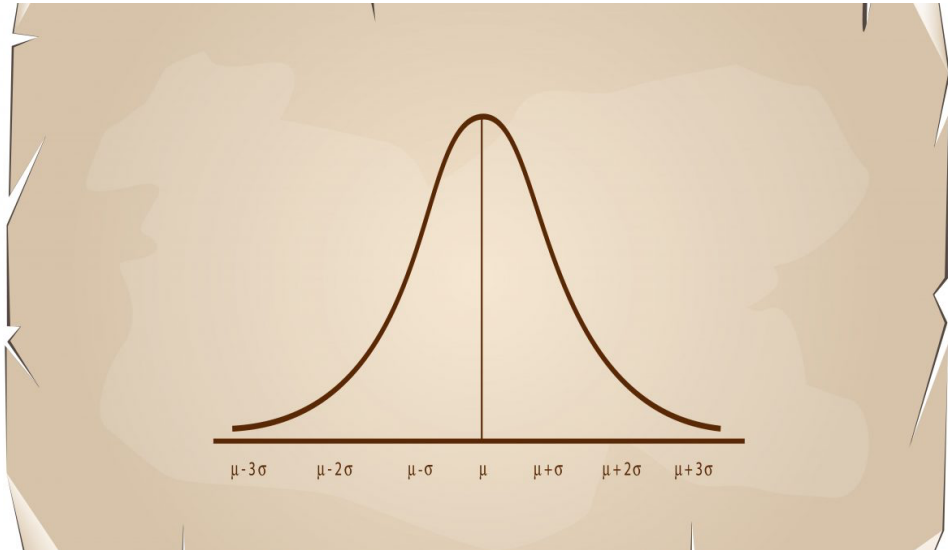


PROCESS IMPROVEMENT, PROJECT MANAGEMENT

Frequency Distribution: Histogram Diagram

Sonya Siderova, 2 years ago 0 4 min read 7281



Histograms are a great way to visualise data and track key performance indicators because they are so clear and simple to read. They are the preferred method of presenting large amounts of data in a simple straightforward manner. What is a histogram and how does it help you analyse your data?

What is a histogram diagram?

The histogram is a graph that is often used in mathematics and statistics. Histograms are used to measure how frequently values or value ranges appear in a set of data. The horizontal axis typically displays the **measured** value – either a continuous numerical variable, such as height, distance or time or a discrete, countable value, such as number of items. The vertical axis shows the **frequency** that this value or value range appears.

Meet the Author



Sonya Siderova is a passionate product manager and a driving force behind [Nave](#), a Kanban analytics suite that helps teams improve their delivery speed through data-driven decision making. When she's not catering to her two little ones, you might find Sonya absorbed in a good heavyweight book, match or behind a screen crafting a new blog post.

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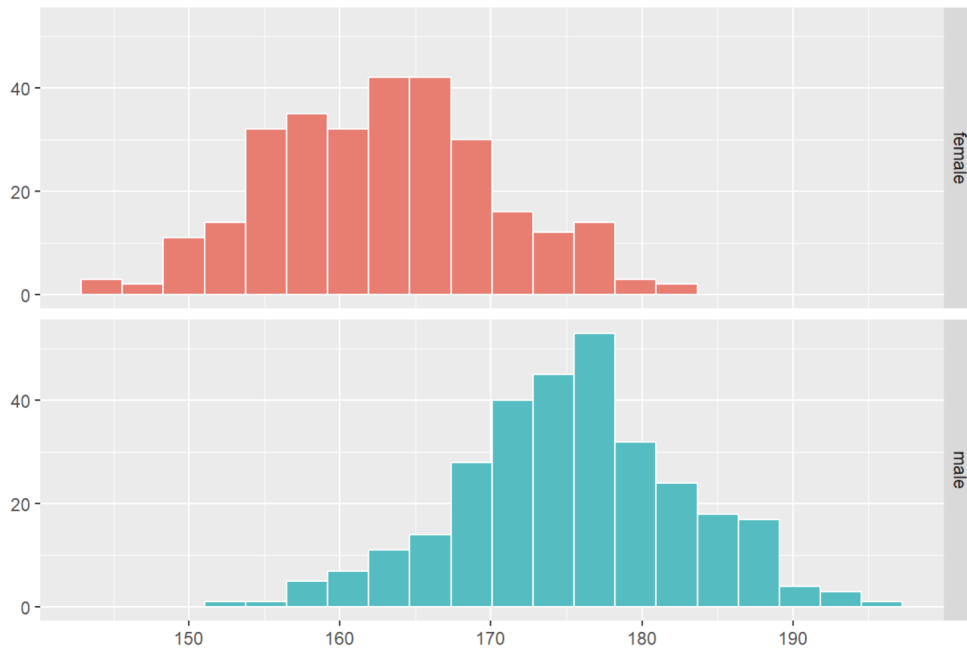
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Histogram divisions can either be discrete number blocks (1, 2, 3) or, in the case of a range, **class intervals** or **bins** (0-10, 10-20, 20-30). The most important thing to remember is that there should be **no gaps** between the numbers or number ranges – every section of the value range is displayed along the horizontal axis.

For a continuous measured variable, class intervals can be a judgement call or worked out through trial and error. They should be chosen so that the shape of the graph resembles a distribution curve similar to the histograms shown above.

Bar charts and histograms: categorical and quantitative

Histogram diagrams have characteristics in common with traditional bar charts – they both measure frequency and use a similar layout. However, there is a key difference:

- Bar charts measure **categorical** data: data that can be split into different categories or types
- Histograms measure **continuous, quantitative** data: data that can be counted

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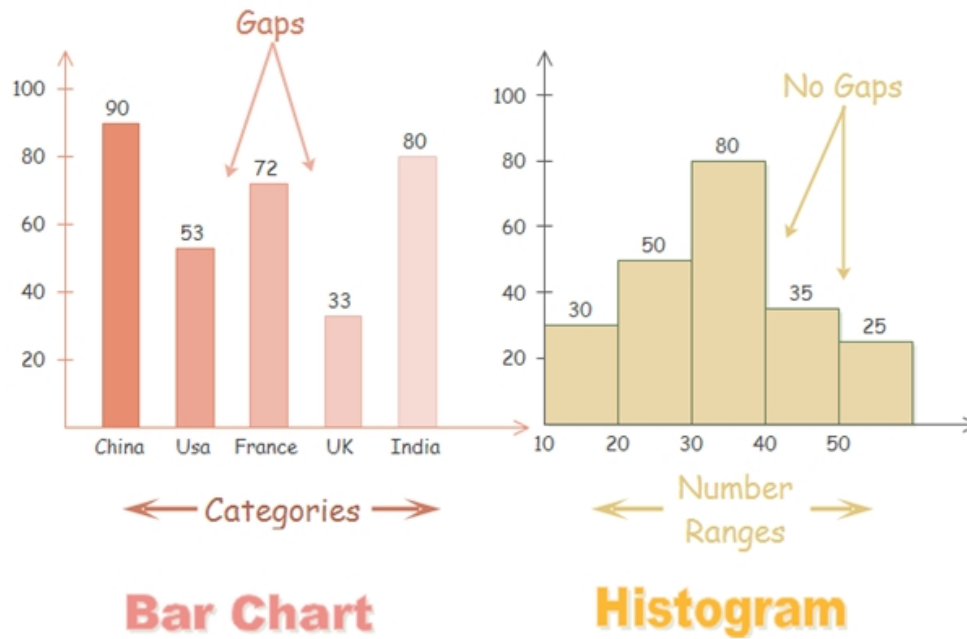
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Bar charts are certainly a useful tool to visualise the size of each category, but histograms are a better way to display frequency distribution over a range. Histograms also allow us to better analyse the data set and find its mean, median and mode.

How to read histogram diagrams

We can use the shape of the histogram to understand how our frequency data is distributed and where the central tendency of the dataset lies.

Averages: mean, median and mode

BLOSSOMS does not agree with this definition of Averages. We believe that only the “mean” is an average.

Averages can be calculated in three ways. The different methods can give the same or different values depending on the data set involved. Consider this simple dataset:

1, 2, 2, 3, 3, 4, 5, 5, 5, 8

- The **mean** is the sum of all of the values in the data set divided by the total number of values. For this dataset, the mean is 3.8. When an average is referred to without specifying if it is a mean, median or mode value, it is almost always the mean.
- The **median** refers to the middle value of the dataset. If there is an even number of values, the midpoint between the two closest values is taken. For this dataset, the median value is 3.5.
- The **mode** is simply the value that appears most often. For this dataset, the mode is 5.

Three methods of calculation, three different averages. The goal of an average is to work out the central tendency of your data – the value your data clusters around. Looking at the shape of your frequency distribution shows you which average best reflects this central tendency.

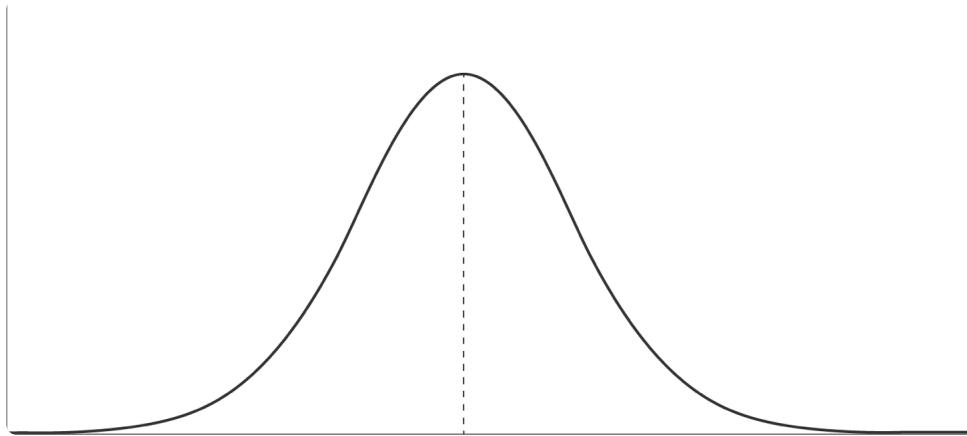
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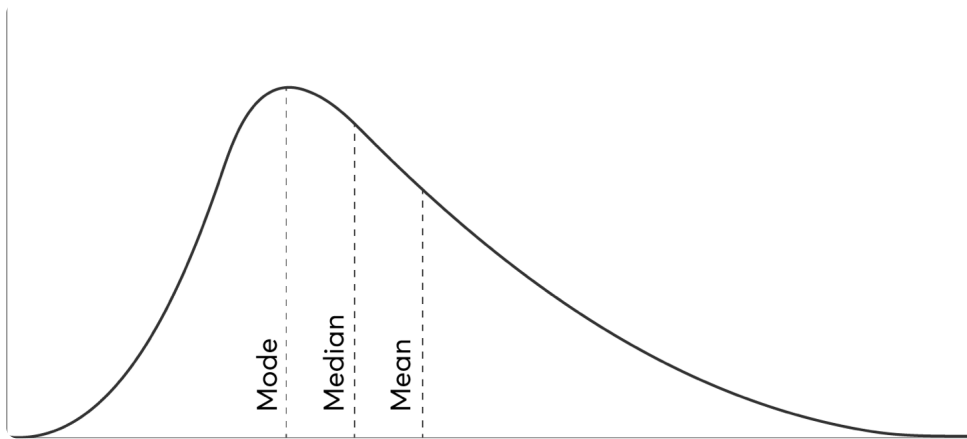
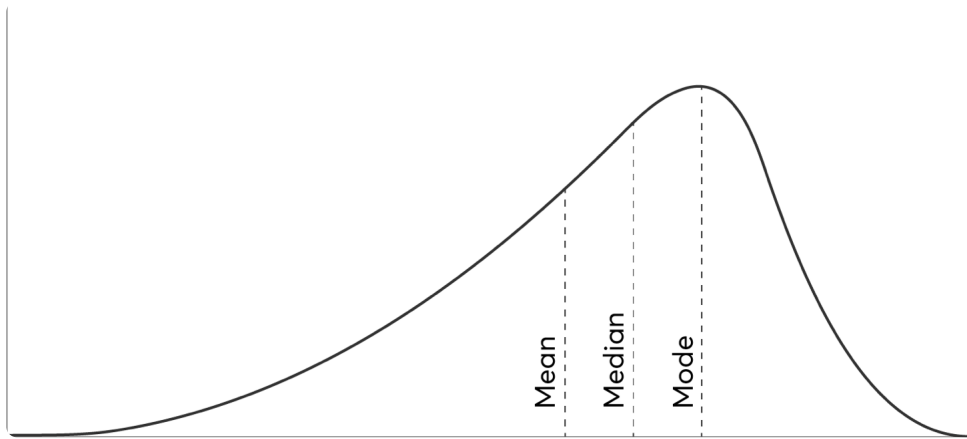
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Frequency Distribution Shapes

The most common frequency distribution type is the normal distribution (also known as a Gaussian distribution or bell curve). This symmetrical shape shows values clustering around the central peak with fewer instances further away. In a normal distribution, the mode, median and mean are the same value.



Datasets can also be skewed to the left (negative) or right (positive). Instead of clustering symmetrically around a central value, much higher or lower values skew the shape of the graph. In these cases, the mode, median and mean are different. For skewed data, the best reflection of the central tendency is the median.



Some histograms will show two peaks. This is known as a bimodal distribution. This distribution indicates that there are two overlapping groups in your dataset. We recommend trying to separate the groups to get a clearer picture of the data.

