Teaching Style

What do you think is my Teaching Style?

pangacademy@gmail.com

A Journey Together

Where are we in our evolution?

AP's learning style

Learning by doing

If there is only one thing you can get out of the class, it will be your familiarity with using Pandas in Jupyter Notebook environment

-Alex Pang 2019

AP's learning style

Lots of CheatSheets and
online materials suggestions

The best teacher is the one that does not teach by himself or herself

\- Alex Pang 2019

AP’s learning style

A critical mind is more important than just knowing mechanics

Ask the right question: Who pay more tips? Is there any bias? Why the mean or median is not good enough? Does the result change if we just focus on a subsets of the data?
Is there another underlying hidden factor?

AP's learning style

Intuition and Understanding is more important than detail formula and API calls

If you can't explain in simple English terms, you don't understand it

- Alex Pang 2019

Examples of Intuitions

The height distribution taken from Computer Science class in Queen College will have a mean ____ (higher or lower) than the whole college and a __________ (positive/zero/negative) skews

The height distribution taken from the basketball Team in Queen College will have a mean ____ (higher or lower) than the whole college and a __________ (positive/zero/negative) skews

The height distribution taken from Computer Science class in Queen College will have a mean ____ (higher or lower) than the whole college and __________ (positive/zero/negative) skews if we know many are also in the basketball Team

The skewness of a random variable X is the third standardized moment γ_1, defined as:[4][5]

$$\gamma_1 = \mathrm{E}\left[\left(\frac{X-\mu}{\sigma}\right)^3\right] = \frac{\mu_3}{\sigma^3} = \frac{\mathrm{E}\left[(X-\mu)^3\right]}{\left(\mathrm{E}\left[(X-\mu)^2\right]\right)^{3/2}} = \frac{\kappa_3}{\kappa_2^{3/2}}$$

If σ is finite, μ is finite too and skewness can be expressed

$$\begin{aligned}\gamma_1 &= \mathrm{E}\left[\left(\frac{X-\mu}{\sigma}\right)^3\right]\\ &= \frac{\mathrm{E}[X^3] - 3\mu\,\mathrm{E}[X^2] + 3\mu^2\,\mathrm{E}[X] - \mu^3}{\sigma^3}\\ &= \frac{\mathrm{E}[X^3] - 3\mu(\mathrm{E}[X^2] - \mu\,\mathrm{E}[X]) - \mu^3}{\sigma^3}\\ &= \frac{\mathrm{E}[X^3] - 3\mu\sigma^2 - \mu^3}{\sigma^3}.\end{aligned}$$

Examples of Intuitions

Comparing the Graduation Rate distribution with the height distribution of the Queens College students, the Graduation Rate should have a ________ (higher/same/lower) Kurtosis

The kurtosis is the fourth standardized moment, defined as

$$\operatorname{Kurt}[X] = \operatorname{E}\left[\left(\frac{X-\mu}{\sigma}\right)^4\right] = \frac{\mu_4}{\sigma^4} = \frac{\operatorname{E}[(X-\mu)^4]}{(\operatorname{E}[(X-\mu)^2])^2},$$

The household income distribution of a gated community should have a ________ (higher/same/lower) standard deviation than a random sample of the whole population

The kurtosis is bounded b

$$\frac{\mu_4}{\sigma^4} \geq \left(\frac{\mu_3}{\sigma^3}\right)^2 + 1,$$