Assignment8

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March 22, 2021

Problem Statement(6.25**):**If $Pr(A) = .8$,$Pr(B) = .5$ and $Pr(B|A) = .4$,Find

i $Pr(A \cap B)$

ii $Pr(A|B)$

iii $Pr(A \cup B)$

Solution:$P(A) = .8$,$P(B) = .5$, $P(B|A) = .4$

1. $P(A \cap B)$
   we know that,

$$\begin{aligned} P(B|A) &= \frac{P(B \cap A)}{P(A)} \\ .4 &= \frac{P(A \cap B)}{.8} \\ P(A \cap B) &= .4 \times .8 \\ \mathbf{P(A \cap B)} &= .32 \end{aligned}$$

2. $P(A|B)$
   we know that,

$$\begin{aligned} P(A|B) &= \frac{P(B|A) \times P(A)}{P(B)} \\ &= \frac{.4 \times .8}{.5} \\ &= .64 \end{aligned}$$

3. $P(A \cup B)$
   We know that,

$$\begin{aligned} P(A \cup B) &= P(A) + P(B) - P(A \cap B) \\ &= .8 + .5 - .32 \\ &= .98 \end{aligned}$$