Assignment 1

AI1110 : Probability and Random Varriables
Indian Institute of Technology Hyderabad

Manpurwar Ganesh*

Problem 11.16.4.7 : A and B are two events such that $\Pr(A) = 0.54$, $\Pr(B) = 0.69$ and $\Pr(A)\mathrm{B} = 0.35$. Find

1) $\Pr(A + B)$
2) $\Pr(A'B')$
3) $\Pr(AB')$
4) $\Pr(BA')$.

Solution:
Given,

$$\Pr(A) = 0.54 \tag{1}$$
$$\Pr(B) = 0.69 \tag{2}$$
$$\Pr(AB) = 0.35 \tag{3}$$

1) We know that,

$$\Pr(A + B) = \Pr(A) + \Pr(B) - \Pr(A'B')$$
$$\Pr(A + B) = 0.54 + 0.69 - 0.35$$
$$\therefore \Pr(A + B) = 0.88.$$

2) By **De Morgan's law**,

$$A'B' = (A + B)'$$
$$\Pr(A'B') = \Pr((A + B)')$$
$$\Pr(A'B') = 1 - \Pr(A + B)$$
$$\therefore \Pr(A'B') = 1 - 0.88 = 0.12$$

3) We know that,

$$\Pr((A + B)') = \Pr(A) - \Pr(AB)$$
$$\Pr((A + B)') = 0.54 - 0.35$$
$$\therefore \Pr((A + B)') = 0.19$$

4) We know that,

$$\Pr(BA') = \Pr(B) - \Pr(AB)$$
$$\Pr(BA') = 0.69 - 0.35$$
$$\therefore \Pr(BA') = 0.34.$$

*The studnent is with the Department of AI , Indian Institute of Technology, Hyderabad 502285 India e-mail: ai22btech11017@iith.ac.in.