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# Contributed Talks

## Efficiency and cost optimization in surveys via haphazard sampling

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Exploratory surveys with face-to-face interviews based on random or stratified sampling usually demand high sample sizes, and therefore, high infrastructure and staff costs. Even then, these experiments do not guarantee control of specific covariates, and may yield wrong inferences about parameters of the model. Our research group [1,2] has proposed the Haphazard Intentional Sampling Method, an allocation procedure that combines goal optimization techniques with random perturbations. The weight of the random perturbation can be calibrated in such a way that, on one hand, it is small enough to provide good representative samples and, on the other hand, it is large enough to break confounding effects and to avoid biased choices. In previous works, we compared the Haphazard Method with the Rerandomization method proposed by Morgan and Rubin [3] in benchmark allocation problems, and showed that the Haphazard Method provides allocation groups with a better balance and consistently more powerful inferences. In this work, we discuss advantages of the Haphazard Method in the context of census sampling, where the inference goal is to provide interval estimates for parameters of interest. We introduce a case study to estimate SARS-CoV-2 prevalence in main municipalities in Brazil. In comparison with rerandomization and single random allocation, samples yielded by the Haphazard method provide smaller and more consistent interval estimates for a given sample size. Interval size is the official goal set for studying the evolution of COVID-19 infection prevalence in Brasil. Therefore, the use of Haphazard Sampling has a great potential to contribute in the efforts to measure and control the spread of COVID-19 pandemy in Brazil.

### References:

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