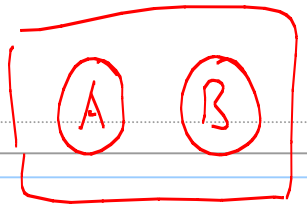
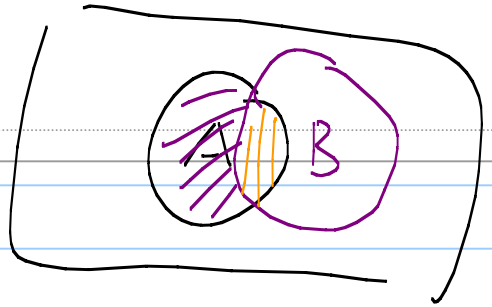
Note Title 8/25/2011



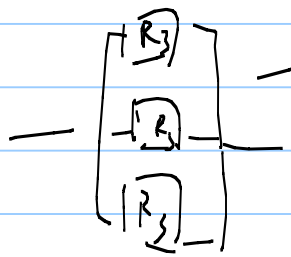


- P(hit the target today) = $p(E|\text{Sunny}) \cdot p(\text{Sunny}) + p(E|\text{rain}) \cdot p(\text{rain})$

  E

  $= 0.8 \times 0.7 + 0.4 \times 0.3 = 0.68$

$$R_{sys} = R_1 \cdot R_2 \cdot [1-(1-R_3)^3] \cdot R_4 \cdot [1-(1-R_5)^2]$$



$\rightarrow R = p(\text{at least one works})$

$= 1 - p(\text{none works}) = 1 - (1-R_3)^3$

$$P(A|B) \overset{?}{=} \frac{P(B|A)P(A)}{P(B)}$$

$$= \frac{P(B|A)P(A)}{P(B|A)P(A)+P(B|A^c)P(A^c)}$$

$\Leftarrow$ $p(A|B) = \frac{p(AB)}{p(B)}$

$\because$ $p(AB) = p(B|A) \cdot p(A)$

$p(hit|Sun) = 0.8$ $p(hit|rain) = 0.4$

$p(sun) = 0.7$ $p(rain) = 0.3$

Q: $p(sun|\overline{hit})$? $p(rain|\overline{hit})$?

$\because$ $p(\overline{hit}|sun) = 0.2$, $p(\overline{hit}|rain) = 0.6$

$p(\overline{hit}) = 1 - p(hit) = 1 - 0.68 = 0.32$

$p(sun|\overline{hit}) = \frac{p(\overline{hit}|sun) \cdot p(sun)}{p(\overline{hit})} = \frac{0.2 \times 0.7}{0.32} = 0.4375$

- $P(E|S)=\prod P(w_i|S)$, $P(E|H)=\prod P(w_i|H)$

{ dollars, cheap, hurry, ... }

$p(\text{dollar}|S) = 0.2$ $\quad p(\text{dollars}|H) = 0.05$

$p(\text{cheap}|S) = 0.5$ $\quad p(\text{cheap}|H) = 0.01$

$p(S) = 0.1$ $\quad p(H) = 0.9$

new Email : { dollar, cheap } $\Leftarrow$ H? S?

$p(E|S) = 0.2 \times 0.5$ $\quad p(E|H) = 0.05 \times 0.01 = 0.0005$

$$\begin{cases} p(S|E) + p(H|E) = 1 \\ \dfrac{p(S|E)}{p(H|E)} = \dfrac{p(E|S)\cdot p(S)}{p(E|H)\cdot p(H)} = \dfrac{0.01 \times 0.1}{0.0005 \times 0.9} = 2.2 \end{cases}$$