

Unigram Query Likelihood

$$\begin{aligned} p(q = \text{"presidential campaign"} | d = \text{... news of presidential campaign ... presidential candidate ...}) \\ = p(\text{"presidential"} | d) * p(\text{"campaign"} | d) \\ = \frac{c(\text{"presidential"}, d)}{|d|} * \frac{c(\text{"campaign"}, d)}{|d|} \end{aligned}$$

Assumption:

Each query word is generated independently