Types of Learning

Tuesday, January 14, 2020 13:00

Supervised Learning:

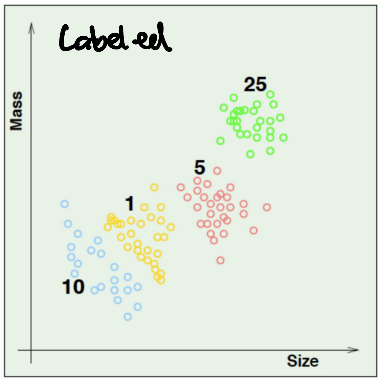
$D = \{(x_1, y_1) \ldots\ldots\}$

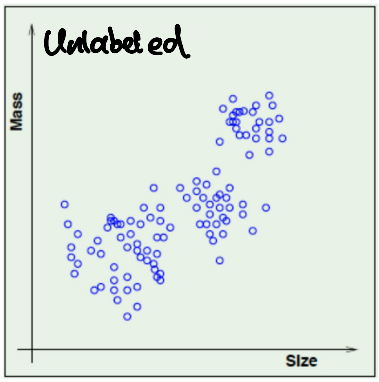
data is labelled (by humans — time consuming)

Unsupervised Learning:

$D = \{x_1, x_2 \ldots\ldots\}$

unlabelled





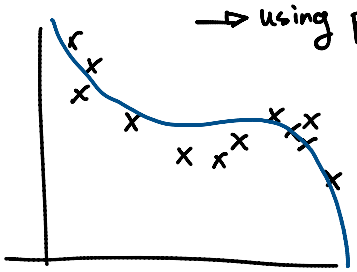
Reinforced Learning

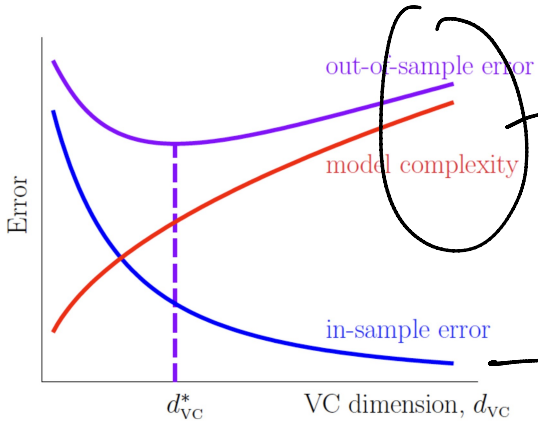
action → feedback from environment (reward / punishment) → change in behaviour.

↳ one in a while choose something else to see what happens (evolution)

Regression: (approximate interpolation)

→ using polynomials instead of just lines.





overfitting (doesn't do well for unsampled data)

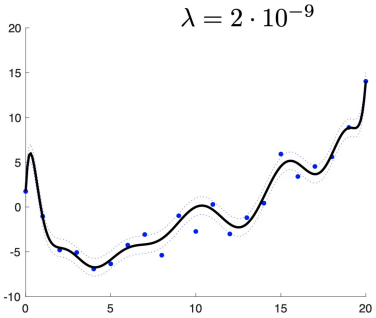
↑ complexity gives better approximation for only what is known

$y = \boldsymbol{w}^T \boldsymbol{z}\,, \quad \boldsymbol{z} = [1, x, \ldots, x^M]^T$

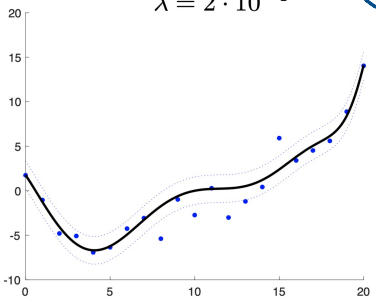
minimize: $E_{\text{in}}(\boldsymbol{w}) + \lambda \|\boldsymbol{w}\|_2^2$

$M = 14$

$\lambda = 2 \cdot 10^{-9}$



$\lambda = 2 \cdot 10^{-4}$



In this case, we penalize the training if the length of the function is too long

(Regularization)

one approach to avoid overfitting