Medical imaging: Use case sample

Assignment - 2

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Version 1

Datum: 24.03.2023

In our previous class, we discussed about fundamentals of medical image classification and sematic segmentation using deep neural networks followed by coding example for classification. You should consider multi-class classification. Based on the discussion, please complete the following tasks:

1. Develop three classification algorithms using Inception V3, Resnet, and squeezeNet on the following databases:
    a. ABIDE Database – Autism classification (40 Marks)
    b. HEP2 Cell classification. – (40 Marks)
        i. https://www.dropbox.com/s/bqtzrmi5l5ojbhh/cells.zip?dl=0
        ii. Use this paper for dataset details:
            1. Qi X, Zhao G, Chen J, Pietikäinen M. Exploring illumination robust descriptors for human epithelial type 2 cell classification. Pattern Recognition. 2016 Dec 1;60:420-9.
2. Develop an innovative architecture using the principles of Resnet and inception for improved classification. (20 Marks)

Report to be submitted should include:

- You have to submit the report with the code.
- The report should contain a detailed study on the comparison of the three algorithms and their performances.
- You have to explain the innovative architecture with the details and the choice of such an approach.

Rules:

1. Please submit individual assignment
2. Please follow the IITH ethics to write assignments
3. Plagiarism – strictly not entertained
4. Use the template to prepare and submit the answer of the assignment.
5. Test the performance of the network trained with the optimal set of parameters on the k-fold cross validation and report the confusion matrix, classification rate and F1 measure per class.
6. Think of a reasonable strategy to optimise parameters . Put more effort on optimising parameters you think are more important.
7. Make sure that your code runs. If not you will be asked to resubmit the code and lose 20% of the code mark.