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Harnessing the recondite role of randomization in today's scientific, engineering, and industrial world

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Randomized experiment is a quintessential methodology in science, engineering, business and industry for assessing causal effects of interventions on outcomes. Randomization tests, conceived by Fisher, are useful tools to analyze data obtained from such experiments because they assess the statistical significance of estimated treatment effects without making any assumptions about the underlying distribution of the data. Other attractive features of randomization tests include flexibility in the choice of test statistic and adaptability to experiments with complex randomization schemes and non-standard (e.g., ordinal) data. In the past, these tests' major drawback was their possibly prohibitive computational requirements. Modern computing resources make randomization tests pragmatic, useful tools driven primarily by intuition. In this talk we will discuss a principled approach to conducting randomization-based inference in a wide array of industrial and engineering settings and demonstrate their advantage using examples. We will also briefly argue that randomization tests are natural and effective tools for data fusion, that is, combining results from an ensemble of similar or dissimilar experiments. Finally, if time permits, we will also discuss how this knowledge can be easily communicated to students and practitioners and mention some available computing resources.

Keywords

Randomized experiments, randomization tests, data fusion

Special/invited session

Keynote speaker

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