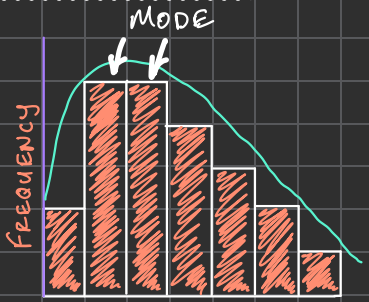
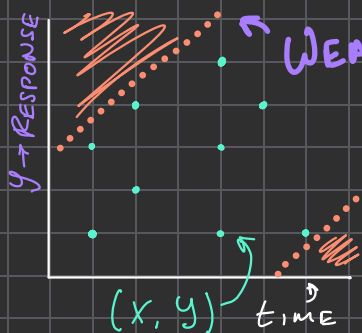
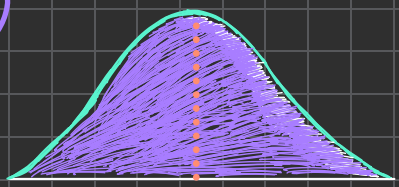
UNIT 1

MEASURES OF:



RIGHT (+) BIMODAL





r → CORRELATION COEF r → ±1 STRONG

$-1 \leq r \leq 1$

r → 0 GETS WEAKER

X	1	2	3	4	5	6
y	1	3	1	2	1	0

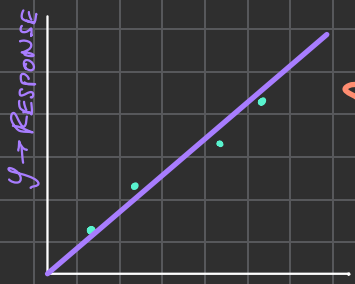
$$\hat{y} = \hat{\beta}_0 + \hat{\beta}_1 x$$

$$y = mx + b$$

$$\hat{\beta}_1 = \frac{s_y}{s_x} * r$$

$$\hat{\beta}_0 = \bar{y} - \hat{\beta}_1 \bar{x}$$

$\bar{x}$ ← SAMPLE MEAN OF X



STRONG POSITIVE

r = 0.95

MEASURE OF CENTER

$\mu \approx \bar{x}$ $\bar{x} = \frac{\sum_{i=1}^{n} x_i}{n}$:MEAN

MEDIAN: $n/2$

$30/2 = 15$

$32/2 = 16$, 17

MEASURE OF SPREAD

VARIANCE → σ^2 OR s^2

$$s^2 = \frac{\sum_{i=1}^{n} (x_i - \bar{x})^2}{n-1}$$

$$\sigma^2 = \frac{\sum_{i=1}^{n} (x_i - \mu)^2}{n}$$

$s = \sqrt{s^2}$

$\sigma = \sqrt{\sigma^2}$

MODE: FREQ DIST

X	1	2	3	4	5	6
y	1	3	1	2	1	0

$$\bar{x} = \sum_{i=1}^{n} x_i / n = \frac{1+2+3+4+5+6}{6} = 3.5$$

$$\bar{y} = \sum_{i=1}^{n} y_i / n = \frac{1+3+1+2+1+0}{6} = 1.33$$

$$S_x = \sqrt{17.5/5} = 3.5$$

$$S_y = \sqrt{5.334/5} = 1.033$$

$r = -0.5175$

$\beta_0 \rightarrow$ "Baseline Effect"

$$\hat{y} = 2.331 - 0.286x$$

Prediction
Within Sample

Forecasting
Out of Sample

$$\hat{y} = \hat{\beta}_0 + \hat{\beta}_1 x$$

$$\hat{\beta}_1 = \frac{S_y}{S_x} * r$$

$$= \frac{1.033}{1.87} * -0.5175$$

$$= -.286$$

$X \rightarrow$ Predictor

$y \rightarrow$ Response

$$\hat{\beta}_0 = \bar{y} - \hat{\beta}_1 \bar{x}$$

$$1.33 + .286(3.5)$$

$$= 2.331$$