Alvin Estevez Jr

Probability and Applied Stats

Professor Hoy

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Normal, Gamma, and Beta Distributions

***What are they?***

Normal, Gamma, and Beta distributions are all essential parts in statistics. These probability distributions help analyze and explain what the data means. There are many different other types of probability distributions but Normal, Gamma, and Beta distributions are the most common and widely used for their multifunctional use.

Normal distributions are used to analyze data that typically has a histogram which fits a bell curve. Normal distributions are also referred to as the Gaussian distribution or bell curve. This is noted because of its symmetrical shape. Mean and standard deviation define the distribution.

Gamma distributions are used to model the distribution until an event has occurred. Gamma distributions use the Poisson process in their method. Gamma distribution is also shown in exponential distributions. Shape and rate define the distribution.

Beta distributions are used in project management which will recognize the uncertainty in the estimation of how long a project will take. This is valuable to know because there is an always an X factor that you have to deal with in any project. Allotting certain time towards that can keep you on track.

***What is their purpose?***

The purpose of normal distributions is to find the probability of observations in a distribution falling above or below a given value. It can also be used to compare scores on different distributions with different means and standard deviations.

The purpose of Gamma distribution is to model positively skewed data. It can show survival analysis and reliability of a product. An example of this would be like predicting if a plane landing were to be successful or not. Gamma distribution would be able to properly show the probability of this happening.

The purpose of Beta distribution is to model the unknown factor of the probability of something happening. The beta distribution works with the binomial distribution because the binomial distribution works with the number of successes in a specific number of trials and then the beta distribution models the probability of success and failure.

***What are their applications?***

Some applications of normal distributions in the real world are things like height and weight. Using normal distributions we can see what the typical weight is for someone x height and vice versa. We can also use normal distribution for something like test scores (SAT). Basically any cluster of data that we want to find the average of we can use normal distributions for.

Some applications of Gamma distributions in the real world are modeling the size of insurance claims. It can also be used to estimate the size of rainfalls too. Using Gamma distributions we can give ourselves a better estimate of certain probabilities that may or may not occur.

Some applications of Beta distributions in the real world are conversion rates from prospects to actual buyers for something like a car. Knowing what the uses are for this can be extremely helpful since you can formulate an idea of what it is you’ll be dealing with if you were to be the seller in this scenario.

**Sources**

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