

Computation of Query Likelihood

Document
d1

**Text mining
paper**



Document LM

$p(w|d1)$

...
text 0.2
mining 0.1
association 0.01
clustering 0.02
...
food 0.00001
...

d2

**Food nutrition
paper**



$p(w|d2)$

...
food 0.25
nutrition 0.1
healthy 0.05
diet 0.02
...

Query q =

“data mining algorithms”

$$\begin{aligned} p(\text{“data mining alg”}|d1) \\ &= p(\text{“data”}|d1) \\ &\quad \times p(\text{“mining”}|d1) \\ &\quad \times p(\text{“alg”}|d1) \end{aligned}$$

$$\begin{aligned} p(\text{“data mining alg”}|d2) \\ &= p(\text{“data”}|d2) \\ &\quad \times p(\text{“mining”}|d2) \\ &\quad \times p(\text{“alg”}|d2) \end{aligned}$$