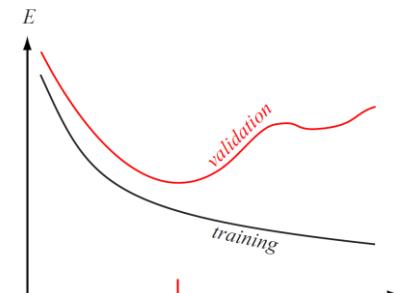


# Programming & Experiment Assignment

- 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

- $x_1^1 \ x_2^1 \ \dots \ x_d^1 \ r^1$   
 $x_1^2 \ x_2^2 \ \dots \ x_d^2 \ r^2$   
 $\vdots$   
 $x_1^N \ x_2^N \ \dots \ x_d^N \ r^N$

## □ 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
:
```