# Bayes' Law

Bayes' law for conditional probabilities: $p(a|b) = \frac{p(b|a)p(a)}{p(b)}$

So in our case:

$$\hat{e}_1^{\hat{I}} = \underset{I, e_1^I}{\text{argmax}}\, p(e_1^I | f_1^J)$$

Apply Bayes' law

$$= \underset{I, e_1^I}{\text{argmax}}\, \frac{p(f_1^J | e_1^I) p(e_1^I)}{p(f_1^J)}$$

$p(f_1^J)$ constant

$$= \underset{I, e_1^I}{\text{argmax}}\, p(f_1^J | e_1^I) p(e_1^I)$$

$\Rightarrow$ irrelevant in maximization

Also called "Noisy Channel" model.