06 March Ass

April 27, 2023

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Q1. What is Statistics?
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Statistics is a branch of applied mathematics that invovles the collection ,␣
 ↪description , analysis , and interfernece of
conclusion from quantitative data .The mathematical theories behind statics␣
 ↪rely heavily on differentail and integral
calculus , linear algebra and probability therory.
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Q2. Define the different types of statistics and give an example of when each␣
 ↪type might be used.
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There are two kinds od statistics , which are descriptive statistics and␣
 ↪inferentail statistics .
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In the descriptive statistics the data is described in a summmarized wat. The␣
 ↪summarization is done from the
sample of the population using different parameters like mean or standard␣
 ↪deviation . Descriptive statisctics
are way of using charts graphs and summary measure to organize , represent and␣
 ↪explain

- Data is typically arranged and displayed in tables or graphs summarizing␣
 ↪details such as histogram , pie, charts bars or scatter plots.
- Descriptive statistics are just descriptive and thus do not require␣
 ↪normalization beyond the data collected.
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In the inferentail statistics we try to interpret the meaning of descriptive␣
 ↪statistics after the the data has been collected
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analyzed and summarised we use inferentail statics to describe the meaning of␣
 ↪the collected data.

- inferentail statistics use the probability principle to assess wheter trends␣
 ↪contained in the research sample can be genralized to a
  large population from which the sample origanlly comes.
- Inferentail statistics are intended to test hypotheses and investigate␣
 ↪relationship between variable and can be used
  to make population predictions.
- inferentail statistics are used to draw conclusions and inferences.
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Q3. What are the different types of data and how do they differ from each␣
 ↪other? Provide an example of
each type of data.
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There are two types of data : Qualitative and Quantitative data which are␣
 ↪futher classified into four categories :
    - Nominal data
    - Ordinal data
    - Discrete data
    - Continuous data
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Nominal data :
              Nominal data is used to label varibales without any order or␣
 ↪quantitive value. the color of hair can be
       considered nominal data as one color cant be  compared with another␣
 ↪color.

example of nominal data :
                        - colour of hair
                        - Marital status
                        - Nationality
                        - Gender
                        - Eyes color
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Ordinal data :
              Ordinal data have original odering where a number is present in␣
 ↪some kind of order by their
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        position on the scale . These data are used for observation like␣
 ↪customer satisfaction , happiness , etc ,
        but we cant do any arithmetical tasks on them.

example of ordinal data :
                          - When companies ask for feedback,experience ,or␣
 ↪satisfaction on a scale of 1-10
                          - Letter grades in the exam (A,,B,C)
                          - Ranking of people in a comprtition
                          - Economic status
                          - Education level
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Discrete data :
               The term discrete means distinct or seprate the discrete data␣
 ↪contain the values that fall under
        integers or whole numbers the total number of students in a class is an␣
 ↪example of discrete data. these
        data cant be broken into decimal or fraction values.

example of discrete data :
                           - total numbers of students present in a class
                           - Cost a cell phone
                           - Numbers of empolyes in a company.
                           - The total number of players eho participated
                           - Days in a week
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Continuous data :
                 Continuous data are in the form of fractional numbers it can␣
 ↪be the version of an android phone , the
        height of a person, the length of an object , continuous data␣
 ↪represents information that can be divided into
        smaller levels , the continuous variable can take any vlaue within a␣
 ↪range .

example of continuous data :
                             - Height of a person
                             - Speed of a vehicle
                             - Time taken to finish the work
                             - wifi frequency
                             - market share price.
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Q4. Categorise the following datasets with respect to quantitative and␣
↪qualitative data types:
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(i) Grading in exam: A+, A, B+, B, C+, C, D, E

ANS - Qualitative data (Ordinal)
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(ii) Colour of mangoes: yellow, green, orange, red

ANS - Qualititve data (Nominal)
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(iii) Height data of a class: [178.9, 179, 179.5, 176, 177.2, 178.3, 175.8,...]

ANS - Quantitative data (Continuous)
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(iv) Number of mangoes exported by a farm: [500, 600, 478, 672, ...]

ANS - Quantitive data (Discrete)
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Q5. Explain the concept of levels of measurement and give an example of a␣
↪variable for each level.
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Nominal :
        A varibale measured on a nominal scale is a varibale that does not␣
↪really have any evaluative distinction.
      one value is not rally greater tahn another. A good example of a␣
↪nominal variable is sex ,Information in a data set
      on sex is usually coded as 0 or 1 , 1 indicating male and 0 indicating␣
↪female . 1 in this case is an arbitrary value
      and it is not any greater or better than 0 . There is only a nominal␣
↪difference between 0 and 1 . With nominal variable
      there is a qualitive difference between values not a quantitive one.
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Ordinal :
        Something measured on a ordinal scale does have an evaluate␣
↪connotation . one value is gretaer or larger or better than the other.
      product A is preffered over product B and therefore A receives of 1 and␣
↪B receives a value of 2. another example might be rating
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      your job statisfaction on a scale from 1 to 10 with 10 representing␣
 ↪complete statisfaction with ordinal scale, we only know that 2 is
      better than 1 to 10 is better than 9 .
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Interval :
        A variable is measured on an interval scale gives information about␣
 ↪more or betterness as ordinal scales do , but interval variable
      have an equal distance between each value the distance between 1 and 2␣
 ↪is equal to the distance between 9 and 10. temperture using
      clesius of fahrenheit is a godd example , there is the exact same␣
 ↪difference between 100 degree and 90 as there is between 42 and 32.
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Ratio :
      Something measured on a ratio scale has the same properties that an␣
 ↪interval scale has expext with a ratio scaling ,
      there is an absolute zero point. temperature measured in kelvin is an␣
 ↪example . there is no value possible below 0 degree kelvin ,
      it is absolute zero weight is another exaple, 0 lbs is a meaningful␣
 ↪absence of weight. your bank account balance is another . althought
      you can have a negative or positive account balace there is a define␣
 ↪and nonarbility meaning of an acoount balance of 0.
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Q6. Why is it important to understand the level of measurement when analyzing␣
 ↪data? Provide an
example to illustrate your answer.
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It is important to understand the level of measurement of varaiable in reserach␣
 ↪, because the elevel of measurement
determines the type of statistical analysis that can be conducted , and␣
 ↪therefore the type of  conclusions that can be drawn from the
research.
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Q7. How nominal data type is different from ordinal data type.
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Nominal data is classified without a natural order or tank , whereas ordinal␣
 ↪data has a predetermined or natural
order. On the other hand , numerical or quantutative data will always be a␣
 ↪number that can be meaured.
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Q8. Which type of plot can be used to display data in terms of range?
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Histogram . If the groups depicted in a bar chart are actually continuous␣
 ↪numerics , we can push the bars together to generate a histogram .
Bar lengths in his histogram typically corresepond to counts of data points .␣
 ↪and their patterns demonstrate the distribuation of variable
in your data . A different chart type like line chart tends to be used when the␣
 ↪verical value is not frequency count.
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Q9. Describe the difference between descriptive and inferential statistics.␣
 ↪Give an example of each
type of statistics and explain how they are used.
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Descriptive statics features or characteristics of a data set , while␣
 ↪inferentail statistics enables the user to test a hypothesis to
check if the data is generalizable to the  wider population.
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- Descriptive statitics gives information about raw data regarding its␣
 ↪description or features. Inferentail statistics ,
on the other hand , draw inferences about the population by using data ␣
 ↪extracted from the population.
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- As for descriptive statistics , it help to organize analyze and present data␣
 ↪ina meaningful manner. Infernatail statistics help to
compare data , amke hypothses and predictions.
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- Descriptive statistics explains already known data related to a particular␣
 ↪sample or population of a small size.
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Inferentail statistics , however aims to draw inference or conclusions about a␣
 ↪whole population
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- We use charts , graphs , and tables to represent descriptive statistics ,␣
 ↪while we use probability methods for
inferentail statistics.
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- It is simpler to perform a study using descriptive statistics rather than␣
 ↪inferentail statistic, where tou need
to establish a relationship between variable in an entire population.
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Q10. What are some common measures of central tendency and variability used in␣
 ↪statistics? Explain
how each measure can be used to describe a dataset.
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Measures of central tendency :

1. Mean :
        The sum of all measurements divided by the number of observation . can␣
 ↪be used with discrete and continuous data .it is
       value that is most common.
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2. Median :
          The middle value that seprate the higher half from the loer half.␣
 ↪mean and median canbe compared with each other to determine if
       the population is of normal distribution or not. numbers are arranged␣
 ↪in either ascending or descending order. the middle number is
       than taken.
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3. Mode :
        The most frequent value. it shows most popular option and is the␣
 ↪highest bar in histogram.
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4. Midrange :
            The arithmetic mean of the maximum and minimum values of a data␣
 ↪set.
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Measure of Variability :

1. Variance :
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            A measure of how far a set of numbers are spread out from␣
↪eachother.it describes how far the number lie from the mean
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2. Standard deviation :
                        It is only used for data that are normally distributed.
↪indicates how much a set of values is spread around the average.
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4. Interquartile range :
                         The interquartile range is also known as the midspread␣
↪or middle fifty  is a measure of statistical disprersion,
        being equal to the difference between the third and the first␣
↪quartiles.
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