



UNIVERSITY OF
BATH

**CM500335: Foundations and Frontiers of
Machine Learning**

Group Assignment 2: Mark Scheme

Dr Raghubir Singh

*Dept. of Computer Science **

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*rs3022@bath.ac.uk

Mark Scheme

- Marking notes:
 1. A submission without both **code** and **report** should be rejected and entered with a 0 grade only with the reason given within the feedback.
 2. Reports included in zip files are acceptable but they should be run through Turnitin separately to add them to the database. The normal process in terms of spotting misconduct applies in the meantime.
 3. A submission containing a valid report and a Jupyter notebook is acceptable.

N.B. You should not provide any Python script files to run. Only the **Pre-run** Jupyter notebook and the report should be in the submission folder.

****All grades are provisional and subject to change by a Board of Examiners****

Section	Criteria	Marks	0-39%	40% Comp. Fail	50% Pass	60% Merit	70% + Distinction
Upload code and the documentation	Pass/Fail	–	Submission does not include both code file and report.	Submission includes both Jupyter Notebook (.ipynb) and report.			

Section	Weight	0-39%	40% Comp. Fail	50% Pass	60% Merit	70% + Distinction
Task 1: Data Visualisation	10	0-3 (Implementation/Methods are not appropriate.)	4 (Implementation/Methods are not justified. Very limited discussion, passing, or limited reference.)	5 (Reference to wider reading, literature used to justify choices. Visualisation of 2D PCA of MNIST training dataset)	6 (Reference to wider reading, literature used to justify choices. Strong observations on the separability of 2D PCA class pairs)	7+ (In-depth or very strong argument. References are wide. Visualisations are clear and highly effective.)
Task 2: Single-layer perceptron	10	0-3 (Implementation/Methods are not appropriate.)	4 (Implementation/Methods are not justified. Very limited discussion, passing, or limited reference.)	5 (Reference to wider reading, literature used to justify choices. Detailed background on single-layer perceptron)	6 (Reference to wider reading, literature used to justify choices. A detailed explanation of the steps involved in the perceptron algorithm. Also, a visualization of the convergence of the algorithm)	7+ (Strong, clear, fluent argument with depth and showing insight, supported by wider literature to support analysis and evaluation of SLP)
Task 3: Multi-layer perceptron	10	0-3 (Implementation/Methods are not appropriate.)	4 (Implementation/Methods are not justified. Very limited discussion, passing, or limited reference.)	5 (Reference to wider reading, literature used to justify choices. Comprehensive background on Multi-layer Perceptron.)	6 (Reference to wider reading, literature used to justify choices. Combinations of different hyperparameters)	7+ (Strong, clear, fluent argument, with depth and showing insight, supported by wider literature that is used to support implementation and evolution of MLP)
Task 4: CNN	10	0-3 (Implementation/Methods are not appropriate.)	4 (Implementation/Methods are not justified. Very limited discussion, passing, or limited reference.)	5 (Reference to wider reading, literature used to justify choices. Detailed background on CNN.)	6 (As Pass. Reference to wider reading, literature used to justify choices. Detailed overview of implementation of CNN with hidden layers)	7+ (Strong, clear, fluent argument, with depth and showing insight, supported by wider literature that is used to support analysis on CNN with the results)
Task 5: Visualising CNN	10	0-3 (Visualisations not present or are not appropriate.)	4 (Visualisations are present, discussion is descriptive.)	5 (Visualisations of layer 1,2 and 3 are appropriate and choice is discussed/justified)	6 (Visualisations are effective and justified with reference to literature. Images of the digits two and nine)	7+ (Visualisations are clear and highly effective. Use of wider reading to justify and support choices. Deep dream images for digit classes 2 and 9)
Task 6: Multi-task learning	20	0-7 (Implementation/Methods are not appropriate.)	8-9 (Implementation/Methods are not justified. Very limited discussion, passing, or limited reference.)	10-11 (Reference to wider reading, literature used to justify choices. Detailed background on MTL)	12-13 (As Pass. Reference to wider reading, literature used to justify choices. Different combinations of λ tested)	14+ (As Merit. Strong, clear, fluent argument, with depth and showing insight, supported by wider literature that is used to support analysis. Visualisation of MTL training with λ values. Advantages and disadvantages of MTL.)
	70	0-39	40-49	50-59 (meets the need of the assignment)	60-69 (goes beyond the pass criteria and shows deeper evaluation and insight into the topic)	70-100 (goes above and beyond the merit and pass and shows exceptional coding and academic writing skill.)