



L-Università
ta' Malta

CIS 3087/3187 – Coursework

Department of Computer Information Systems
University of Malta.

Dr John Abela

Email: john.abela@um.edu.mt Mob: 79367936

Neural Networks for Data Mining

The objectives of this assignment is to learn how artificial neural networks work, how to implement them in a high-level language, and how to use them to learn a simple Boolean function.

- Implement an artificial neural network that learns a Boolean function. The Boolean function must map 5 bits into 3 bits. You must create a Boolean function yourself in a spread sheet. You will have 32 inputs and output. Randomly choose 26 of the input-output pairs for training and the rest for testing.
- The neural network must have 5 input neurons, 4 hidden neurons, and 3 output neurons. Use the Sigmoid transfer function, 0.2 error threshold and 0.2 learning rate. You are encouraged to experiment with more hidden neurons.
- Implement the *Error Back Propagation* algorithm for training the weights.
- You must use a high-level language such as C++, Java, Python, or C#
- You may not use Python AI or Machine Learning packages. The implementation must be your own. You can, however, use matrix/vector arithmetic packages.
- You can use Matlab but must include extensions of your own choice to the project
- You must plot the bad facts vs the epochs graph to show convergence
- You can use RapidMiner (instead of writing and implementing your own neural network) but the marking will then be out of 50%
- Documentation must include source code, data sets, epochs graph, comments, and other details as per Notes below.
- The network should converge in less than 1000 epochs.

Deliverables and Notes:

- You must submit the following documentation:
 - Front page with your ID Card Number (if applicable), name and surname, degree programme, and year. Make sure that the course code, CIS 3087 or CIS 3187, is printed on the front page.
 - **Signed Plagiarism Declaration Form.**
 - Statement of Completion – which parts of the above were attempted and work and which do not.
 - A listing of the training data and the results obtained on each dataset.
 - Any observations, problems encountered, and notes.
 - All documentation, code and training data a CD or DVD
- Submission deadline is **Noon on Wednesday 24th January, 2019**. You must submit the documentation to the CIS departmental office. There will be no extensions.