AI1110: Assignment 6

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***Abstract*—This document contains the solution to Question of Chapter 13 (Probability) in the NCERT Class 12 Textbook.**

Probability ex 13.1 q5.

if $\Pr(A) = \frac{6}{11}$,$\Pr(B) = \frac{5}{11}$ and $\Pr(A+B) = \frac{7}{11}$,find

1) $\Pr(AB)$
2) $\Pr(A|B)$
3) $\Pr(B|A)$

Solution. Let X,Y are random variables that represents the occurence of events A and B. Given $\Pr(X=1) = \frac{6}{11}$,$\Pr(Y=1) = \frac{5}{11}$ and $\Pr(\{X=1\}+\{Y=1\}) = \frac{7}{11}$

Events	Random variable
A'	X=0
A	X=1
B'	Y=0
B	Y=1

TABLE I: Events

1) Intersection

$$\Pr(AB) = \Pr(\{X=1\},\{Y=1\}) \quad (1)$$
$$= \Pr(X=1) + \Pr(Y=1) \quad (2)$$
$$- \Pr(\{X=1\}+\{Y=1\}) \quad (3)$$
$$= \frac{6}{11} + \frac{5}{11} - \frac{7}{11} \quad (4)$$
$$= \frac{4}{11} \quad (5)$$

2) Conditional probability

$$\Pr(A|B) = \frac{\Pr(\{X=1\},\{Y=1\})}{\Pr(Y=1)} \quad (6)$$
$$= \frac{\frac{4}{11}}{\frac{5}{11}} \quad (7)$$
$$= \frac{4}{5} \quad (8)$$

3) Conditional probability

$$\Pr(B|A) = \frac{\Pr(\{X=1\},\{Y=1\})}{\Pr(X=1)} \quad (9)$$
$$= \frac{\frac{4}{11}}{\frac{6}{11}} \quad (10)$$
$$= \frac{2}{3} \quad (11)$$