AI1103 : Assignment 1

Javaji Manoj Bhargav - CS20BTECH11022

Download all python codes from

https://github.com/Manojbhargav1305/AI1103/tree/main/Assignment1/codes

and latex codes from

https://github.com/Manojbhargav1305/AI1103/blob/main/Assignment1/Assignment1.tex

PROBLEM(2.8)

Two groups are competing for the position on the board of directors of a corporation.The probabilities that the first and the second groups will win are 0.6 and 0.4 respectively.Further,if the first group wins,the probability of introducing a new product is 0.7 and the corresponding probability is 0.3 if the second group wins.Find the probability that the new product introduced was by the second group.

SOLUTION

let $M \in \{0,1\}$ be a random variable such that $M = 0$ represents product is not introduced by winning group and $M = 1$ represents product is introduced by the winning group.let $H \in \{0,1\}$ be another random variable such that $H = 0$ represents that group A wins,$H = 1$ represents that group B wins. we know that Bayes theorem:

TABLE 0

variable	description
$M = 0$	product not introduced by winning group
$M = 1$	product introduced by winning group
$H = 0$	group A wins
$H = 1$	group B wins

TABLE 0: 1

	$H = 0$	$H = 1$
$M = 0$	o.28	0.18
$M = 1$	0.42	0.12

$$P = (A|B) = \frac{P(A \cap B)}{P(B)}, if P(B) \neq 0 \tag{0.0.1}$$

so required probability that new product was introduced by group B be P.

$$P = Pr(M = 0|H = 0) + Pr(M = 1|H = 1) \tag{0.0.2}$$
$$= 0.18 + 0.12 \tag{0.0.3}$$
$$= 0.30 \tag{0.0.4}$$
$$\tag{0.0.5}$$

hence the required probability that the product was introduced by the second group is 0.30