Seminar on Resampling Methods

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Seminar kick-off meeting:

- **First** week of the (upcoming) semester (exact time and date will be announced later; in agreement with participants)

Meeting to assign seminar topics to participants:

- **Second** week of the semester (exact time and date will be announced later; in agreement with participants)

Seminar presentations:

- Block seminar **at the end** of the semester (exact time and date in agreement with participants)
What are resampling methods?

Resampling (Statistics) (engl. Wikipedia):

In statistics, resampling is any of a variety of methods for doing one of the following:

1.) Estimating the precision of sample statistics (medians, variances, percentiles) by using subsets of available data (jackknifing, subsampling) or drawing randomly with replacement from a set of data points (bootstrapping)

2.) Exchanging labels on data points when performing significance tests (permutation tests, randomization tests, or re-randomization tests)

3.) Validating models by using random subsets (bootstrapping, cross validation)

Universal technique(s) to approach various tasks:

- statistical inference (in general), confidence intervals, testing, model selection, variable selection, tuning parameter selection, prediction, etc.
Possible topics

Modern statistical methodology using resampling methods in different contexts:

- resampling for big data
- resampling for causal inference
- multiplier / dependent wild bootstrapping
- subsampling
- frequency domain bootstrapping
- resampling / bootstrapping for prediction
- bootstrapping empirical processes
- bootstrapping with (lasso) penalization
- bootstrapping for functional data
- Bayesian bootstrap
- ...
Introductory reading

- Davison & Hinkley (1997). Bootstrap Methods and Their Applications
- Dikta & Scheer (2021). Bootstrap Methods: With Applications in R.
- Shao & Tu (1993). The Jackknife and Bootstrap.
Requirements to pass the seminar

Bachelor:
- presentation (30 minutes)
- seminar paper (10 pages)
- active participation in discussions, feedback

Master:
- presentation (45 minutes)
- seminar paper (10 pages)
- active participation in discussions, feedback
Registration

Binding enrollment for the seminar via email to:

jentsch@statistik.tu-dortmund.de

till

March 27, 2022