

=> Parametric Model;

$$\hat{y} = \beta_0 + \beta_1 x_i$$

Intercept      Slope

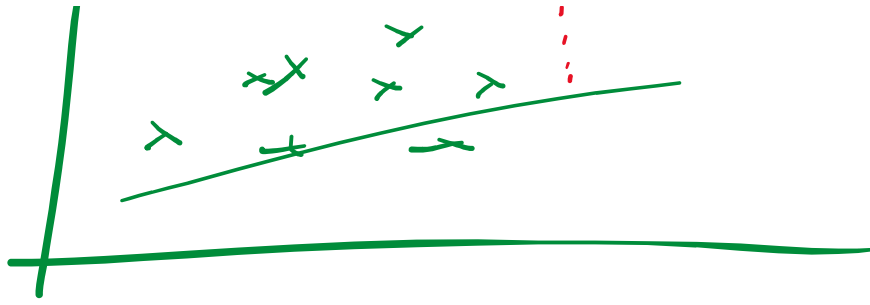
$$\beta_0 = \bar{y} - \beta_1 \bar{x}$$

$$\beta_1 = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sum (x_i - \bar{x})^2}$$

$$\hat{y} = 0.287 + 3.68 \times x_i$$

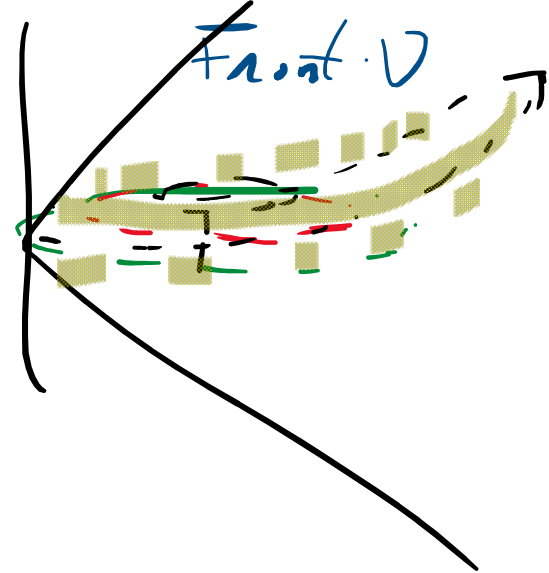
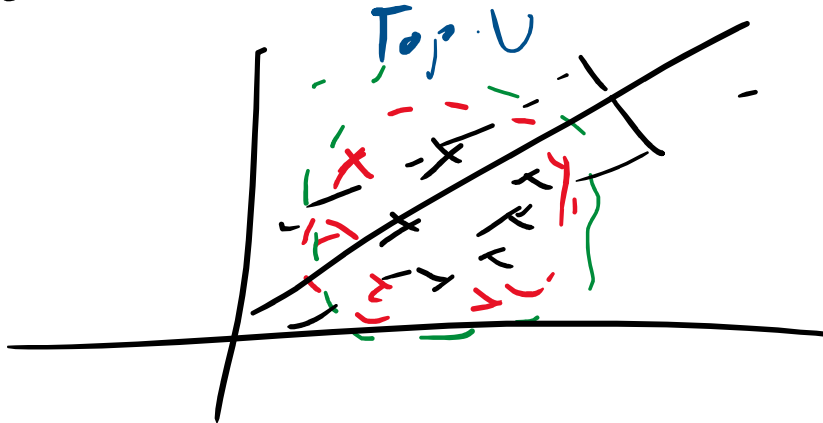
=> Pre-determine the calculations.





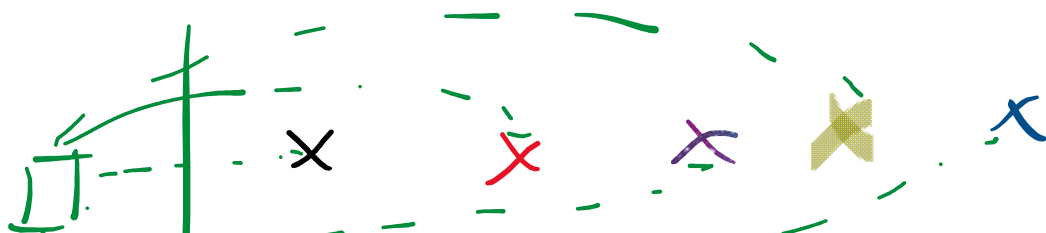
Non-Adaption Mechanism : Heuristic

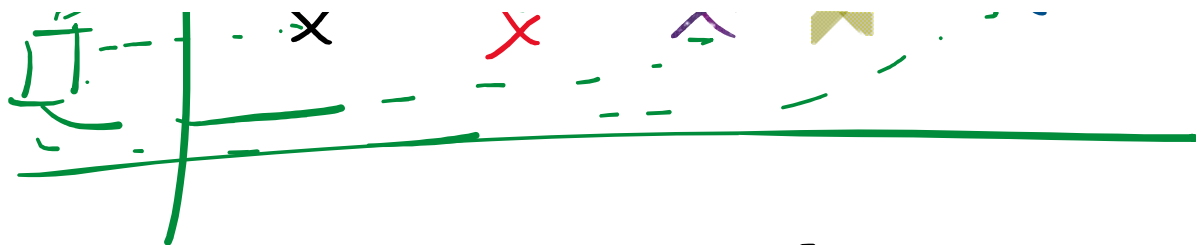
Eg: SVM (Supervised & Non-Parametric)



$$\hat{y} = \underbrace{w \cdot x + b}_{\text{Weights}} \quad \text{Bias}$$

=> Euclidean Distance





$\Rightarrow$  Deep Learning  $\subset$  Structure

Artificial Neural Networks  $\subset$  Non-Parametric

$$\hat{y} = \underset{\substack{\uparrow \\ \text{Train}}}{\beta_0} + \underset{\substack{\uparrow \\ \text{Test}}}{\beta_1 x_i}$$

$$\begin{bmatrix} x \\ y \end{bmatrix} = \begin{cases} \text{Train} \\ \text{Test} \end{cases}$$

x	1	2	3	4	5	6
y	2	4	6	8	10	12

$$\beta_0 = 0.71$$

$$\beta_1 = 2.8$$

$$(12) \quad \hat{y} = 0.71 + 2.8 \times \underline{6}$$

$$0.71 \rightarrow 16.8$$

$$= \underline{\underline{17.5}}$$

$$\beta_0 = 0.01$$

$$\beta_1 = 2$$

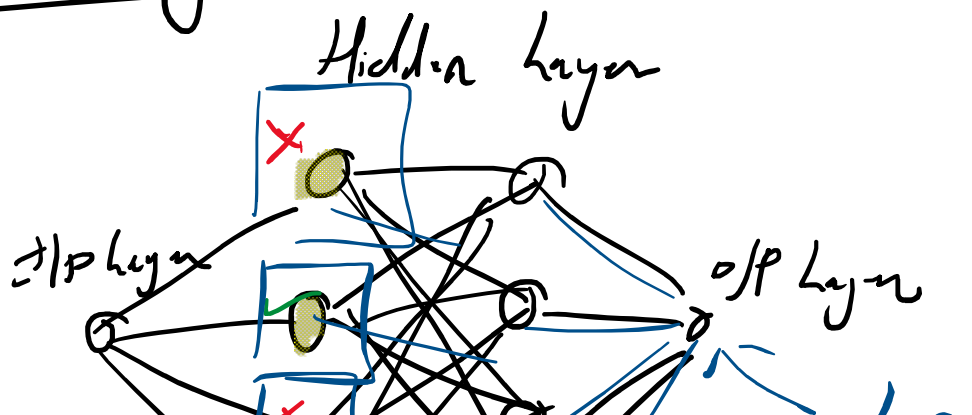
Humans

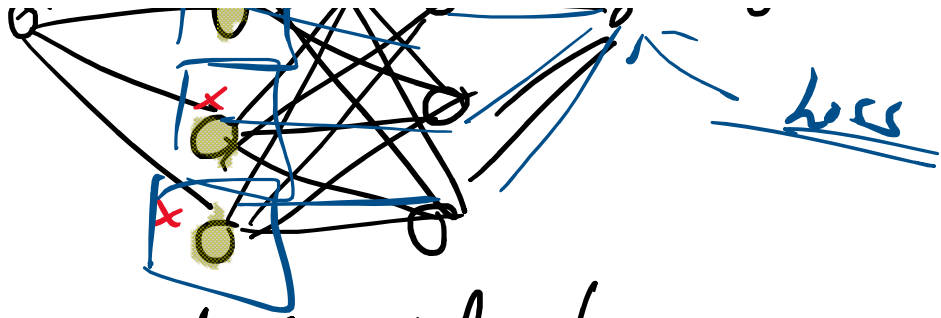
- ⇒ Analyze
- ⇒ Lost info
- ⇒ Overcoming loss
  - ↳ Change
- ⇒ Compare

ANN

- ⇒ Trains
- ⇒ loss
- ⇒ Optimization
  - ↳ Backtracking
- ⇒ Validation

⇒ Understanding DL.





Mathematical Information

① Activation Functions

② Loss Functions

Error

③ Optimization (Back Propagation) Backtracking

④ Epochs (Iterations of Training)

⑤ Evaluation

⇒ Activation Fns :  
 ↳ Rectified Linear Unit (ReLU)  
 ↳ softmax

↳ Softmax  
 ↳ Sigmoid (Logit)   - Classification  
 ↳ Tan Hyperbolic  
 ↳ Leaky ReLU

Non-linear Functions

⇒ Loss Functions: (Error Measurements)

↳ Mean Squared Error  
 ↳ Mean Absolute Error  
 ↳ Binary Crossentropy (Logarithmic Loss)  
 ↳ Categorical CrossEntropy  
 ↳ Sparse Categorical CrossEntropy.

⇒ Loss Optimizers (Backpropagate)

↳ Gradient Descent  
 ↳ Stochastic Gradient Descent.  
 ↳ RMSProp  
 ↳ AdaGrad

Lo Adam