CS3264
Machine Learning
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01. Intro
What is
1. Supervised Learning - Classification/Regression
2. Unsupervised - Kmeans, PCA
3. Reinforcement - Giving rewards and punishment

Linear regression
- Data - tuples of points $\{(x_n, t_n)\}_{0 \to N}$
- Model - $y = w_0 + xw_1$
- Loss - Mean square error $\frac{1}{2}\sum_{n=1}^{N}(y_n - t_n)^2$
- Derivative to find lowest point to find w
- $t_n = [x_n][w_n]^T$

Non-Linear regression
- Basis factor expansion $x \to [x, x^2, x^3.., x^P]$
- Find weights for each polynomial/exponential/..
- Note that minimization of error function has a unique solution
  - Unique weight that optimises the model

Regularization
Ridge regression solution
- Add regularizer ($\frac{\lambda}{2}||w||^2$) to error function
  - Lambda is a constant
  - smaller = error matters more
  - larger = penalise weights more