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?
1. 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...
1. 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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