

Probabilidad.

1) Espacio muestral. Todos los posibles resultados de un exp.

(a) Lanzar una moneda

$$\Omega = \{\text{águila}, \text{sol}\}$$

(b) Lanzar dos monedas

$$\Omega_1 = \{(a,a), (a,s), (s,a), (s,s)\}$$

$$\Omega_2 = \{(a,a), (a,s), (s,s)\}$$

$$P(a,a) = \frac{1}{4}, \quad P(a,s) = \frac{1}{4}$$

$$P(s,a) = \frac{1}{4}, \quad P(s,s) = \frac{1}{4}$$

$$P(a,a) = \frac{1}{3}, \quad P(a,s) = \frac{1}{3}, \quad P(s,a) = \frac{1}{3}$$

(c) Lanzar un dado

$$\Omega = \{1, 2, 3, 4, 5, 6\}$$

2) Conjunto especial denominado σ -álgebra

$$\mathcal{F} = \{\emptyset, \{\text{águila}, \text{sol}\}, \{\text{águila}\}, \{\text{sol}\}\}$$

3) Función de probabilidad (medida de probabilidad)

$$P(\{\text{águila}\}) = 1/2, \quad P(\{\text{sol}\}) = 1/2 \quad \underset{\lambda}{P}: \mathcal{F} \rightarrow [0, 1]$$

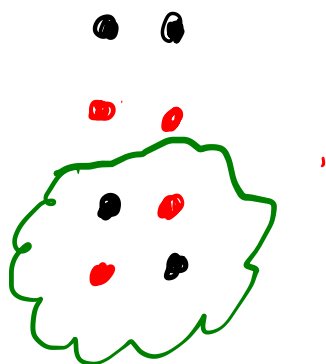
$$P(\{\text{vertical}\}) = P(\emptyset) = 0$$

$$P(\{\text{águila}\} \cup \{\text{sol}\}) = P(\{\text{águila}, \text{sol}\}) = 1$$

Ejemplo. $\Omega = \{1, 2, 3, 4, 5, 6\}$ $\downarrow \{4, 5, 6\}$

$$\mathcal{F} = \{\emptyset, \Omega, \{1\}, \dots, \{6\}, \{1, 3\}, \dots, \{5, 6\}, \dots\}$$

$$P(\{\text{resultado sea mayor o igual que 4}\}) = P(\{4, 5, 6\}) = P(\{4\}) + P(\{5\}) + P(\{6\}) \\ = \frac{1}{6} + \frac{1}{6} + \frac{1}{6} = \frac{3}{6} = \frac{1}{2}$$



Estadísticos descriptivos

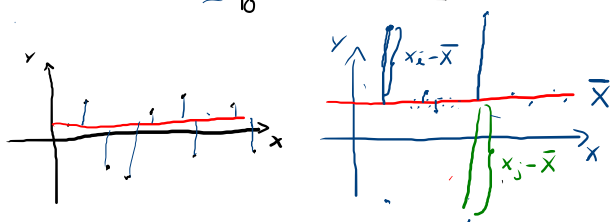
Considerar que tenemos un conjunto de datos

$$X = \{ \underbrace{1, 3, -4, -5.1}_{x_1, x_2, \dots}, \underbrace{6, 8}_{x_6, x_7}, \underbrace{20, -7.2, 14, -4}_{x_9, x_{10}} \}$$

1) Promedio o media

$$\bar{X} = \frac{1+3-4-5.1+6+8+20-7.2+14-4}{10} = 3.17$$

2) Varianza



$$S^2 = \sigma^2 = \frac{1}{n} \sum_{i=1}^n (x_i - \bar{X})^2 \quad \text{si } S^2 = 0, \text{ ent. } x_i = \bar{X}$$

3) Desviación estándar

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

4) Mediana (ordenar nuestros datos)

$$\begin{aligned} \text{mediana} &= \frac{1+3}{2} = 2 & \{-7.2, -5.1, -4, -4, \underbrace{1, 3}_{(1,3)}, 6, 8, 14, 20\} & n=10 \\ \text{mediana} &= 1 & \{-7.2, -5.1, -4, -4, \underbrace{1}_{(1)}, 3, 6, 8, 14\} & n=9 \end{aligned}$$

$$5) \{1, 2, 3\} \quad \bar{X} = 2$$

$$\text{mediana} = 2$$

$$\{1, \underbrace{2, 3}_{(2.5)}, 1000\} \quad \begin{aligned} \text{mediana} &= 2.5 \\ \bar{X} &= \frac{1+2+3+1000}{4} = \underbrace{251}_{(251)} \end{aligned}$$

6) Rango = máximo - mínimo

7) Percentiles

a) Calcular el percentil 0.1 o el percentil 10%

$$\{-7.2, -5.1, -4, -4, \underbrace{1, 3}_{2, 3}, 6, 8, 14, 20\} \quad n=10$$

$$P_{0.1} = -7.2$$

$$P_{0.25} = \frac{(-5.1 - 4)}{2} = -4$$

8) moda = -4

Obs. Varianza

$$\sigma^2 = \frac{1}{n} \sum_{i=1}^n (x_i - \bar{X})^2, \quad \sigma^2 = \frac{1}{n-1} \sum_{i=1}^n (x_i - \bar{X})^2$$

\uparrow $E[X]$ \uparrow

