

SNS COLLEGE OF ENGINEERING



Coimbatore – 641 107

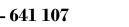
TOPIC : 1.3 – Baye's theorem & Problems

Baye's theorem:
If Bi, B2... Bn be, a clet of
enhaustive and mutually exclusive events
associated with random experiment and A
B another event associate with Bi
Then
$$P(Bi|A) = \frac{P(Bi) \cdot P(A|Bi)}{\sum_{i=1}^{2} P(Bi) \cdot P(A|Bi)}$$

 $\frac{2}{P(Bi) \cdot P(A|Bi)} = \frac{P(Bi|A)}{P(Bi|A)}$
 $P(Bi|A) = \frac{P(Bi|A)}{P(A)} = \frac{P(Bi|A)}{P(Bi|A)}$
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an usur livosen at random. What is the
prob that white ball is drawn from the
ist win?
Self
her Bi be the event that ist win choosen
at B₂ be the event that ist win choosen
at B₃ be the event that ist win choosen.
Let A be the ovent that a is ball b
drawn.

$$p(B_1) = p(B_2) = p(B_3) = \frac{1}{3}$$

 $p(A|B_1) = \frac{2}{5}$; $p(A|B_2) = \frac{3}{5}$; $p(A|B_3) = \frac{4}{5}$
 \therefore By baye's thin probab of WB being
drawn out of the ist win is given by
 $P(B_2|A) = \frac{p(B_1)}{2} p(A|B_2)$
 $= p(B_1)P(A|B_1)$
 $= p(B_1)P(A|B_1)$
 $= \frac{1}{3} \cdot \frac{2}{5}$
 $= \frac{2}{3} \cdot \frac{2}{5}$



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0110 ×====/ 9 9. 2) A bag contains 5 balls 2 it is not know how many of them are white. 2 Balls are drawn at random from the bag and they are noted to be white. What is the chance that all the balls in the bag are white. a first theory. If you a Sola State 2 w balls have drawn out, The Bag must have contain 2, 3, 4 pr) 5 as balls. Let B, event of bag containing 2 w Balls ; 3 W Ball Ba (4) 4. (4) 1 W balls B3 // 5 W balls St a d 84 Bet A be the event of drawing white balls. A. A. Marker

ofince no. of W balls in the bag is not known, Bi's are corvally likely t

 $P(B_1) = P(B_2) = P(B_3) = P(B_4) = \frac{1}{4}$



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$$B_{1} \rightarrow 2W + P(B_{1})$$

$$B_{2} = 3W + P(B_{2})$$

$$B_{3} = AW = P(B_{2})$$

$$B_{4} = 5W = P(B_{4})$$

$$P(B_{4}/A) = \frac{P(B_{4}) \cdot P(A|B_{4})}{\frac{A}{2}}$$

$$P(B_{1}) = \frac{P(B_{1}) \cdot P(A|B_{1})}{\frac{A}{2}}$$

$$P(A|B_{2}) = \frac{3C_{2}}{5C_{2}} = \frac{3\times2}{1\times2} = \frac{4}{10} = \frac{3}{10}$$

$$P(A|B_{2}) = \frac{3C_{2}}{5C_{2}} = \frac{3\times2}{1\times2\times3} = \frac{4}{10}$$

$$P(A|B_{3}) = \frac{4C_{2}}{5C_{3}} = \frac{4\times3YZ}{1\times2\times3} = \frac{24}{10}$$

$$P(A|B_{3}) = \frac{5C_{2}}{5C_{3}} = 1$$

$$= \frac{1}{4} + 1$$

$$= \frac{1}{4} + \frac{1}{10}$$

$$= \frac{1}{20} = \frac{10}{20} = 1$$