



PASIÓN POR EDUCAR

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Nombre de la Materia: ESTADISTICA INFERENCIAL.

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Nombre de la Licenciatura: Administración y Estrategias de Negocios.

Cuatrimestre: 4To.

Unidad: 3

PASIÓN POR EDUCAR

Plataforma: Citlally Rubio

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Problema 1 - Correlación de Pearson

$$\text{Formula} \Rightarrow r = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sqrt{\sum (x_i - \bar{x})^2 \sum (y_i - \bar{y})^2}}$$

$$\text{Promedios: } \bar{x} = 7.1 \quad \bar{y} = 7.5$$

$$(x_i - \bar{x}) = -2.1, 0.9, -3.1, 2.9, -0.1, 1.9$$

$$(y_i - \bar{y}) = -0.5, 0.5, -1.5, 1.5, -0.5, 0.5$$

$$(x_i - \bar{x})(y_i - \bar{y}) = 1.05, 0.45, 4.65, 4.35, 0.05, 0.95$$
$$\sum = 11.5$$

$$(x_i - \bar{x})^2 = 4.41, 0.81, 9.61, 8.41, 0.01, 3.61 = 26.86$$

$$(y_i - \bar{y})^2 = 0.25, 0.25, 2.25, 2.25, 0.25, 0.25 = 5.5$$

$$\sum x \quad \sum y = 147.73 = 12.15$$

$$r = \frac{11.5}{12.15} = 0.941 \quad \frac{11.5}{0.94} = 12.23$$

Contexto: conforme se implementa más capacitación al empleado este aumenta la satisfacción a nuestros clientes siendo así de esta relación una correlación fuerte. (ambas variables aumentan a su vez).

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Problema 2 - Correlación de Pearson

Promedios = $\bar{x} = 12.5$ $\bar{y} = 220.83$

| $(x_i - \bar{x})$ | $(y_i - \bar{y})$ | $(x_i - \bar{x})(y_i - \bar{y})$ | $(x_i - \bar{x})^2$ | $(y_i - \bar{y})^2$ |
|-------------------|-------------------|----------------------------------|---------------------|---------------------|
| -2.5 | -20.83 | 52.075 | 6.25 | 433.88 |
| -0.5 | -0.83 | 0.415 | 0.25 | 0.6889 |
| -1.5 | -5.83 | 8.745 | 2.25 | 33.9889 |
| 1.5 | 9.17 | 13.755 | 2.25 | 84.0889 |
| 0.5 | 4.17 | 2.085 | 0.25 | 17.3889 |
| 2.5 | 141.17 | 35.425 | 6.25 | 200.1889 |
| | | $\Sigma 112.5$ | $\Sigma 17.5$ | $\Sigma 770.78$ |

$$\Sigma x \Sigma y = 13.4480.65 = 115.96$$

$$r = \frac{112.5}{115.96} = 0.97 \qquad \frac{112.5}{0.97} = 115.96$$

Contexto = conforme se contratan más empleados a su vez aumenta la producción obteniendo así una relación positiva de Correlación fuerte.

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Problema 3 - Chi cuadrado.

$$\chi^2 = \sum (O_i - E_i)^2 \quad E = \frac{\text{Tot. F.} \times \text{Tot. Colm.}}{\text{Tot. Gen.}}$$

V - Presencial

$$E_1 = \frac{(25)(33)}{70} = \frac{825}{70} = 11.78$$

V - Lineal

$$E_2 = \frac{(25)(37)}{70} = \frac{925}{70} = 13.21$$

P - Presencial

$$E_3 = \frac{(20)(33)}{70} = \frac{660}{70} = 9.42$$

P - Lineal

$$E_4 = \frac{(20)(37)}{70} = \frac{740}{70} = 10.57$$

A - Presencial

$$E_5 = \frac{(25)(33)}{70} = \frac{825}{70} = 11.78$$

A - Lineal

$$E_6 = \frac{(25)(37)}{70} = \frac{925}{70} = 13.21$$

$$\chi^2 = \frac{2.55}{5.991} = 0.42$$

$$15 - 11.78 = 3.22^2 = 10.36 / 11.78 = 0.87$$

$$8 - 9.42 = (-1.42)^2 = 2.01 / 9.42 = 0.21$$

$$10 - 11.78 = (-1.78)^2 = 3.16 / 11.78 = 0.26$$

$$10 - 13.21 = (-3.21)^2 = 10.30 / 13.21 = 0.78$$

$$12 - 10.57 = 1.43^2 = 2.04 / 10.57 = 0.19$$

$$15 - 13.21 = 1.79^2 = 3.20 / 13.21 = 0.24$$

$$\alpha = 0.05 \quad \chi^2 = 2.55$$

Grad de Lib = Fila 1 = 3 - 1 = 2 Column 1 = 2 - 1 = 1

$$2 \times 1 = 2$$

$$\chi^2 = 5.991 \leftarrow \text{valor critico}$$

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Problema 4 - Chi cuadrado

| Inc. | Satis. | Ins. |
|---------------------|---------|--------------|
| Economico. | 20 = 15 | 5 = 10 = 25 |
| Tiempo L. | 10 = 15 | 15 = 10 = 25 |
| Σ Satisfecho | 30 | 20 = 50 |

$$\frac{(25)(30)}{50} = 15$$

$$\frac{(25)(20)}{50} = 10$$

$$\frac{(25)(20)}{50} = 10$$

$$\frac{(25)(10)}{50} = 5$$

$$\chi^2 = \frac{8.2}{3.841} = 2.13$$

$$20 - 15 = 5^2 = 25 / 15 = 1.6$$

$$5 - 10 = (-5)^2 = 25 / 15 = 1.6$$

$$10 - 15 = (-5)^2 = 25 / 15 = 1.6$$

$$15 - 10 = 5^2 = 25 / 15 = 1.6$$

$$\chi^2 = 8.2$$

$$\alpha = 0.05$$

$$\text{Grad de Lib} = 2 - 1 = 1 \quad 2 - 1 = 1 \quad |X| = 1$$

$$\chi = 3.841 = \text{v. Crit.}$$

Citlally Alejandra M.R.

Problema Plataforma

| | | |
|-----|-----|-----|
| DÍA | MES | AÑO |
| | | |

Problema 5 - Regresión - Lineal

$$\hat{y} = B_0 + B_1 x \quad B_1 = \frac{\sum (x_i - \bar{x})(y_i - \bar{y})}{\sum (x_i - \bar{x})^2}$$

$$\bar{x} = 7.1 \quad \bar{y} = 7.5$$

$$B_0 = \bar{y} - B_1 \bar{x}$$

| x | y | $(x_i - \bar{x})$ | $(y_i - \bar{y})$ | $(x_i - \bar{x})(y_i - \bar{y})$ | $(x_i - \bar{x})^2$ | $(y_i - \bar{y})^2$ |
|----|---|-------------------|-------------------|----------------------------------|---------------------|---------------------|
| 5 | 7 | -2.1 | -0.5 | 1.05 | 4.41 | 0.25 |
| 8 | 8 | 0.9 | -0.5 | 0.45 | 0.81 | 0.25 |
| 4 | 6 | -3.1 | -1.5 | 4.65 | 9.61 | 2.25 |
| 10 | 9 | 1.9 | 1.5 | 4.35 | 3.61 | 0.25 |
| 7 | 7 | -0.1 | -0.5 | 0.05 | 0.01 | 0.25 |
| 9 | 8 | 1.9 | -0.5 | 0.95 | 3.61 | 0.25 |
| | | Σ | | 11.5 | 26.86 | 5.5 |

$$B_1 = \frac{11.5}{26.86} = 0.4281$$

$$R^2 = 1 - \frac{0.56}{5.5}$$

$$B_0 = 7.5 - (0.4281)(7.1)$$

$$B_0 = 7.5 - 3.03 = 4.47$$

$$\hat{y} = 4.47 + 0.4281x$$

$$R^2 = 1 - 0.10$$

$$R^2 = 0.9$$

| x | y | \hat{y}_i | $y_i - \hat{y}_i$ | $(y_i - \hat{y}_i)^2$ |
|----|---|-------------|-------------------|-----------------------|
| 5 | 7 | 6.61 | 0.39 | 0.15 |
| 8 | 8 | 7.84 | 0.11 | 0.01 |
| 4 | 6 | 6.18 | -0.18 | 0.03 |
| 10 | 9 | 8.75 | 0.25 | 0.06 |
| 7 | 7 | 9.46 | -0.46 | 0.21 |
| 9 | 8 | 8.32 | -0.32 | 0.10 |
| | | Σ | | 0.56 |

Relación Positiva.

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Problema 6 - Relación Lineal

| X | y | $(x_i - \bar{x})$ | $(y_i - \bar{y})$ | $(x_i - \bar{x})(y_i - \bar{y})$ | $(x_i - \bar{x})^2$ | $(y_i - \bar{y})^2$ |
|----|-----|-------------------|-------------------|----------------------------------|---------------------|---------------------|
| 10 | 200 | -2.5 | -20.83 | 52.075 | 6.25 | 433.89 |
| 12 | 220 | -0.5 | -0.83 | 0.415 | 0.25 | 0.6889 |
| 11 | 215 | -1.5 | -5.83 | 8.745 | 2.25 | 33.98 |
| 14 | 230 | 1.5 | 9.17 | 13.755 | 2.25 | 84.08 |
| 13 | 225 | 0.5 | 4.17 | 2.085 | 0.25 | 17.38 |
| 15 | 235 | 2.5 | 14.17 | 35.425 | 6.25 | 200.78 |

$$\bar{x} = 12.5 \quad \bar{y} = 220.83$$

$$B_0 = 220.83 - (6.4314)(12.5)$$

$$B_0 = 220.83 - 80.3925 = 140.4375$$

$$\hat{y} = 140.4375 + 6.4314X$$

| x | y | \hat{y}_i | $y_i - \hat{y}_i$ | $(y_i - \hat{y}_i)^2$ |
|----|-----|-------------|-------------------|-----------------------|
| 10 | 200 | 204.75 | -4.75 | 22.57 |
| 12 | 220 | 217.6143 | 2.3857 | 5.69 |
| 11 | 215 | 211.829 | 3.8171 | 14.57 |
| 14 | 230 | 230.4771 | 0.22 | |
| 13 | 225 | 224.0457 | 0.9543 | 0.91 |
| 15 | 235 | 236.9085 | -1.9085 | 3.64 |

$$S_e = 47.6$$

$$R^2 = 1 - \frac{47.6}{770.98}$$

$$R^2 = 1 - 0.06$$

$$R^2 = 0.94$$

Relación Positiva