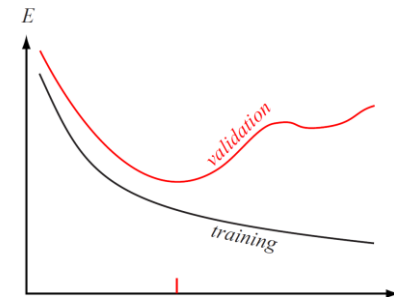


# Programming & Experiment Assignment

- ❑ Classification experiment using DNNs
  - Implement a mini-batch SGD algorithm to train the parameters of a DNN.
  - For the following experiments, plot the error graphs for both the training and validation data.
    - Experiment with different learning rates
    - Experiment with various mini-batch sizes
    - Experiment with different numbers of nodes and layers (additional 10 points)
    - Experiment with various types of activation functions (additional 10 points)
- ❑ Submit the following.
  1. Source code (50 points)
  2. Documentation including the explanation of the training and validation procedures (10 points)
  3. Error curve graphs (40 points)
- ❑ Due: 12/1



# Data File Format

## □ Training/test data file format

$$\begin{array}{ccccc} \blacksquare & x_1^1 & x_2^1 & \cdots & x_d^1 & r^1 \\ & x_1^2 & x_2^2 & \cdots & x_d^2 & r^2 \\ & \vdots & & & & \\ & x_1^N & x_2^N & \cdots & x_d^N & r^N \end{array}$$

## □ Sample file

```
-2.120279e+001 -5.292185e+000 ... -1.098583e+000 0
-2.267072e+001 -6.845204e+000 ... -3.950064e+000 0
-2.177675e+001 -7.340329e+000 ... -3.973404e+000 0
:
-2.035374e+001 -5.470649e+000 ... -3.804142e+000 1
-2.103584e+001 -5.863925e+000 ... -3.812235e+000 1
-2.162024e+001 -4.248268e+000 ... -3.703966e+000 1
:
```