Identifying Outbreak Source on a Network with Limited Information

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Abstract

We compare the relative success of multiple approaches to identifying the source of a simulated series of outbreaks on a real-world network when information is severely limited. The source data for the network is based on wifi co-location data for approximately 100k individuals resulting in a mean contact degree of roughly 12.

The performance of these approaches is subject to several constraints that challenge in real-world investigations: the structure of the network is not directly available, the infection parameters are initially unknown, cases go largely unreported – *e.g.*, because they are misidentified, there is little public health infrastructure, or the disease is typically asymptomatic – and active investigation results are highly time-sensitive. These constraints would make some traditional network analysis based approaches unteneable.