

ECS795P CW3

Mini-Project

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CW3 will be made available on Thursday 7th April 2022. The submission deadline is Thursday 12th May 2022 23:55, to be submitted by QM Plus. A submission portal on QM Plus will be made available. We will also allow for one-week late submission with standard penalty applied up-to Thursday 19th May 2022.

CW3 assessment weighting in relation to all other assessments:

- (1) The coursework 3 mini-project has a weighting of 50% 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 deep CNN networks
- Requirements
 - 1) You shall use *at least* two of VGG, ResNet, or GoogleNet networks. You can use more than two including other networks.
 - 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 your chosen networks.
 - 3) You shall submit a 6-page report (a research paper) including
 - 1) Critical analysis of the 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) Quantitative 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 code 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 Thursday 12/05/2022 at 23:55 through the QM Plus.
 - 2) One week late-submission with standard penalty applied is allowed (late-submission deadline 23:55 Thursday 19/05/2022).
- Suggestions
 - 1) For more details on deep networks VGG, ResNet, GoogleNet, you can access the original papers on coursework webpages.
 - 2) If you make any improvement to the original models, do 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 Plus 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

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.

Num: 0

Num: 1

Num: 2

Num: 3

Num: 4

Num: 5

Num: 6

Num: 7

Num: 8

Num: 9

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)