24/2/24 & 25/2/24

27 MARCH'23 MONDAY

13th Week • 086-279

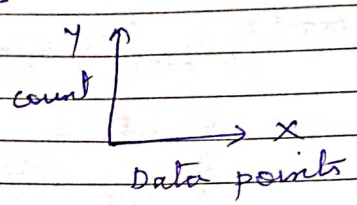
stats - 3

MARCH 2023

SUN	MON	TUE	WED	THU	FRI	SAT
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

09.00 ① data distribution ⇒ plotting the frequency of data.

10.00



11.00

12.00 ② probability

13.00 ③ Random variable

④ probability distribution functn

14.00 ↳ Pms (probability mass functn)

15.00 ↳ PDF (probability density functn)

16.00 ↳ CDF (cumulative distribution ")

17.00

18.00 Pms (discrete)

① uniform distribution

② Bernolis dist

③ binomial / multinomial

④ poisson dist

PDF (continuous)

① Normal dist

② SND

③ Power law

④ pareto dist

⑤ log normal dist

⑥ T, F, chi-square dist

Probability

It matters not how many years we live, but how we live them.

APRIL 2023

SUN	MON	TUE	WED	THU	FRI	SAT
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

MARCH'23 TUESDAY 28

13th Week • 087-278

Probability → chance of happening a event

1. Basic Probability theory
2. Independent events
3. Dependent event / conditional prob.
4. Naive Bayes theorem
5. types of event in prob like mutually exclusive events

(1, 2, 3, 4 → naive bayes algo.)

(5 → text classification)

Basic Probability

P(happening) + P(not happening) = 1

P(A) + P'(A) = 1

Variable

x + 5 = 6

x = 6 - 5

variable → (x) = 1

Random variable ⇒ Random experiment

(H, T) (tossing a coin)

(1, 2, 3, 4, 5, 6) (Dice Rolling)

(Pass or Fail) (Exam Result)

29 MARCH'23
WEDNESDAY
13th Week • 088-277

SUN MON TUE WED THU FRI SAT SUN MON TUE WED THU
1 2 3 4 5 6 7 8 9
12 13 14 15 16 17 18 19 20 21 22
26 27 28 29 30 31

09.00 Random variable

10.00 discrete
↳ whole no.
eg:- H, T,
{1, 2, 3, 4, 5, 6}
&
coin, cards, dice

11.00 continuous
↳ range
eg:- height, weight
$a \leq$ height $\leq b$
$x \leq$ weight $\leq y$

12.00

13.00

14.00

15.00 Probability distribution

16.00 ① Probability mass func^n (PMS) (Discrete variable)

17.00 ② Probability density func^n (PDF) (Continuous variable)

18.00

PMS

$P(X = x) = p_i$

X → random variable
x → some value
p_i → probability

$1 \leq p_i \geq 0$ or $0 \leq p_i \leq 1$

$\sum p_i = 1$

eg) in a coin

$P(X = \text{Head}) = \frac{1}{2} = 0.5$

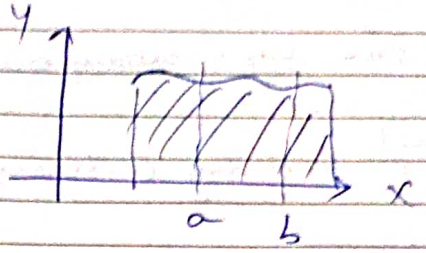
$P(X = \text{Tail}) = 1 - 0.5 = 0.5$

$P(X = \text{Head} + \text{Tail}) = 1$

A group of people, each going his way, is not an organization.

PDF: (range is continuous)

$$\int_{-\infty}^{+\infty} f(x)\,dx = 1$$



$$P(X=x) = \frac{1}{\sqrt{2\pi}\,\sigma} e^{-\frac{1}{2}\left(\frac{x-\mu}{\sigma}\right)^2}$$

$$\int_a^b f(x)\,dx = P_i$$

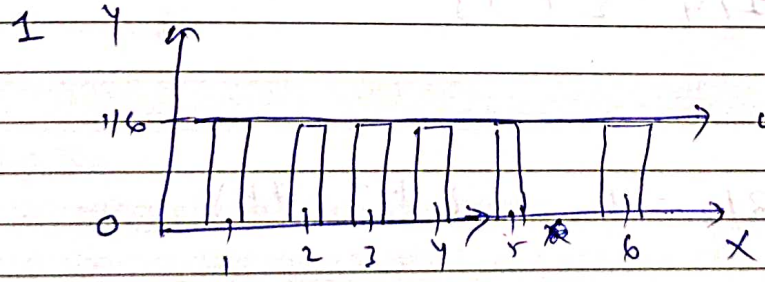
$a \le x \le b$

Uniform distribution :—

Dice ⇒ $x=1$ $x=2$ $x=3$ $x=4$ $x=5$ $x=6$

$P(X=1) = \frac{1}{6}$ $P(X=2)$ $P(X=3)$ . . .

$\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$ $\frac{1}{6}$



Bernoulli's distribution — Binary outcome with respect single

Yes/no
0/1
T/F
Pass/Fail

$P(X=x)$ $p^x \cdot (1-p)^{1-x}$

09.00 Binomial distribution ⇒ $\boxed{{}^{n}C_{r}\, p^{r}\, (1-p)^{n-r}}$

10.00 ~~Bernoulli~~ one try (binary outcome)

11.00 ~~Binomial~~ n try (binary outcome)

12.00 ~~multinomial~~ n try (multiple outcome)

13.00

14.00 Binomial

15.00 coin {H, T} tossed 2 times ~~consecutively~~ consecutively & i want ~~atleast~~ one head

16.00 (1) (2)

H H

17.00 H T

T H

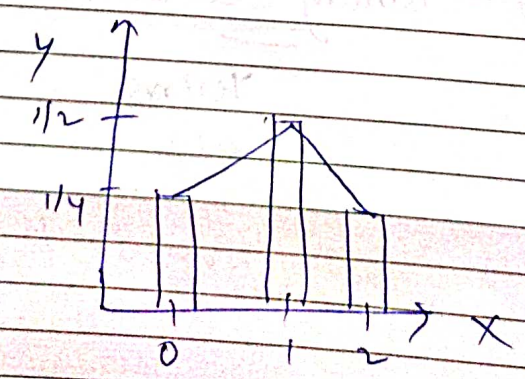
18.00 T T

$P(X=0) = 1/4$ {T T}

0 head

$P(X=1) = 2/4 = 1/2$ {HT, TH}

$P(X=2) = 1/4$



Cumulative distribution [add step by step]

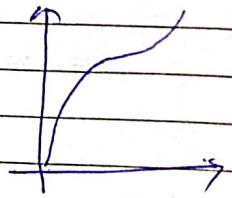
1 + 2 + 3 + 4 + 5 = 15

3, 6, 10, 15

$P(X \leq 1)$

$= P(X=0) + P(X=1)$

$= \frac{1}{4} + \frac{1}{2} = \frac{3}{4}$



So according to our ques $P(X \leq 2)$

$= \frac{1}{4} + \frac{1}{2} + \frac{1}{4} = 1$

Multinomial dist.

6 people blood category O+ B+ A+ AB+

3 1 1 1

$${}^{n}C_{r}\, p^{r} (1-p)^{(n-r)}$$

$$\Rightarrow \frac{6!}{3!\,1!\,1!\,1!} \times (3/6)^{3} \times (1/6)^{1} \times (1/6)^{1} \times (1/6)^{1}$$

Thinking well is wise; planning well, wiser; doing well, wisest and best of all.