

# Thoughts of Statistics

Looking back upon those great minds...

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# Outline

1. Target – What's statistics?
2. History – How was Stat. evolving?
3. Innovation – Where to start?

# I. Target

- ◆ Collection, classification, analysis, and interpretation of numerical *facts* of data

"Encyclopedia of American History"

- ◆ Essential: Data / Sample v.s. Population →  
Uncertainty
  - C. R. Rao's book
  - Chebyshev inequality
- ◆ Regression, sampling survey, time series, etc...

# i. Target (cont')

- ◆ Descriptive

- Does there exist so-called descriptive statistics?
- Figures

- ◆ Inferential

- Where are the theoretical bases?
- Why normal distribution? CLT, ...

- ◆ Exploratory

- How? DM...

## 2. History

- ◆ Let's examine some cases to grasp the routine of the evolution of thoughts
  - Time and Space: From cross-section / time series to *longitudinal* data / *spatial* statistics
  - GLM/Logistic regression: From discrete points to *continuous* probabilities
  - Quantile regression: From mean to *quantiles*
  - Permutation test / Bootstrap / Jackknife / Cross-validation : From sample to "*sample's sample*"
  - ARCH/GARCH: From homoscedasticity to *heteroskedasticity*

## 2. History (cont')

- ◆ Neyman v.s. Fisher v.s. Bayes
  - Frequentist v.s. Fiducial v.s. Bayesian
  - What does  $P\{L < \theta < U\} = 1 - \alpha$  mean?

# 3. Innovation

- ◆ Another side
  - Bootstrap & Sampling: with replace or not?
- ◆ Combination
  - Bootstrap & Jackknife: JAB
  - Path analysis & Factor analysis: SEM
  - Parametric & Nonparametric: Semiparametric, Local Polynomial Modelling
- ◆ Genius
  - Kaplan-Meier

# Thanks!

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