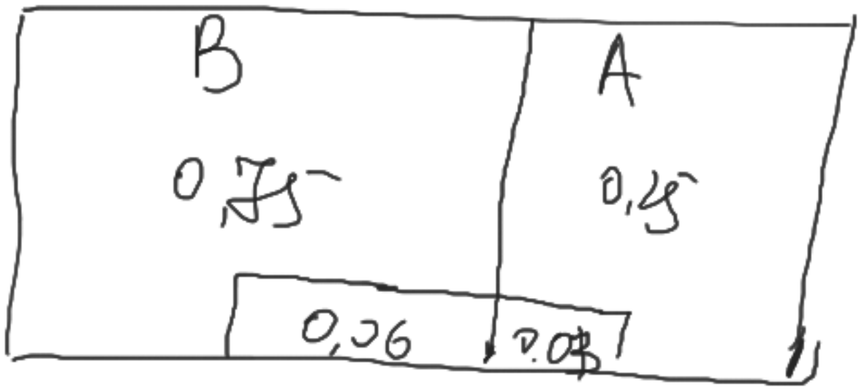

$P(A) = 0,25$

$P(B) = 0,75$

$P(d/B) = 0,06$

$P(d/A) = 0,03$

$P(d) = 0,06 \cdot 0,75 + 0,03 \cdot 0,25 = 0,0525$ $P(A/d) =$)

$$P(A/d) = \frac{P(d/A) \cdot P(A)}{P(d)} = \frac{0,03 \cdot 0,25}{0,0525} = 14\%$$

$P(S) = 0{,}27$

$P(\neg S) = 0{,}73$

$P("u"/S) = 0{,}46$

$P("u"/\neg S) = 0{,}19$

$P("u") = P("u"/S) \cdot P(S) + P("u"/\neg S) \cdot P(\neg S)$

$P(S/"u") = \frac{P(S \cap "u")}{P("u")} =$

$= \frac{P(S) \cdot P("u"/S)}{P("u"/S)\,P(S) + P("u"/\neg S) \cdot P(\neg S)} =$

$= 0{,}47 \simeq 47\%$

$P(\neg S/"u") = 52\%$ V: Non SPAM

$P(S \mid \text{"Winner"} \cap \text{"Urgent"})$

$P(S \mid w) = \frac{P(S \cap w)}{P(w)}$

$P(w \mid S) = \frac{P(S \cap w)}{P(S)}$

$P(S \mid \text{"Winner"}) = \frac{P(S) \cdot P(\text{"w"} \mid S)}{P(\text{"w"})}$

$P(w, u) = P(w) \cdot P(u)$ — "w" ∩ "u"

Prob ⇒ Prior

⇒ Posterior

$P(S \mid w \cap u) = \frac{P(S \cap w \cap u)}{P(w \cap u)} =$

$= \frac{P(S \cap w) \cdot P(u \mid S \cap w)}{P(w \cap u)}$

$P(S) \cdot P(w \mid S) \cdot P(u \mid S)$

$P(nS \mid w \cap u)$ $P(nS) \cdot P(w \mid nS) \cdot P(u \mid nS)$

→ urgent

$P(S)$

$P(\text{have} / \text{Spam})$

Text	Label
I have	SPAM
Winner	HAM
Hey! ..	SPAM
	SPAM
...	...

SPAM

have $\Rightarrow$ $\frac{\text{count}(\text{have})}{\text{count}(\text{all})}$

$P(\text{have} / \text{Spam}) = \frac{\text{count}(\text{have}) + \alpha}{\text{count}(\text{all}) + \alpha \cdot N_{\text{uniq}}}$

$\alpha = 1$: Nonnacy.

$\alpha > 1$: