

BAYESIAN LOGISTIC REGRESSION (CH. 4.5)

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PRIOR
LIKELIHOOD

} POSTERIOR
L (NOT GAUSSIAN!)
 $y_n = \sigma(\underline{w}^T \underline{\phi}_n)$

→ LAPLACE-APPROXIMATION

L AT MAP SOLUTION

L COVARIANCE $\underline{\Sigma}_N = -\nabla \nabla \ln p(\underline{w} | \underline{t})$

$$q(\underline{w}) = \mathcal{N}(\underline{w} | \underline{w}_{\text{MAP}}, \underline{\Sigma}_N)$$

PREDICTIVE DISTRIBUTION (CH. 4.5.2)

$$p(c_1 | \underline{\phi}, \underline{t}) \approx \int \sigma(\underline{w}^T \underline{\phi}) q(\underline{w}) d\underline{w}$$

$$L \approx \sigma(k(\sigma_a^2) \mu_a)$$

$$k(\sigma^2) = (1 + \pi \sigma^2 / 8)^{-1/2}$$

$$\begin{array}{c} \uparrow \quad \uparrow \\ \text{var}[a] \quad \mathbb{E}[a] \\ \uparrow \quad \uparrow \\ a = \underline{w}^T \underline{\phi} \end{array}$$

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