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CA-1

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MACHINE LEARNING

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1. A company has two assembly lines, line A and line B, producing the same product Line A produces 60% of the products and line B produce 40% of the products. How ever 5% of the products produced by line A are defective, while only 2% of the products produced by line B are defective. A customer receives a defective product what is the probability that it came from line A?

To find the probability that the product was Produced by line A (i.e) $P(A/D)$

$$P(A/D) = \frac{P(A) \cdot P(D/A)}{P(A) \cdot P(D/A) + P(B) \cdot P(B/B)}$$

$P(A)$ = probability of product produced by line A

= 60 % = $\frac{60}{100}$ = $\frac{6}{10}$ = 0.6.

$P(B)$ = probability of product produced by line B.

= 40 % = $\frac{40}{100}$ = $\frac{4}{10}$ = 0.4.

$P(D/A)$ = probability of defective product produced by A

$= 5\% = \frac{5}{100} = 0.05$

$P(D/B)$ = probability of defective product produced by B.

$= 2\% = \frac{2}{100} = 0.02.$

Substituting values,

$$P(A/D) = \frac{\frac{6}{10} \times \frac{5}{100}}{\frac{6}{10} \times \frac{5}{100} + \frac{4}{10} \times \frac{2}{100}}$$

$$= \frac{30/1000}{30/1000 + 3/1000}$$

$$= \frac{\frac{30}{1000}}{\frac{33}{1000}} = \frac{30}{1000} \times \frac{1000}{33} = \frac{30}{33} = \frac{15}{19} = 0.789$$

$P(A/D) = 0.7894.$