20/7/22

Date / /
Page

Machine Learning

Key elements

1. Representation
2. Evaluation
3. Optimization

Candidate programs (hypothesis) & NP Hard ?

Constrained

Data has to be labelled for supervised learning

Unsupervised learning → No labelling

↳ clustering learning

Classification

True false

Regression — gives one value

prediction

Unsupervised → Association & Clustering

Difference

Networks

1. Propagation Delay
2. Latency = variation in delay
3. Jitter – noise (unpredictable)

Protocol Convertor → Gateway

21/7/22

Date
Page

Flowing Networks

Physical layer node to node

Data link layer end to end

Network layer process to process

21/7/22

Fundamentals ML

Semi-supervised

labelled & unlabelled

Reinforcement learning

reward / punishment

Reinforcement Vs Supervised

chess | Object Recognition

Statistical distribution

Significant Test (NOR)

Date / /
Page

ML Problem

Regression & continuous / supervised

Statistics - collection, organization / interpretation of dat

- Descriptive → numerical calculations
- Inferential - complex

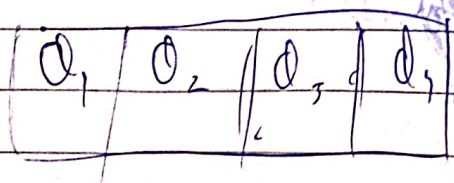
Normal distribution

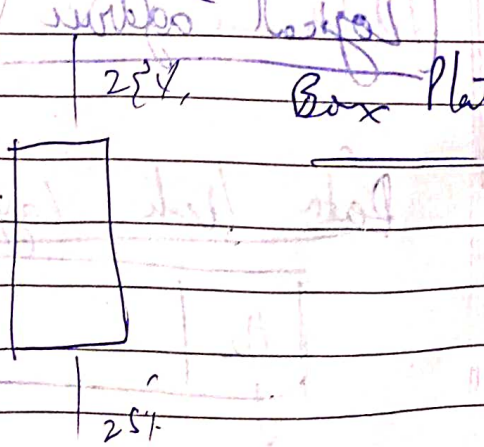
unimodal - 1 peak

Variability

Range -

Interquartile range (IQR) → dispersion b/w upper (75th) & lower (25th)





Measure for Box plot - use IQR

Fundamental of ML

Date Page 28/07/22

28/7/22

Variance & Standard Deviation

Range

IQR → Inter Quartile Range → give dispersion of data

$$S.D. = \sqrt{\frac{\Sigma(x_i - \bar{x})}{n}}$$

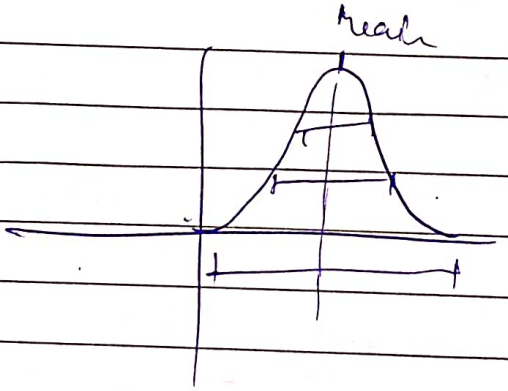
$$SD = \sqrt{\frac{\Sigma(x_i - \bar{x})^2}{n}} = \sigma$$

σ^2 = Variance

Normal Distribution

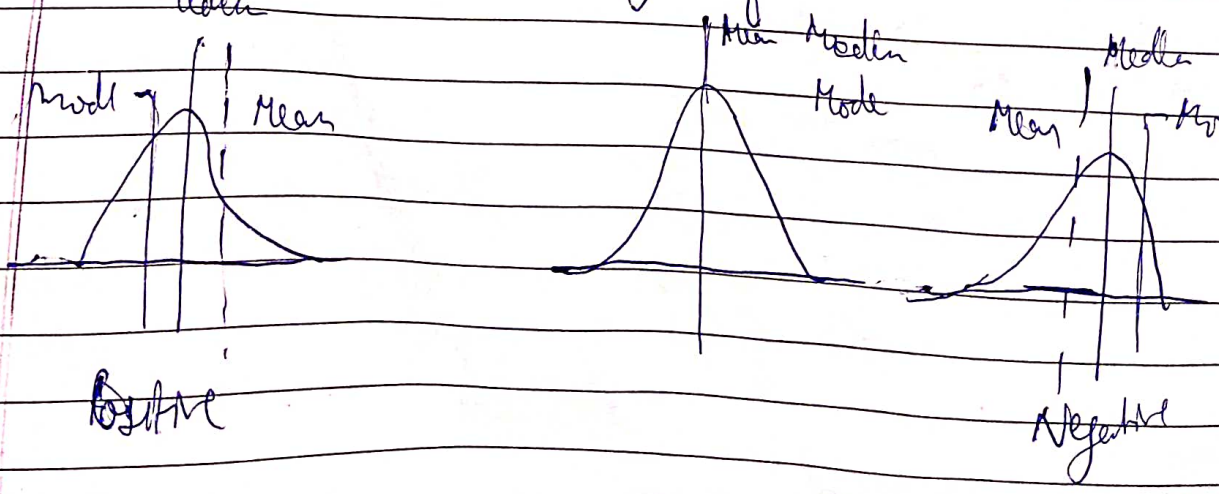
V / SD = 1

Mean = 0



Modality - no. of peaks

Skewness → Symmetry of distribution



Positive Skewness → Mean right of Median
Negative Skewness → Mean left of Median

Box Plot

Data Visualization

Data points - markers

Width of bin → must be of regular interval
For histogram / Ecdf plot

ANOVA → Box plots
- F-value
- Pearson Coefficient

→ P-Test

BOX PLOT

Outliers

For median, sort the data, then take middle value
In image processing, there is no decimal median value

Outlier → Imp. for identification of range
↳ gives data dispersion
↳ how far data is spread

e) Pie chart loses many features

Exploring Networks | 29-07-24

RTS - Request to send
CTS - Clear to send

Signalling Information

✡ Physical Interface - Pins. Pins in cable

Standard format of Switch
↳ OSI layer protocol
↳ Connecting points

Router acts like a switch

Date / /
Page

	ML	DL
①	Require user intervention	feature extraction without human interaction

Maths
Max Pooling

Activation function

Relu
Softmax apply on last layer

Cross Entropy
Loss function

ADAM optimizer

4/8/22

Date / /
Page

ML

Baye's Theorem Numericals

P(B) - Burglary

P(E) - Earthquake

P(A|B,E) - Alarm

P(J|A) - John Calls

P(M|A) - Mary Calls

$P(A \wedge B) = P(A|B) * P(B)$

$P(A) = P(A|B) * P(B)$ → prior probability

New instance →

$$P(B|A) = \frac{P(A|B) * P(B)}{P(A)}$$

---

(1) $P(J, M, A, \neg B, \neg E)$

$\Rightarrow P(J|A) * P(M|A) * P(A|\neg B, \neg E) * P(\neg B) * P(\neg E)$

---

(2) $P(J) = P(J|A)P(A) + P(J|\neg A)P(\neg A)$

Date
Page / /

$\Rightarrow P(J|A)\{P(A|B,E)*P(B,E) + P(A|\neg B,E) + P($
$\ldots\ldots\} + P(J|\neg A)\{P(\neg A|B,E) * P(B,E) +$

$\Rightarrow 0.90[0.95 \times 0.001 \times 0.002 + 0.29 \times 0.999 \times 0.002$
$+ 0.94 \times 0.001 \times 0.998 + 0.001 \times 0.999 \times 0.998$
$+$