AI1110 Assignment 1

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EE22BTECH11204

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Question: 12.13.1.14 Given that the two numbers appearing on throwing two dice are different. Find the probability of the event the sum of numbers in the dice is 4

Solution:

The total number of outcomes when throwing two dice = 6*6 = 36

Outcomes where the two numbers appearing on the dice are different and sum is 4:

(1,3) ; (3,1)

Conditional Probability:

If event A occurs given that the event B has already occured then,

$$\Pr(A|B) = \frac{\Pr(AB)}{\Pr(B)} \tag{1}$$

Here,

A: Sum of numbers on two dice is 4

B: Numbers on the two dice are different

We know,

$$\Pr(AB) = \frac{2}{36} \tag{2}$$

Outcomes on the dice are different:

$$\Pr(B) = \frac{6*5}{36} = \frac{30}{36} \tag{3}$$

Conditional Probabiity $\Pr(A|B)$:

$$\Pr(A|B) = \frac{\Pr(A.B)}{\Pr(B)} \tag{4}$$

$$\Pr(A|B) = \frac{\frac{2}{36}}{\frac{30}{36}} \tag{5}$$

$$\Pr(A|B) = \frac{2}{30} \tag{6}$$

$$\Pr(A|B) = \frac{1}{15} \tag{7}$$

$\therefore$ The probability of the event the sum of the dices is 4 given that the two dices show different number is $\frac{1}{15}$.