Probability Assignment 1

EE22BTECH11210 - KUMAR ARYAN

Question :

Given two independent events A and B such that P(A) = 0.3, P(B) = 0.6. Find

(i) P(A and B)

(ii) P(A and not B)

(iii) P(A or B)

(iv) P(neither A nor B)

Solution :

Given P(A) = 0.3, P(B) = 0.6.

(i) P(A and B)

As A and B are independent events.
p(A and B) = P($A \cap B$) = P(A)×P(B)
= 0.3 × 0.6
= 0.18

(ii) P(A and not B)

P(A and not B) = P($A \cap B'$) = P(A) - P($A \cap B$)
= 0.3 - 0.18 = 0.12

(iii) P(A or B)

P(A or B) = P($A \cup B$)
As we know, P($A \cup B$) = P(A) + P(B) - P($A \cap B$)
p($A \cup B$) = 0.3 + 0.6 - 0.18
P($A \cup B$) = 0.72

(iv) P(neither A nor B)

p(neither A nor B) = P($A' \cap B'$)
As, $A' \cap B'$ = ($A \cup$B)' P(neither A nor B) = P(($A \cup B$)')
= 1-P($A \cup B$) = 1-0.72 = 0.28

Code

The python code is as follows :

```
def main():
    a = float(input('Enter probability of A :'))
    b = float(input('Enter probability of B :'))

    P_A_and_B = a*b
    P_A_andNot_B = a - a*b
    P_A_or_B = a + b - a*b
    P_neither_A_nor_B = 1 - P_A_or_B

    print('P(A and B) = ',P_A_and_B)
    print('P(A and not B) = ',P_A_andNot_B)
    print('P(A or B) = ',P_A_or_B)
    print('P(neither A nor B) = ',
        P_neither_A_nor_B)

if __name__=='__main__':
    main()
```