Alexandria University
Faculty of Engineering
Computer and Communications Program

Due : 5/23/2018
CCE :Pattern Recognition

Assignment#4 MRNet (Total 100Points)

Submit a report and the codes used. Report should detail and illustrate every step in the assignment. Report will worth (25 points).

Problem Statement

The MRNet dataset consists of 1,370 knee MRI exams performed at Stanford University Medical Center. The dataset contains 1,104 (80.6%) abnormal exams, with 319 (23.3%) ACL tears and 508 (37.1%) meniscal tears; labels were obtained through manual extraction from clinical reports.

1. Download Data (10 point)

Register and download the dataset from the following link
https://stanfordmlgroup.github.io/competitions/mrnet/

2. Build Model (60 points)

Build a deep CNN model to perform the classification task. Your model may benefit from the following:

1. **Famous CNN Architectures:**
   You may use architectures like: ResNet, GoogLeNet, VGG, … [1]
2. **Transfer Learning:**
   If you used any of the famous architectures, you may use pretrained weights for the architecture instead of training the network from scratch. ImageNet is the mostly used dataset in pretraining CNN architectures.
3. **Ensemble:**
   Integrating more than one model using ensemble could enhance the performance of classification.

You could referee to the baseline model of MRNet. [2]

3. Big Picture (30 Points)

a. Plot accuracy, F-score, and loss of both training and validation sets per epoch.
b. Observe the change of performance with epochs, see if the model performance is accepted, underfitting or overfitting, and try to fix by tuning.

4. Bonus (20 Points)

- Best results in the class will get 20 points bonus
- Second best results will get 10 points bonus.

5. References

[1]https://keras.io/applications/
[2]https://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.1002699

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