

Designing experiments via bandit algorithms: modeling considerations for better outcomes

A seminar by Nina Deliu

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Room Benvenuti
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The multi-armed bandit (MAB) framework holds great promise for de-signing adaptive experiments with outcomes and resource (e.g., cost, time, or sample size) benefits. For example, it can result in better participant out-comes and improved statistical power at the end of a trial. However, due to mathematical and computational aspects, most MAB variants have been developed and are implemented under binary or normal outcome models.

In this talk, guided by three case studies we have designed, I will illustrate how traditional statistics can be integrated within this framework to enhance its potential. Specifically, I will focus on possibly the most popular MAB algorithm, Thompson sampling, and on two types of outcomes: (i) rating scales, increasingly common in recommendation systems, digital health and education, and (ii) zero-inflated data, characterizing mobile health experi-ments. Theoretical properties and empirical advantages in terms of balancing exploitation (outcome performance) and exploration (learning performance) will be presented. Further considerations will be provided in the unique and challenging case of small samples.



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