Homework 2

TAs

1 Submission requirement

1. report contains the results (metrics, plot, segmentation examples);
2. code with a readme file.

2 Lesion Classification (50%)

lesion classification dataset This dataset contains 900 training images(image link and annotation link) and 379 test images (image link and annotation link). Each image has one state: benign or malignant (a total of 727 benign images and 173 malignant images in the training set).

In this problem, you are required to implement a classification network (*e.g.* ResNet-50) to predict the lesion disease state of benign or malignant. The uploaded codes should include the model, data loader, train, and test codes (**15%**). In addition, you are also required to:

1. Report accuracy and AUC on the test set, and achieve at least 60% accuracy and 60% AUC. (**15%**)
2. Plot the training & test loss curves, training & test accuarcy curves. (**10%**)
3. Try to give a solution to the imbalanced problem of this dataset. Show the accuracy and AUC of your solution. (**10%**)

Here are some hints for you:

1. loss function: cross-entropy loss
2. optimizer: SGD/Adam, learning rate decay
3. Useful links: augmentaion library, dataset details,

3 Brain MRI Segmentation (50%)

This dataset(download link) contains patients' brain MR images together with manual FLAIR abnormality segmentation masks(25 patients for training and 5 patients for testing). All images are provided in '.tif' format with 3 channels per image and masks are binary, 1-channel images.

In this problem, you are required to implement a segmentation network(e.g., Unet), including the model, dataloader, and training/testing(**15**%). In addition, you need to

1. Report 4 evaluation metrics on the test set: dice ($\geq$ 60%), jaccard, the average surface distance (ASD), and the 95% Hausdorff Distance (95HD); (**15**%)

2. Plot the training & test loss curves, training & test dice curves; (**10**%)
3. Show at least 4 segmentation results compared with the ground-truth label (i.e., 4 slices with GT and predictions). (**10**%)

Here are some hints for you:

1. loss function: dice loss, cross-entropy loss
2. optimizer: SGD/Adam, learning rate decay
3. Useful links: segmentation models, augmentaion library, dataset details(Note that our dataset is a subset of this dataset.)