NDLS - Talk # 02

Machine learning Notes

Learning → how do we learn?
- learn by linking to previous information.
- Update our belief system based on new data.

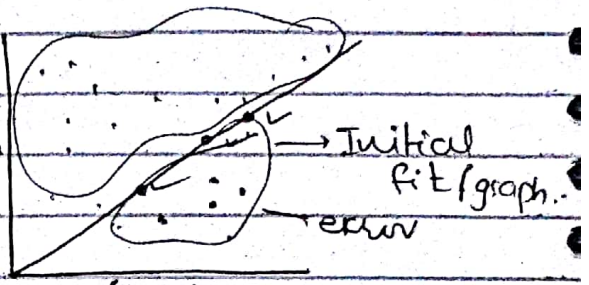
⇒ Data (Experiences): $x_1 \ldots\ldots x_n$

Output: y

- Initial result very wrong, so then updates results.

Terms

1) Representation → representing fit the data. ⇒ only 3 points fit.



2) Evaluation → Standard metric to compare results of different algo.

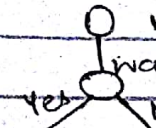
3) Optimization → Actual learning.

Representation Algorithms → k-nearest neighbours
→ clustering (k-means)

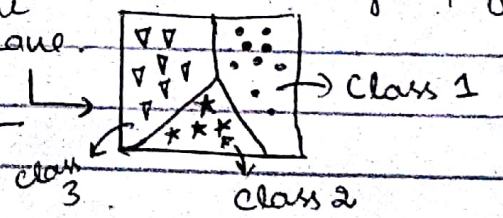
⇒ Check new point of data lies where.

⇒ similar points lie in same space on plane. ⇐⇒ focused on grouping

Decision Tree



new point: ★ where? → class 2



Evaluation → how to find/know if network is good?
- distance → L_1, L_2
- prob. base → K-L divergence
- Classification → softmax, Git loss

Confusion Matrix → check what is TP, FN, FP, TN.

$$\text{Precision} = \frac{TP}{TP+FP}$$

$$\text{Recall} = \frac{TP}{TP+FN}$$

$$F_1 = \frac{2*(\text{precision} * \text{recall})}{\text{precision} + \text{recall}}$$

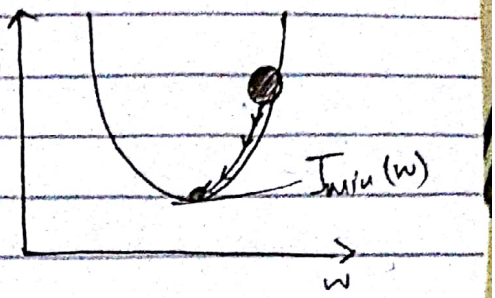
	P	N
P	TP	FP
N	FN	TN

Optimization → searching
- Gradient Descent
- Linear/Quadratic Reg

⇒ $y = Wx + b$
- solve for weight.

→ Used today: Gradient Descent.

→ $J(w)$ → Jacobian
- matrix of first order partial derivatives.



⇒ Activation Fn
- make sure that values are not fed randomly.

Bias vs Variance
- small input change, large output change
- ↓ biased towards same output.