

COMP 448/548
Medical Image Analysis

Spring 23
Homework #3

Yiğit Can Ateş 75617 - Melis Oktayoğlu 64388

Implementation Details

1. The standard input size for AlexNet is 224 x 224 x 3. However our input dataset has size 256 x 256 x 3. We used `transforms.Resize(224)` function to resize our dataset.
2. We normalized the input dataset using `transforms.Normalize()` function. The mean and standard deviation parameters were selected based on the values provided in AlexNet Pytorch documentation. (mean=[0.485, 0.456, 0.406], std=[0.229, 0.224, 0.225])
3. We modified only the last layer of the architecture, to be appropriate for the 3-class classification, instead of its standard 1000-class classification. In order to this, we fixed the input size of the layer to 4096.
4. We used the Cross Entropy Loss function in backpropagation.
5. We used the standard parameters described in the AlexNet paper.
6. We used an approach which included weights to address the class-imbalance problem.
We calculated the weights using the following formula:

$$w_j = n / k \cdot n_j$$

where: w_j is the weight of class j , n is the number of samples, n_j is the number of samples of class j , and k is the number of classes.

	Training portion of the training set				Validation portion of the training set				Test set			
	C1	C2	C3	All	C1	C2	C3	All	C1	C2	C3	All
With input normalization and with addressing the class imbalance problem	96 %	94 %	100 %	96 %	100 %	83 %	100 %	93 %	91 %	88 %	96 %	92 %
With input normalization and without addressing the class imbalance problem	97 %	94 %	100 %	96 %	93 %	90 %	87 %	90 %	85 %	87 %	87 %	86 %
Without input normalization and with addressing the class imbalance problem	40 %	51 %	100 %	63 %	27 %	81 %	100 %	78 %	52 %	64 %	100 %	71 %