ECS795P CW3
Mini-Project

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CW3 will be made available on Wednesday 7th April 2021. The <u>submission deadline is Sunday 16th May</u>, to be submitted by QM Plus. A submission portal on QM Plus will be made available. We will also allow for one-week <u>late submission with standard penalty applied up-to Sunday 23rd May 2021</u>.

CW3 assessment weighting in relation to all other assessments:

(1)   The <u>coursework 3 mini-project has a weighting of 50%</u> of the total course assessment
(2)   The coursework 2 has a weighting of 15%
(3)   The coursework 1 has a weighting of 15%
(4)   The two critical reports have a weighting of 10% each

Description of ECS795P CW3 Mini-Project

➢ Task: **Deeper Networks for Image Classification –** Performing and evaluating image classification tasks with deeper networks
➢ Requirements
  1) You should use *at least* two deep networks including VGG, ResNet, GoogleNet.
  2) You *MUST* use MNIST dataset for the image classification task. Moreover, we encourage you to use extra datasets (such as CIFAR, Tiny-Imagenet) to further evaluate the deeper networks.
  3) You should submit a 6-page report (a research paper) including
      1) Critical analysis of models;
      2) Implementation of model training and test settings, including the model training/testing process (the loss changing during training period, the train/test accuracy, etc.), to support your experimental results;
      3) Evaluation on your experimental results;
      4) Run-time screenshots.
      5) Report format: Please use the same LaTeX style as required for your MSc final project report (double-column, 11pt font size)
  4) You should submit (a) your codes for model building, data loading & processing, training, evaluation, and visualisation; (b) evidence of model training and inference/test including text logs, tensorboard logs, run-time screenshots, any other logs demonstrating the training process with explicit **timestamps** recorded in a file/files (no need to submit the trained weights); (c) your six pages report.
➢ Timetable
  1) Submit all materials above ((a)-(c)) in a single zip file by the DEADLINE on Sunday 16/05/2021 at 23:55 via QM+.
  2) One week late-submission with standard penalty applied is allowed (late-submission deadline 23:55 Sunday 23/05/2021).
➢ Suggestions
  1) For more details on the deeper networks, i.e. VGG, ResNet, GoogleNet, you can access the original papers on coursework webpages.
  2) If you make any improvement on the base networks, please highlight them in the intro, method and experiment sections of your report.
  3) For the submitted materials of this project, please make sure that it is small enough to be within the limit of QM+ online submission limit (DON'T include the datasets in your submitted materials).

An example template of a coursework 3 report:

Deeper Networks for Image Classification

Author

1. Introduction

2. Critical Analysis / Related Work

3. Method / Model Description
In this paper, I use various deeper networks for evaluating the effectiveness of deeper CNN models for image classification on MNIST.
3.1 Model Architecture
(I) VGG-16

(II) ResNet

(III) GoogLeNet

3.2 XXX

3.3 XXX

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4. Experiments
4.1 Datasets
   The MNIST database [1] of handwritten digits, available from this page, has a training set of 60,000 examples, and a test set of 10,000 examples. It is a subset of a larger set available from NIST. The digits have been size-normalized and centred in a fixed-size image.

4.2 Testing Results

4.3 Further Evaluation

4.4 XXX

5. Conclusion

Reference
[1] Y. LeCun, L. Bottou, Y. Bengio, and P. Haffner. "Gradient-based learning applied to document recognition." Proceedings of the IEEE, 86(11): 2278-2324, November 1998.

Marking Criteria of ECS795P CW3

- Visualisation (e.g. image examples of success & failure cases, screenshot of classification input & output, visualisation of model training & testing processes) - 15 marks

- Literature critical review, Model aims, and Report organisation - 10 marks

- Implementation, Code training & testing, and Scope (e.g. how many different models trained and tested) - 15 marks

- Report writing and clarity - 25 marks

- Experiment analysis and testing, including the number of datasets used for testing & analysis - 25 marks

- Model design and/or performance improvement (e.g. new model training strategy, modifications to existing models, new model design, new learning tasks beyond classification) - 10 marks

Total 100 marks (for a 50% of the total assessment)