Bayesian

$$P(A|B) = P(A \cap B) / P(B)$$

$$P(B/A) = P(A \cap B) / P(A)$$

$$P(A \cap B) = P(A/B) \cdot P(B)$$

$$P(A \cap B) = P(B/A) \cdot P(A)$$

$$P(A/B) \cdot P(B) = P(B/A) \cdot P(A)$$

$$\boxed{P(A/B) = \frac{P(B/A) \cdot P(A)}{P(B)}}$$

$\cancel{P(s)}$ s - has the disease
t - has a positive lab result

$$P(s/t) \propto \frac{P(t/s) \cdot P(s)}{\cancel{P(t)}} \quad \text{Prior} \qquad 0.98 \times 0.008 = 0.00784$$

$$P(\bar{s}/t) \propto \frac{P(t/\bar{s}) \cdot P(\bar{s})}{\cancel{P(t)}} \qquad 0.03 \times 0.992 = 0.02967$$

$$P(s/t) = \frac{0.00784}{0.00784 + 0.02967}$$

$$P(\bar{s}/t) = \frac{0.02967}{0.00784 + 0.02967}$$

A = Not buy. B = Weekday

$$P(A/B) \propto \frac{P(B/A) \cdot P(A)}{\cancel{P(B)}} = 0.33 \times 0.2 = \underline{0.066}$$

=

$$P(\bar{A}/B) \propto \frac{P(B/\bar{A}) \cdot P(\bar{A})}{\cancel{P(B)}} = \frac{9}{\cancel{24}} \times \frac{\cancel{24}}{30} = \underline{0.3}$$

$$P(A/B) = \frac{0.066}{(0.066 + 0.3)}$$

$$P(\bar{A}/B) = \frac{0.3}{(0.066 + 0.3)}$$

P(A/B) = P(No / Discount = yes, Free deli = y, Days Holi)

$$= \frac{P(\text{Dis, Free, Holiday} / P(\text{No}))}{P(\text{Dis, Free, Holiday})} \times P(\text{No})$$

$$P(c/d5) \propto \frac{P(d5/c)\,P(c)}{\cancel{P(d5)}}$$

$$= (3/4)^3 \times 1/14 \times 1/14 \times 3/4.$$

$$P(J/d5) \propto$$

$$P(C) = \frac{0.0003}{(0.0003 + 0.0001)}$$

$$P(J) = \frac{0.0001}{(0.0003 + 0.0001)}$$

$P(H)$ $\quad$ $P(S)$ $\quad$ $P(R)$.

$$P(S/H) \propto \frac{P(H/S) \cdot P(S)}{P(H)}$$

$$\propto \frac{0.8 \times 0.66}{\cancel{P(H)}} = 0.413$$

$$P(R/H) \propto \frac{P(H/R) \cdot P(R)}{P(H)}$$

$$\frac{0.4 \times 0.33}{\cancel{P(H)}} = 0.316$$

$$P(S/H) = \frac{0.413}{(0.413 + 0.316)}$$

$P(R/H) = 0.316$

$$P(R/A) = \frac{[illegible]}{(0.413 + 0.31r)},$$