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## Difference between discrete and continuous random variable examples

Presenter 2: We are going to look at two different types of data called "discrete" and "continuous" data. It's important to be able to tell the difference between them because this will help us to analyse and understand our results. Presenter 1: Discrete data is information that can only take certain values and these are often whole number values such as one, two or three woodlice. You don't get one and three-quarter woodlice walking by, so they must be whole numbers. Presenter 2: Continuous data is information that can take any value, such as speed, so these values don't need to be whole numbers. We are curious about why you find woodlice in dark places. Student 1: We're going to put all the woodlice into here to see whether or not they prefer the light or the dark, and then we're going to count how many, just to see. Presenter 2: We will look at the behaviour of woodlice in two different situations - one in a chamber of light and one in the dark. Presenter 1: After two minutes, we count the number of woodlice in the chamber. Student 2: OK, 1, 2, 3, 4, 5, 6, 7, 8, 9... Presenter 2: So, is this continuous or discrete data? Presenter 1: Discrete, because you can only have whole numbers of woodlice. In addition, we have only two choices of light or dark. Presenter 2: With discrete data, there is a further distinction which needs to be made. Presenter 1: This is between "categorical" and "numeric". Presenter 2: Numeric is numbers. For example, numbers of woodlice. Presenter 1: And categorical is categories, like light or dark, male or female, or three different people, for example Kim, Shueella and Keisha. Presenter 2: What is the woodlouse with the greatest mass that we can find? Presenter 1: To answer this question, we need to collect woodlice and weigh them. Presenter 2: Is this discrete or continuous data? Presenter 1: Well, the definition of discrete is it has to be whole values. Presenter 2: But the mass could be any value, so we don't have whole values here. Presenter 1: So, that makes it continuous data. Presenter 2: Yes, think about values on a scale. They are continuous, like speed, distance or weight. Presenter 1: Now we have looked at the difference between continuous and discrete data, but also we have seen the difference between categorical and numeric data, which are two different types of discrete data.

Discrete vs. Continuous Random Variables	
<ul style="list-style-type: none"> <li><b>Discrete</b> <ul style="list-style-type: none"> <li>Finite number of possible outcomes</li> <li>ex: ACT score</li> </ul> </li> <li><b>Continuous</b> <ul style="list-style-type: none"> <li>Infinitely many possible outcomes</li> <li>ex: temperature in Los Angeles tomorrow</li> </ul> </li> <li>ALEKS problems: only calculating expected value and variance for DISCRETE random variables</li> </ul>	

Variable refers to the quantity that changes its value, which can be measured. It is of two types, i.e. discrete or continuous variable. The former refers to the one that has a certain number of values, while the latter implies the one that can take any value between a given range. Data can be understood as the quantitative information about a specific characteristic. The characteristic can be qualitative or quantitative, but for the purpose of statistical analysis, the qualitative characteristic is transformed into quantitative one, by providing numerical data of that characteristic.

So, the quantitative characteristic is known as a variable. Here in this article, we are going to talk about the discrete and continuous variable. Content: Discrete Variable Vs Continuous Variable Comparison Chart Definition Key Differences Examples Conclusion Comparison Chart Basis for Comparison Discrete Variable Continuous Variable Meaning Discrete variable refers to the variable that assumes a finite number of isolated values. Continuous variable alludes to the a variable which assumes infinite number of different values.

Range of specified number Complete Incomplete Values Values are obtained by counting. Values are obtained by measuring. Classification Non-overlapping Overlapping Assumes Distinct or separate values. Any value between the two values. Represented by Isolated points Connected points Definition of Discrete Variable A discrete variable is a type of statistical variable that can assume only fixed number of distinct values and lacks an inherent order. Also known as a categorical variable, because it has separate, invisible categories. However no values can exist in-between two categories, i.e. it does not attain all the values within the limits of the variable.

### Discrete vs Continuous Variables

<ul style="list-style-type: none"> <li><b>Discrete Variables:</b> Can take on only certain values along an interval                             <ul style="list-style-type: none"> <li>the number of sales made in a week</li> <li>the volume of milk bought at a store</li> <li>the number of defective parts</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li><b>Continuous Variables:</b> Can take on any value at any point along an interval                             <ul style="list-style-type: none"> <li>the depth at which a drilling team strikes oil</li> <li>the volume of milk produced by a cow</li> <li>the proportion of defective parts</li> </ul> </li> </ul>
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So, the number of permitted values that it can suppose is either finite or countably infinite. Hence if you are able to count the set of items, then the variable is said to be discrete.

## Discrete vs. Continuous

Discrete R.V.	Continuous R.V.
Number of heads in n coin tosses	A number from the interval [a,b] where a,b ∈ R
Year of birth of all students in this class	Exact weight of all students in this class
Number of phone calls per minute at a telephone exchange	Time between successive phone calls at a telephone exchange
Winning time of Olympic 100m races rounded to the nearest 100 <sup>th</sup> of a second.	Exact winning time of Olympic 100m races

Definition of Continuous Variable Continuous variable, as the name suggest is a random variable that assumes all the possible values in a continuum. Simply put, it can take any value within the given range. So, if a variable can take an infinite and uncountable set of values, then the variable is referred as a continuous variable. A continuous variable is one that is defined over an interval of values, meaning that it can suppose any values in between the minimum and maximum value.

It can be understood as the function for the interval and for each function, the range for the variable may vary. The difference between discrete and continuous variable can be drawn clearly on the following grounds: The statistical variable that assumes a finite set of data and a countable number of values, then it is called as a discrete variable. As against this, the quantitative variable which takes on an infinite set of data and a uncountable number of values is known as a continuous variable. For non-overlapping or otherwise known as mutually inclusive classification, wherein the both the class limit are included, is applicable for the discrete variable.

On the contrary, for overlapping or say mutually exclusive classification, wherein the upper class-limit is excluded, is applicable for a continuous variable. In discrete variable, the range of specified number is complete, which is not in the case of a continuous variable. Discrete variables are the variables, wherein the values can be obtained by counting. On the other hand, Continuous variables are the random variables that measure something. Discrete variable assumes independent values whereas continuous variable assumes any value in a given range or continuum. A discrete variable can be graphically represented by isolated points.

Unlike, a continuous variable which can be indicated on the graph with the help of connected points. Examples Discrete Variable Number of printing mistakes in a book. Number of road accidents in New Delhi. Number of siblings of an individual. Continuous Variable Height of a person Age of a person Profit earned by the company. Conclusion By and large, both discrete and continuous variable can be qualitative and quantitative. However, these two statistical terms are diametrically opposite to one another in the sense that the discrete variable is the variable with the well-defined number of permitted values whereas a continuous variable is a variable that can contain all the possible values between two numbers.