

Name: Zaeem yousaf

Roll No: 192-1196

Subject: Statistics & probability

Teacher: Sir Mubashir Qayyum

Assignment # 1

Section: 4A (BSCS)

Data 1

Heights of '50' men of Indonesia taken from internet. and the 50 observations are following...

5.39, 5.37, 5.29, 5.5, 5.57,
6.2, 4.94, 4.99, 5.6, 6.2,
5.1, 5.2, 5.9, 5.7,
5.32, 5.28, 5.17, 4.91,
5.88, 5.6, 5.7, 5.24,
5.29, 5.5, 5.27, 6.2,
4.95, 4.99, 5.6, 6.2,
5.15, 5.9, 5.29, 5.5,
5.57, 6.2, 4.95, 4.95,
4.99, 5.6, 6.2, 5.1,
5.3, 5.9, 5.29, 5.5,
5.7, 6.2, 4.88, 5.29

Data 2

Heights of '50' men of Pakistan. Data taken from internet. the observations are as under.

5.87, 5.57, 5.68, 5.73
5.77, 6.88, 5.04, 5.37
5.75, 6.75, 5.3, 6.07
5.42, 6.4, 5.55, 6.31
5.37, 5.31, 6.08, 5.80
6.59, 5.51, 5.57, 5.64
6.45, 5.15, 5.24, 5.80
5.49, 5.72, 5.62, 5.81
5.61, 6.10, 6.125, 5.78
6.96, 5.58, 5.45, 5.71
6.05, 5.83, 5.89, 6.2
6.05, 5.79, 5.63, 5.92
5.87, 6.2

Data - 1

$$\text{Mean} \Rightarrow \frac{\sum X}{n} = \frac{274.53}{50} = 5.49$$

$$\text{Median} \Rightarrow \left[\frac{51}{2} \right]^{\text{th}} \text{ value}$$

$$= 5.50$$

$$Q_1 \left[\frac{51}{4} \right]^{\text{th}} \text{ value} = 5.21$$

$$Q_2 \left[\frac{51}{2} \right]^{\text{th}} \text{ value} = 5.50$$

$$Q_3 \left[\frac{3}{4} \times 51 \right]^{\text{th}} \text{ value} = 5.67$$

$$P_{90} \left[\frac{90}{100} (51) \right]^{\text{th}} \approx 46^{\text{th}} \text{ from sorted} = 6.2$$

$$P_{10} \left[\frac{10}{100} (51) \right]^{\text{th}} \text{ 5th value} = 4.95$$

Data - 2

$$\text{Mean} = 5.82$$

$$\text{median} = 5.74$$

$$Q_1 = 5.49$$

$$Q_2 = 5.74$$

$$Q_3 = 6.09$$

$$P_{90} = 6.59$$

$$P_{10} = 5.27$$

Data 1

Sd

$$= \sqrt{\frac{\sum (x - \bar{x})^2}{n}}$$

$$= \frac{\sum (x - \bar{x})^2}{n} = 7.61$$

$$\text{var} = \frac{\sum (x - \bar{x})^2}{50} = 0.15$$

$$\text{sd} = \sqrt{0.15} = 0.39$$

Data 2

sd

$$\sum (x - \bar{x})^2 = 11.17$$

$$\frac{\sum (x - \bar{x})^2}{50} = \frac{11.17}{50}$$

$$\text{var} = 0.22$$

$$\text{sd} = \sqrt{0.22} = 0.47$$

Q2 coefficient of variation

$$CV = \frac{\sigma}{\mu} \Rightarrow$$

data 1

$$CV = \frac{0.39}{5.49} = 0.07$$

data 2

$$CV = \frac{0.47}{5.82} = 0.08$$

CV of data 2 (0.08) has greater dispersion around mean which shows that pakistani have more versatile height as compared to indonesian who are almost even heighted.

Q2 Karl Pearson Coefficient of Skewness

Data 1

Data 2

$$= \frac{3(\text{mean} - \text{median})}{\text{sd}}$$

$$\frac{3(5.82 - 5.74)}{0.47}$$

$$= \frac{3(5.49 - 5.50)}{0.39}$$

$$= -0.08$$

$$= 0.5$$

Both value (-0.08) and (0.5) are near zero which show that heights of Men from Indonesia and Pakistan are almost normally distributed. However, Data 2 is slightly +vely skewed, Data 1 -vely skewed.

Q3 Bowley's coefficient of skewness

$$S_{kg} = \frac{(Q_3 - Q_2) - 2(Q_2 - Q_1)}{Q_3 - Q_1}$$

Data 1

$$\frac{(5.67 - 5.5) - (5.50 - 5.21)}{5.67 - 5.21}$$

$$= -0.26$$

Data 2

$$\frac{(6.09 - 5.74) - (5.74 - 5.49)}{(6.09 - 5.49)}$$

$$= 0.17$$

As Karl Pearson's result, data 1 is slightly -vely skewed while data 2 is +vely

skewed. The graph of both data will look almost normal.

Q4 percentile coefficient of kurtosis:

$$K = \frac{Q.D}{P_{90} - P_{10}}$$

$$Q.D = \frac{Q_3 - Q_1}{2}$$

Data 1

$$Q.D = \frac{5.67 - 5.21}{2}$$

$$= 0.23$$

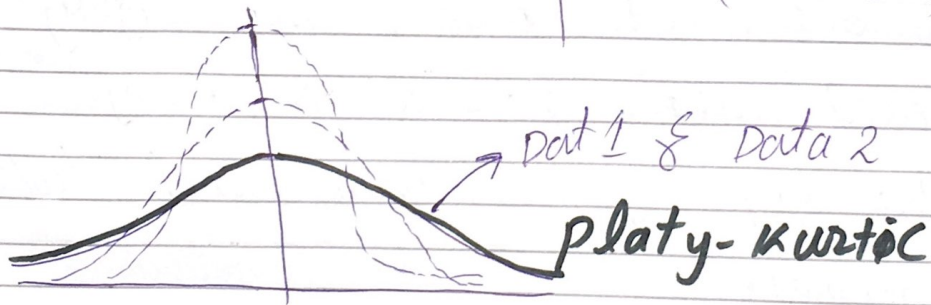
$$K = \frac{0.23}{6.2 - 4.95} = 0.18$$

Data 2

$$Q.D = \frac{6.09 - 5.49}{2}$$

$$= 0.3$$

$$\frac{0.3}{(6.59 - 5.27)} = 0.23$$



Coefficient of kurtosis of Data 1 (0.18) and Data 2 (0.23) lie between 0-0.5 which show that both Data have normal distribution.

Conclusion: ① mean of Data 1 is smaller than Data 2 which shows that on average Pakistani are taller than Indonesian.

② Greater Standard deviation and 'coefficient of variation' of Data 2 show that there is greater variety of heights in Pakistan.

③ Karl Pearson's coefficient of skewness and Bowley's coefficient of skewness show that both data are almost normally distributed with minor skewness.

in opposite direction.

④ 'percentile coefficient of kurtosis' of both data fall in range 0-0.5 which claim that both data have normal distribution.