Maximizing monotone submodular functions under noise

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Abstract

There has been a great deal of work on submodular optimization under various constraints. However, in some applications we do not have access to the submodular function, but are given a noisy signal of the value, or the original function is only approximately submodular. In this talk I will explain the similarities and differences between the two problems, discuss the robustness of the greedy algorithm, and propose more resilient algorithms. I will focus on maximizing a submodular function under a cardinality constraint, and show that for noise evaluation we can usually get to a (1 - 1/e) approximation ratio. For approximately submodular functions (with some approximation definition) we have an optimal algorithm, and we show that little can be done when the noise is adversarial.

Based on joint works with Yaron Singer