Lab: Explore MRI data

Video: MRI Data and Image

Video: Segmentation

Lab: Get a sub section

Reading: Convolutional Neural networks

Video: 2D U-Net and 3D U-

Reading: More about U-Net

Lab: Implement U-Net

for segmentation

Video: Data augmentation

Video: Loss function for image segmentation

Video: Different Populations and Diagnostic Technology

Video: External validation

Video: Measuring Patient

Practice Quiz: Week 3 Quiz:

Programming Assignment:

Segmentation for Magnetic Resonance Imaging (MRI)

Segmentation on medical

Programming: 3D Image

Brain Tumor Auto-

Summary of AI for Medical

Video: Congratulations!

Acknowledgements

Reading: Citations

Practical considerations

Image segmentation

Registration

3 min

3 min

10 min

Net 2 min

1h

2 min

1 min

2 min

3 min

Quiz week 3

images

Segmentation

Diagnosis

1 min

Reading:

10 min

10 min

outcomes

(Optional) 10 min

1h

Keep Learning

grade 100%

Week 3 Quiz: Segmentation on medical images Week 3 Quiz: Segmentation on medical images

TOTAL POINTS 9

1. Which of the self pwif ngo y ra a ses i தாராளி on task?	1 / 1 point	Try again
None of the above		
Determining Whatele here is a mass in a chest X-ray TO PASS 80% or higher	Grade 100%	View Feedback
Determining which areas of the brain have tumor from an MRI		Ve keep your highest score
Oetermining whether a brain tumor is present in an MRI		
		6 P
✓ Correct		
Classification tasks have binary or categorical labels for each image, while segmentation tasks ask you to		

2. What is the MAIN disadvantage of processing each MRI slice independently using a 2D segmentation model (as mentioned in the lecture)?

1 / 1 point

Hint: watch the lecture video "Segmentation" to help you answer this question.

- None of the above
- 3D models are always better than 2D models

determine a label for every pixel (or voxel).

- It is difficult to register slices of MRI models
- You lose some context between slices

Correc

The main disadvantage is the loss of information between slices. For example, if a tumor is present in a given slice, then we would expect higher probability of having a tumor in the same area in neighboring slices.

3. The U-net consists of...

1 / 1 point

- Just a contracting path
- An expanding path followed by a contracting path
- Just an expanding path
- A contracting path followed by an expanding path

Correct

The U-net consists of a contracting path followed by an expanding path. This can be interpreted as 'squeezing the input to create a low dimensional representation and then producing a segmentation based off of those low dimensional features.

4. Which of the following data augmentation is most effective for MRI sequences?

1/1 point

- Rotation
- Randomly shuffle the pixels in each slice
- Shifting each pixel to the right by a constant amount with wrap around
- Shuffling the slices

Correct

The only transformation which preserves the integrity of the data is using rotations. If we shuffle the slices, the relationships between the slices will change and the model will not be able to learn.

5. What is the soft dice loss for the example below?

1/1 point

$$L(P,G) = 1 - rac{2\sum_{i=1}^{n}p_{i}g_{i}}{\sum_{i=1}^{n}p_{i}^{2} + \sum_{i=1}^{n}g_{i}^{2}}$$



