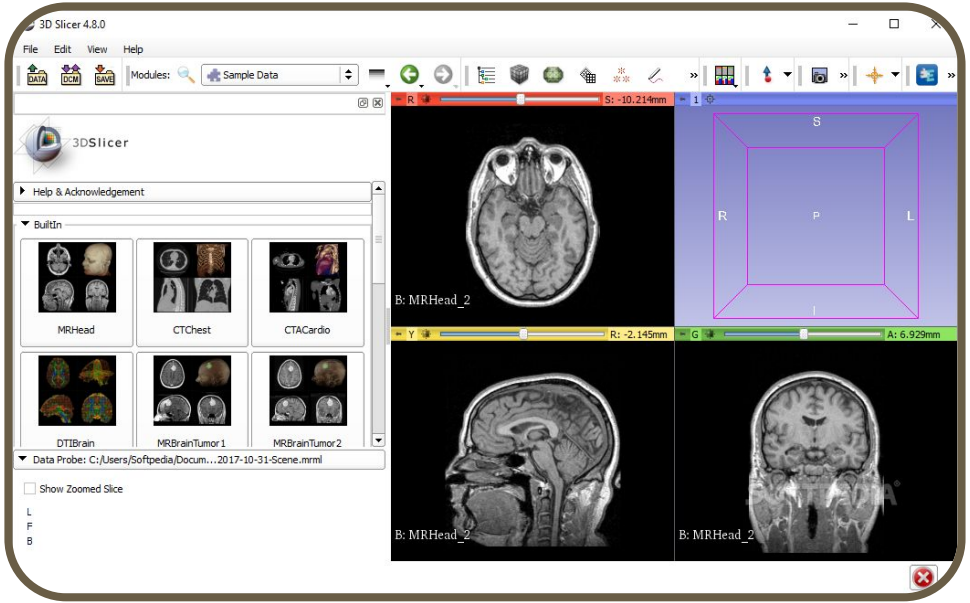
- Why Python? (C/C++, MATLAB, Python, etc.)

- Advantages
  - Easy to use
  - Interpreted Language
  - Quickly development and research
  - Many powerful open libraries

- Disadvantages
  - Speed is slower than C/C++
  - Memory Consumption

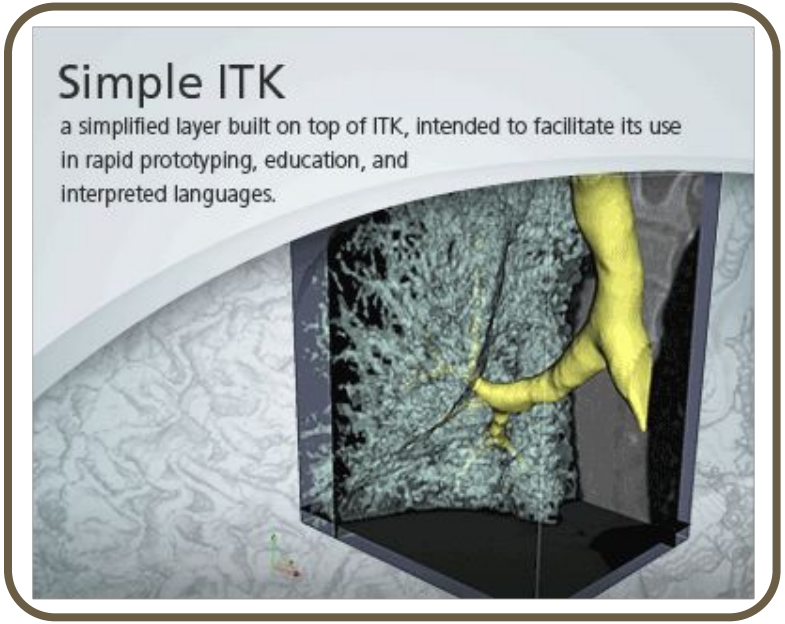
Tools (3D Slicer)

- What's 3D Slicer?
- Visualize data (images)
- Label the essential parts
- Include SimpleITK, VTK, PyQt
- Simpler than python



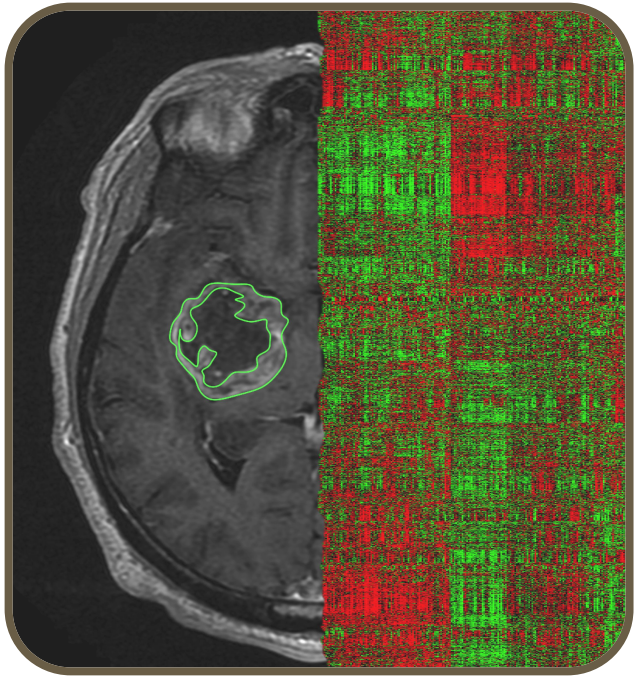
Tools (SimpleITK)

- What's SimpleITK?
- Processing medical images
- Easy to read and write medical images
- Powerful toolkit for image analysis
- Provide a high level of usability



Tools (Radiomics)

- What’s Radiomics?
- Statistics features
- Shape, surface and volume information
- Reduce dimension of information
- Interpretable



Hands-on

Hands-on

- Introduce Workflow
- Download Material: https://yuehchou.github.io/courses/workshop/ai_application.html
- 2019 ESMO Discussion & Poster

Challenges

Challenges

1. Trust or not?
2. Hardly acquire data (e.g. medical images)
3. Lack of medical knowledge
4. Highly dependent on doctors

References

References (Tools)

1. 3D Slicer: https://www.slicer.org/
2. Radiomics: http://www.radiomics.io/pyradiomics.html
3. SimpleITK: http://www.simpleitk.org/
4. VTK: https://vtk.org/
5. Python Introduction: https://yuanyuyuan.github.io/itcm/lab-1.html

References (Organizations & Conferences)

1. ESMO: https://www.esmo.org/
2. RSNA: https://www.rsna.org/
3. MICCAI: http://www.miccai.org/
4. CodaLab: https://codalab.org/
5. LiTS: https://competitions.codalab.org/competitions/15595

Thanks

Questions & Comments