

$$PMI(w, l) = \log \left(\frac{P(l|w)}{P(l)} \right)$$

brigand: *once* in l_7

$$PMI(\text{"brigand"}, l_1) = \log \left(\frac{0}{-1} \right) = -\infty$$

$$PMI(\text{"brigand"}, l_7) = \log \left(\frac{1}{0.1} \right) = \log(10)$$

	Label 1	Label 2
the	1	1
cat	1	0
hat	0	1

$$\text{PMI}(\text{the}, l_1) = \log \left(\frac{1/2}{1/2} \right) = \log(1) = 0$$

$$\text{PMI}(\text{cat}, l_1) = \log \left(\frac{1}{1/2} \right) = \log(2) = 1$$

$$\text{PMI}(\text{hat}, l_1) = \log \left(\frac{0}{1/2} \right) = \log(0) = -\infty$$

3.12 ColumbiaX: DS101X Statistical Thinking for Data Science and Analytics