

Designing Experiments on Networks – a review.

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Abstract

Much work exists (within the COSTNET community and elsewhere) on analysis of network data; often we wish to infer the influence of some network on some response we measure.

However, in this talk we consider designing experiments on experimental units linked by some intrinsic network structure, in order to get maximum information about our interventions (treatments).

Networks in experiments may be obvious, or less so, and might correspond to:

- social networks- for example we may give an advert to users connected by a social network, and try to infer the effectiveness (for example in A/B testing);
- spatial networks- for example in agricultural experiments, we may apply a treatment to one plot of wheat, and the effect of the treatment spreads to the adjacent experimental unit;
- temporal networks- we can even incorporate temporal elements into the definition, for example in a crossover experiment, a drug administered at a particular time might still have an effect afterwards.

In this talk, we briefly review some of the work we, and others, have done on experiments on networks, and talk about the vital importance of including the network structure in our model where it exists. We show that by not taking into account network structure, we can design experiments which have very low efficiency and/or produce biased results, and provide some guidelines for performing robust experiments on networked data.