

Module Title:	AI Methods	Module Code:	COB107
Session:	2023/2024	Semester:	2
Title/Description:	ANN Implementation	Part:	1 of 1
This coursework represents	20	% of the module assessment	
Staff Member responsible:	Dr C W Dawson		
Date set:	w/b 12 February 2024		
Date to be handed in:	20 March 2024	By 11am	

Specification:	As attached
Method(s) of Presentation:	Electronic submission of report – including program listings, references, figures. Submit as either Word or PDF – as many files as required – e.g. one file for code, one for report; one file containing both; etc.
Assessment Guidelines:	As attached

AI Methods - Neural Network Coursework

Outline

You are to implement, in a programming language of your choice, an artificial neural network – specifically a multi-layer perceptron (MLP) - trained, initially, using the error backpropagation algorithm. Once implemented you are to train your network on the data set provided and evaluate its performance. Note – you should NOT use numerical computing environments (such as MATLAB) or pre-written neural network libraries (although other libraries, for example, mathematical functions, matrices, etc. are acceptable). Typical languages you could use would be Python, Java, C#, C++, or C.

There are a number of stages to this process that will be evaluated:

- 1) Appropriate data pre-processing of the supplied data set;
- 2) Implementation of the algorithm in an appropriate language;
- 3) Documentation and commenting of this implementation;
- 4) Appropriate training, configuration and weight adjustment of the ANN model;
- 5) Appropriate evaluation of the chosen ANN;
- 6) Comparison with a suitable baseline – for example, a multiple linear regression model (see LINEST in Excel).

You should also try different ‘improvements’ to the standard backpropagation algorithm and report on these – for example, momentum, annealing, etc (others discussed in lectures).

The data set will be provided as an Excel or Text file consisting of N columns. You should process these data appropriately. This involves cleaning the data, selecting a way to split the data into appropriate subsets, exploring and selecting predictors, and standardising the data to an appropriate range.

Marking scheme

Your report (which should be structured in the following sections) will be assessed as follows (these are weightings for each component):

1. Data pre-processing (including cleansing, data splitting, identifying predictors) – 10%;
2. Implementation of the MLP algorithm (including modifications / improvements) – 40%;
3. Training and network selection – 20%;
4. Evaluation of final model (including comparisons between different modifications to the algorithm) – 20%;
5. Comparison with another data driven model or baseline – 10%;

Your report should include a program listing (i.e. the code you have written) as well as the sections outlined above. Make sure you structure your report into these sections and use section numbers. Include references where appropriate.

The report should be submitted electronically via Learn by the due date.

Note – I am not running your program(s) – so the only way I can see that your code works (Section 2) is from the results you present (Sections 3 and/or 4).

COB107 – ANN Coursework Feedback

Student: xxxxx

Data pre-processing (10%) – xx%

comments

Implementation of MLP (40%) – xx%

comments

Training and network Selection (20%) – xx%

comments

Evaluation of final model (20%) – x%

comments

Comparison with other models (10%) – xx%

comments

Overall – xx%

comments