

### UoT Exercise 3

Download and read the paper from [https://storage.googleapis.com/cyberyuner/CSDA\\_final.pdf](https://storage.googleapis.com/cyberyuner/CSDA_final.pdf)

#### Goal 1:

Reimplement the algorithm (Factor Analysis EM on incomplete data) in Python, and validate your results using small scale data in Table 1. In your code, please keep your variable names consistent with the symbols used in the paper. Please clearly structure your code in EM part, with clear segments of Expectation calculation and Maximization assignment. Please also show the iterations of likelihood improvement.

#### Goal 2:

Reimplement the same algorithm in GPU, using Tensorflow / Pytorch, or even low level CUDA toolkit. All main computations (including matrix manipulations, EM iterations, updates) should be done in GPU. Please use a large-scale data to demonstrate the efficiency of improvement in GPU, and also validate your results across GPU and CPU.