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Norma

Acros Somano Victor Ghalieb 14/11/2022 Section A Session #6 FMID Método corto de la varianza Conocernos nuestras expresiones para varianza: $5^2 = \frac{\sum (x - \bar{x})^2}{N-1} \quad \text{y} \quad \sigma^2 = \frac{\sum (x - \bar{x})^2}{N} \quad ,$ pero tambien sabemos que: $\overline{x} = \frac{z_{00}}{n}$. Notemos, de manera inicial, que dentro del numerador de las varianzas tenemos un binamio clevado al cuadrado. Podemos enfacarnos en este, y expandirlo $\Sigma (x-\overline{x})^2 = \Sigma (x^2 - 2x\overline{x} + \overline{x}^2) \leftarrow distributions'' \Sigma''$ $= \sum (x^2) - 2\sum (x \cdot \bar{x}) + \sum (\bar{x}^2) \leq \text{sustitutions} \quad \bar{x} = \frac{\sum (x)}{n}$ $= \sum_{(x^2)} - 2 \left[\sum_{(x)} \cdot \frac{\sum_{(x)}}{n} \right] + \sum_{(x)} \left[\frac{\sum_{(x)}}{n} \right]$ $\overrightarrow{q \cdot q} = \overrightarrow{q^2}$ $\overrightarrow{x \cdot a} = x \cdot 1 \cdot \overrightarrow{q}$; $x \cdot \frac{\overrightarrow{q}}{n} = x \cdot \frac{1}{n} \cdot \overrightarrow{q}$ $= \sum_{n} (x^{2}) - 2 \frac{\left[\sum(x)\right]^{2}}{n} + \sum_{n} \left[\left(\frac{1}{N^{2}}\right)\right] \cdot \left[\sum(x)\right]^{2}$ $= \sum_{n} (1) = n ; \sum_{n} \left(\frac{1}{N^{2}}\right) = \sum_{n} \left[1 \cdot \frac{1}{N^{2}}\right] = \sum_{n} (1) \cdot \sum_{n} \left(\frac{1}{N^{2}}\right)$ $= \sum_{n} (x^2) - 2 \frac{\left[\sum_{n} (x)\right]^2}{n} + \frac{n}{n^2} (\sum_{n} x)^2$ $= \sum (x^2) - 2 \frac{(\sum x)^2}{N} + \frac{(\sum x)^2}{N}$ 4x 9 x 4 $= \sum (x^2) - \frac{(\sum x)^2}{N} = \frac{1}{N} (N \sum (x^2) - (\sum x)^2)$ Numerador. Una vez analizado el numerador, hemos conseguido expresculo unicamente en términos de n, $\Sigma(x^2)$ y $\Sigma(x)$. Si insertamos esta nueva expresión dentro de nuestras fórmulas de varianza, tenemos: $5^{2} = \frac{1}{N} \cdot \frac{N\Sigma(x^{2}) - (\Sigma x)^{2}}{N}$ $\sigma^{2} = \frac{1}{N} \cdot \frac{N\Sigma(x^{2}) - (\Sigma x)^{2}}{N}$ Distribuimos in, separamos fracciones y obtenemos: $S^{2} = \frac{n \Sigma(x^{2})}{n(n-1)} - \frac{(\Sigma x)^{2}}{n(n-1)}$ $\sigma^{2} = \frac{n \Sigma(x^{2})}{N^{2}} - \frac{(\Sigma x)^{2}}{N^{2}}$ $S^{2} = \frac{\Sigma(x^{2})}{N-1} - \frac{(\Sigma x)^{2}}{N^{2}-N} \qquad \qquad S^{2} = \frac{\Sigma(x^{2})}{N} - \left(\frac{\Sigma x}{N}\right)^{2}$ $\sigma^2 = \frac{\Sigma(x^2)}{\sqrt{x^2}} - \frac{x^2}{x^2}$ $S^2 = \frac{\sum x^2}{N-1} - \frac{\sum^2 x}{N^2-N} = O^2 - \frac{\sum x^2}{N} - \frac{\sum^2 x}{N}$

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