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Matching on-the-fly in Sequential Experiments for Higher Power and Efficiency

Adam Kapelner, Abba Krieger

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We propose a dynamic allocation procedure that increases power and efficiency when measuring an average treatment effect in sequential randomized trials. Subjects arrive iteratively and are either randomized or paired via a matching criterion to a previously randomized subject and administered the alternate treatment. We develop estimators for the average treatment effect that combine information from both the matched pairs and unmatched subjects as well as an exact test. Simulations illustrate the method's higher efficiency and power over competing allocation procedures in both controlled scenarios and historical experimental data.

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