

Let x be number of positive points and y be number of negative points. In our set of k -points we have some x and some y . ~~we can model this using~~ we can assign probabilities of finding positive and ~~neg~~ negative points in a query box ~~base~~ based on the set of its k -points. we can model this behaviour using a binomial distribution.

$$P(\text{Positive}) = \binom{k}{x} \cdot \phi_x^x \cdot (1 - \phi_x)^{k-x}$$

$$P(\text{Negative}) = \binom{k}{y} \cdot \phi_y^y \cdot (1 - \phi_y)^{k-y}$$

where k is the total number of k points, ϕ_x is probability of finding a positive point once and ϕ_y is ~~pos~~ negative.

But this model does not take in the distance between a k point and the query box. Let d be the distance. So, I used a ~~decay~~ decay