Connecting the Dots: Probabilistic Foundations

Abstract

In almost all public and private sectors, being able to draw conclusions and make connections from data is an invaluable asset. Probabilistic methods can allow analysts with the proper amount of information to “connect the dots”, or make connections between entities that may not appear to be related at first glance. While applications of these techniques are far ranging, one of its most important uses is helping intelligence analysts find links between individual criminals, terrorists, and the geographic or organizational junctures which connect them. However, with the introduction of modern era computing, there is now unprecedented amounts of data for analysts to sift through, making it difficult to make meaningful connections. By examining various computer algorithms and their effectiveness in “connecting the dots”, ideal candidates for an effective method can be found. We will compare different methods of evaluating ideal pathway candidates, interactions between graph size and entity relatedness, and syntactic versus non-syntactic storytelling. Though experimentation, we hope to narrow down the most effective characteristics for successful analytic algorithms, increasing the efficacy of information technology on numerous fronts.

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