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Simplifying experimental design generation for real-world challenges

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In today's fast-paced industrial landscape, the need for faster and more cost-effective research and development cycles is paramount. As experiments grow increasingly complex, with more factors to optimize, tighter budgetary and time constraints, and limited resources, the challenges faced by industry professionals are more pressing than ever before.

Although the optimal design of experiments framework allows to tailor a design as close as possible to the problem at hand, it still requires deep knowledge about statistical concepts and terminology. For instance, when considering hard-to-change factors, one must be familiar with split-plot designs and decide on the number of whole plots and total number of runs. This technicality, in combination with the observation that, most often, researchers or engineers rather than statisticians construct the experimental plans, is one of the causes for the low adoption rate or bad configuration of the most performant types of experimental designs.

Can we make design of experiments more accessible to engineers? What if we tailor the design generation to the actual description of the experimental constraints in engineering terms? Imagine an algorithm where engineers define the cost of each test and the transition time between tests, all in their preferred units. This algorithm would automatically determine the tests to be performed, the optimal ordering and number of runs, regardless of the budgetary constraints. Engineers could spend less time setting up experiments and focus more on extracting valuable insights.

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