

DAILY ASSESSMENT FORMAT

Date:	17-06-2020	Name:	MOUNITHA D M
Course:	Statistical Learning	USN:	4AL17EC055
Topic:	Rules for Probability calculation Bayes' Theorem Normal Distribution	Semester & Section:	6 TH SEM "A" SEC
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FORENOON SESSION DETAILS

Image of session

Courses / Statistical Learning / Rules for Probability calculation

Content << Rules for Probabilty calculation

Learning Videos ^

- Agenda ✓
- Case study on statistics and Probability Theory ✓
- Solution for case study ✓
- Introduction to Probability ✓

Rules for Computing Probability

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1) Addition Rule -Mutually Exclusive Events

$$P(A \cup B) = P(A) + P(B)$$

This rule says that the probability of the union of A and B is determined by adding the probability of the events A and B.

Here the symbol $A \cup B$ is called A union B meaning A occurs, or B occurs or both A and B simultaneously occur. When A and B are mutually exclusive, A and B cannot simultaneously occur.

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- Rules for Probability calculation ✓
- Bayes' Theorem
- Normal Distribution
- Learning Material
- Quiz

Solution to part 2)

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Look at the Diagram:

There are totally 52 cards in a pack out of which 4 are Kings and 13 are Diamonds. Let A= getting a King and B= getting a Diamond. The two events here are not mutually exclusive because you can have a card, which is both a King and a Diamond called King Diamond.

$$P(K \cup D) = P(K) + P(D) - P(K \cap D)$$

$$= 4/52 + 13/52 - 1/52 = 16/52 = 4/13$$

King and Diamond

Plot:



Normal Distribution

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Properties of Normal Distribution



- The normal distribution is a continuous distribution looking like a bell. Statisticians use the expression "Bell Shaped Distribution".
- It is a beautiful distribution in which the mean, the median, and the mode are all equal to one another.
- It is symmetrical about its mean.
- If the tails of the normal distribution are extended, they will run parallel to the horizontal axis without actually touching it. (asymptotic to the x-axis)
- The normal distribution has two parameters namely the mean μ and the standard deviation σ

Dr. P.K. Viswanathan

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→ Rules for probability calculation

- ① Addition rules – mutually Exclusive Event

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- ② Independent Events

$$P(A \cap B) = P(A) \cdot P(B)$$

This rule says when the two events A and B are independent, the probability of the simultaneous occurrence of A and B are mutually exclusive probability of A and the probability B.

→ The probability that an event will occur is a number between 0 and 1.

In other words, it is a fraction.

It also sometimes written as a percentage because

percentage is simply fraction with a denominator of 100. For now about these concepts,

Events are mutually exclusive or disjoint if they cannot occur at the same time.

→ The probability that Event A occurs, given that Event B has occurred is called a conditional.

→ The complement of an event is the event not occurring. The probability that Event A will not occur is denoted by $P(A')$.

→ The probability of the intersection of Events A and B is denoted by $P(A \cap B)$. If Events 'A' and 'B' are mutually exclusive $P(A \cap B) = 0$.

→ If the occurrence of event A changes the probability of Event B, then Events A and B are dependent.

Bayes's Theorem

$$P(B/A) = \frac{P(A/B) \cdot P(B)}{P(A/B) \cdot P(B) + P(A/\bar{B}) \cdot P(\bar{B}) + \dots + P(A/B_k) \cdot P(B_k)}$$

B_i = i th event of k mutually exclusive and collectively exhaustive events

A = new event that might impact $P(B_i)$.

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