Behavior of a Mixture Model

d = text the

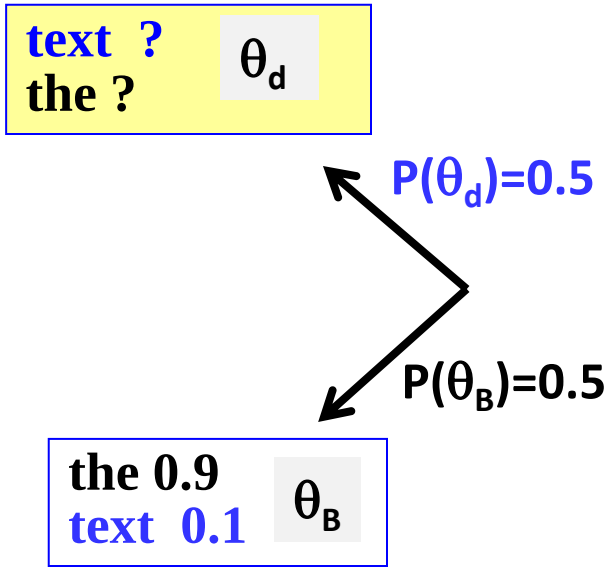
Likelihood:

$P(\text{“text”}) = p(\theta_d)p(\text{“text”}|\theta_d) + p(\theta_B)p(\text{“text”}|\theta_B)$
$= 0.5*p(\text{“text”}|\theta_d) + 0.5*0.1$

$P(\text{“the”}) = 0.5*p(\text{“the”}|\theta_d) + 0.5*0.9$

$p(d|\Lambda) = p(\text{“text”}|\Lambda)\, p(\text{“the”}|\Lambda)$

$= [0.5*p(\text{“text”}|\theta_d) + 0.5*0.1] \times [0.5*p(\text{“the”}|\theta_d) + 0.5*0.9]$



How can we set $p(\text{“text”}|\theta_d)$ & $p(\text{“text”}|\theta_d)$ to maximize it?

Note that $p(\text{“text”}|\theta_d) + p(\text{“the”}|\theta_d) = 1$