

$$s(d) = s(d, \text{spam}) - s(d, \text{ham})$$

$$s(d, \text{spam}) ?$$

After char gramming, for spam,

$$l_{\text{avg}}(\text{spam}) = \frac{5+11}{2}$$

$$l_{\text{avg}}(\text{ham}) = \frac{12+3}{2}$$

$$\text{Score}_{(\text{spam})} = \log\left(\frac{2}{2}\right) \cdot \frac{2(2 \cdot 1 + 1)}{2 + 1 \cdot 2(-0.75) + 0.75\left(\frac{5}{4}\right)}$$

$$= 0.983$$

$$\text{Score}_{(\text{ham})} = \log\left(\frac{2}{1}\right) \cdot \frac{1(1 \cdot 2 + 1)}{1 + 1 \cdot 2(0.25) + 0.75\left(\frac{10}{7.5}\right)}$$

$$= 0.956$$

$$s(d) = 0.983 - 0.956 = 0.027$$