Spy vs. Spy: Anonymous Messing over Networks

Abstract: Anonymous microblogging platforms, such as Whisper, Yik Yak, and Secret have emerged as important tools for sharing one’s thoughts without fear of judgment by friends, the public, or authorities. These platforms provide anonymity by allowing users to share content (e.g., short messages) with their peers without revealing authorship information to other users. However, recent advances in rumor source detection show that existing messaging protocols, including those used in the mentioned anonymous microblogging applications, leak authorship information when the adversary has global access to metadata. For example, if an adversary can see which users of a messaging service received a particular message, or the timestamps at which a subset of users received a given message, the adversary can infer the message author’s identity with high probability. We introduce a novel anonymous messaging protocol, which we call adaptive diffusion, that is designed to resist such adversaries. We show that adaptive diffusion spreads messages quickly while achieving provably-optimal anonymity guarantees for specific classes of connectivity networks. Simulations on real social network data show that adaptive diffusion effectively hides the location of the source on real-world networks.

This is a joint interview with ECE.

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