

$$\bar{Q} \equiv \begin{bmatrix} p(w_1|w_1) \dots \\ \vdots \\ p(w_j|w_i) \end{bmatrix}$$

$$S \equiv \begin{bmatrix} p(w_1|w_1) \dots & p(y^{(l)}|w_1) \\ \vdots & \vdots \\ p(w_j|w_i) & p(y^{(l)}|w_i) \end{bmatrix}$$

New column(s) encoding
word-sentiment relationship

