MEDIAN

मध्यांक

LECTURE 2

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Calculating the median

If observations of a variable are ordered by value, the median value corresponds to the middle observation in that ordered list. The median value corresponds to a cumulative percentage of 50% (i.e., 50% of the values are below the median and 50% of the values are above the median). The position of the median is

$\{(n + 1) \div 2\}$th value, where n is the number of values in a set of data.

In order to calculate the median, the data must first be ranked (sorted in ascending order). The median is the number in the middle.

Median = the middle value of a set of ordered data.

The median is usually calculated for numeric variables, but may also be calculated for categorical variables that are sequenced, such as the categories in a satisfaction survey: excellent, good, satisfactory and poor. These qualitative categories can be ranked in order, and thus, are considered ordinal.

Raw data

In raw data, the median is the point at which exactly half of the data are above and half below. These halves meet at the median position. If the number of observations is odd, the median fits perfectly and the depth of the median position will be a whole number. If the number of observations is even, the depth of the median position will include a decimal. You need to find the midpoint between the numbers on either side of the median position.

Example 1 - Raw data (discrete variables)

Imagine that a top running athlete in a typical 200-metre training session runs in the following times:

26.1, 25.6, 25.7, 25.2 et 25.0 seconds.

How would you calculate his median time?

First, the values are put in ascending order: 25.0, 25.2, 25.6, 25.7, 26.1.

Then, using the following formula, figure out which value is the middle value. Remember that n represents the number of values in the data set.

Median = $\{(n + 1) \div 2\}^{th}$ value

$= (5 + 1) \div 2$

$= 3$

The third value in the data set will be the median. Since 25.6 is the third value, 25.6 seconds would be the median time.

= 25.6 secondes

Example 2 - Raw data (discrete variables)

Now, if the runner sprints the sixth 200-metre race in 24.7 seconds, what is the median value now?

Again, you first put the data in ascending order: 24.7, 25.0, 25.2, 25.6, 25.7, 26.1. Then, you use the same formula to calculate the median time.

Median = $\{(n + 1) \div 2\}^{th}$ value

$= (6 + 1) \div 2$

$= 7 \div 2$

$= 3{,}5$

Since there is an even number of observations in this data set, there is no longer a distinct middle value. The median is the 3.5^{th} value in the data set meaning that it lies between the third and fourth values. Thus, the median is calculated by averaging the two middle values of 25.2 and 25.6. Use the formula below to get the average value.

Average = (value below median + value above median) ÷ 2

= (third value + fourth value) ÷ 2

= (25.2 + 25.6) ÷ 2

= 50.8 ÷ 2

= 25.4

The value 25.4 falls directly between the third and fourth values in this data set, so 25.4 seconds would be the median time.

TO BE CONTINUED...