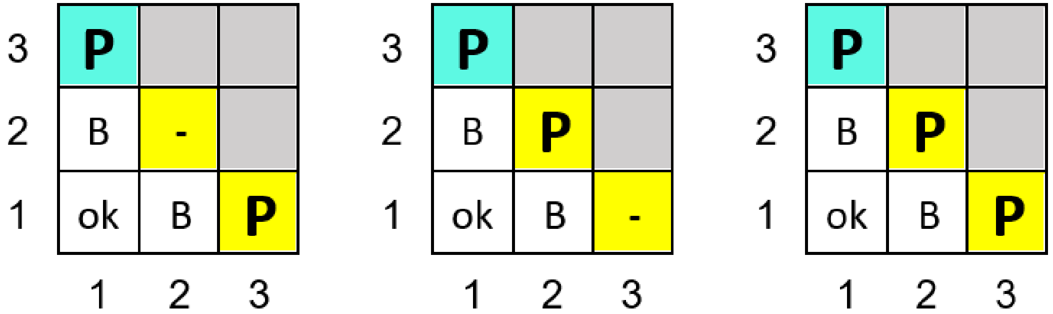
Bayes' Theorem: $\Pr(A \mid B) = \dfrac{\Pr(B \mid A)\Pr(A)}{\Pr(B)}$

Let $A = pit_{1,3}$ and $B = obs$

$$\Pr(pit_{1,3} \mid obs) = \frac{\Pr(obs \mid pit_{1,3})\,\Pr(pit_{1,3})}{\Pr(obs)}$$



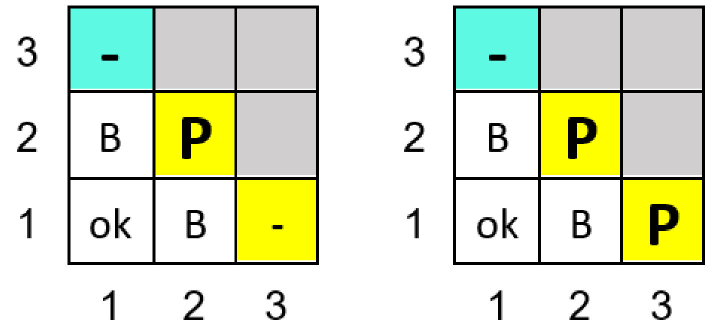
$$\Pr(obs \mid pit_{1,3}) = (.8)(.2) + (.2)(.8) + (.2)(.2) = .36$$

$$\Pr(pit_{1,3} \mid obs) = \frac{(.36)(.2)}{\Pr(obs)} = \frac{.072}{\Pr(obs)}$$

Bayes' Theorem: $\Pr(A \mid B) = \dfrac{\Pr(B \mid A)\Pr(A)}{\Pr(B)}$

Let $A = \neg pit_{1,3}$ and $B = obs$

$$\Pr(\neg pit_{1,3} \mid obs) = \frac{\Pr(obs \mid \neg pit_{1,3})\,\Pr(\neg pit_{1,3})}{\Pr(obs)}$$



$$\Pr(obs \mid \neg pit_{1,3}) = (.2)(.8) + (.2)(.2) = .20$$

$$\Pr(\neg pit_{1,3} \mid obs) = \frac{(.20)(.8)}{\Pr(obs)} = \frac{.16}{\Pr(obs)}$$

$$\Pr\left(pit_{1,3} \mid obs\right) = \frac{.072}{\Pr(obs)} \qquad \Pr\left(\neg pit_{1,3} \mid obs\right) = \frac{.16}{\Pr(obs)}$$

$$\Pr(A \mid B) + \Pr(\neg A \mid B) = 1$$

$$\Pr\left(pit_{1,3} \mid obs\right) + \Pr\left(\neg pit_{1,3} \mid obs\right) = \frac{.072}{\Pr(obs)} + \frac{.16}{\Pr(obs)} = \frac{.232}{\Pr(obs)} = 1$$

$\therefore \Pr(obs) = .232$ So, the normalization constant $\alpha = \dfrac{1}{.232}$

$$\therefore \Pr\left(pit_{1,3} \mid obs\right) = \frac{1}{.232} \times .072 = .3103 \approx 31\%$$