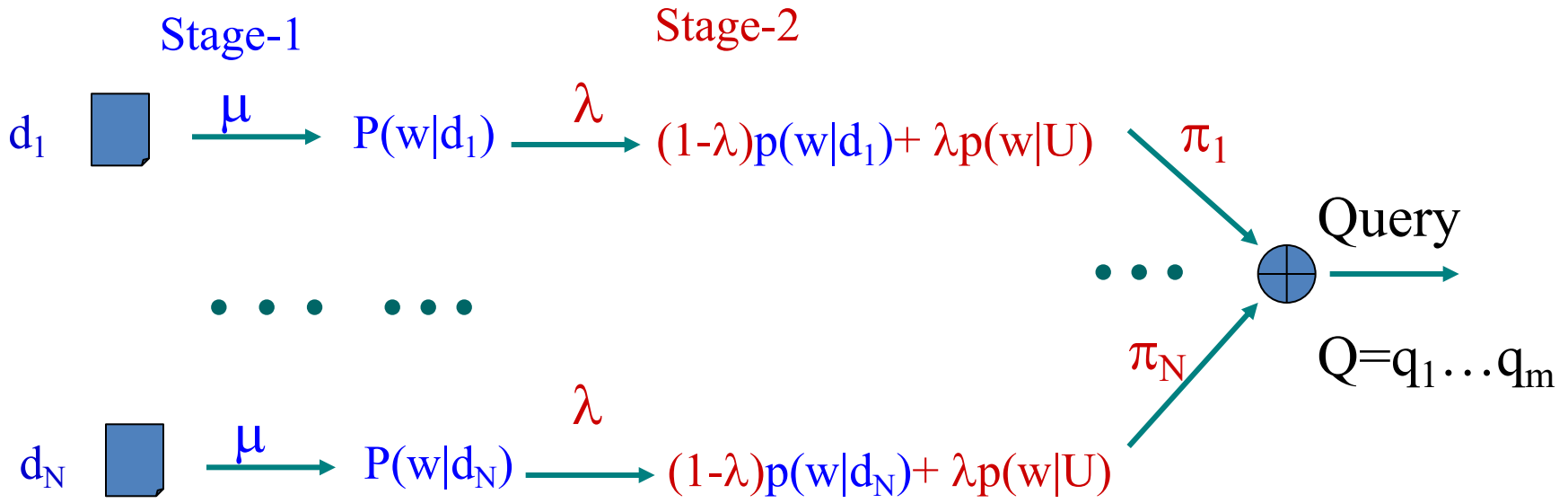
Estimating λ using Mixture Model

[Zhai & Lafferty 02]



$$p(Q \mid \lambda, U) = \sum_{i=1}^{N} \pi_i \prod_{j=1}^{m} ((1-\lambda)p(q_j \mid d_i) + \lambda p(q_j \mid U))$$

$$\hat{\lambda} = \underset{\lambda}{\text{argmax}}\ p(Q \mid \lambda, U)$$

Estimated in stage-1

$$p(q_j \mid d_i) = \frac{c(q_j, d_i) + \hat{\mu} p(q_j \mid C)}{|d_i| + \hat{\mu}}$$

Maximum Likelihood Estimator
Expectation-Maximization (EM) algorithm