AI / ML – Technical Session 4 (09.10.2025)

Task 3 – PyTorch Challenge:

- *The demo PyTorch neural network (in pytorch_demo.ipynb) doesn't train very well on the concentric rings dataset, and does a poor job on the spiral dataset.*
- *Experiment with the code to produce better models. You can change any of the hyperparameters including the learning rate, number of layers, number of neurons in a given layer, and choice of activation function.*
- *You can also change the number of training epochs, configure the optimizer differently or use a different optimizer.*
- *You might like to try out ideas using TensorFlow Playground where it's easier to experiment with the network topology and other options. You can then implement any promising ideas in code.*

Final submission: AT_PyTorchDemo_DL_V3.ipynb

<u>Why did I choose this methodology?</u>

- The original pytorch_demo.ipynb performed poorly on both the rings and spiral datasets.
- To improve performance, I increased the model capacity by expanding the hidden layer width (64 for rings, 96 for spiral) and extended training duration (220-260 epochs versus the original's shorter runs).
- I also adjusted the learning rate slightly higher for rings (1.5e-3) to help convergence, whilst keeping Adam as the optimiser for stability.
- The validation split ensures reported accuracy reflects genuine generalisation rather than overfitting to training data.
- These changes address the task criteria of producing better models through sensible hyperparameter adjustments.
- I was unable to get this to work on GPU Cuda as I used Python 3.12 since CUDA wheels aren't available for Python 3.13 yet, thus having to run on CPU PyTorch instead.