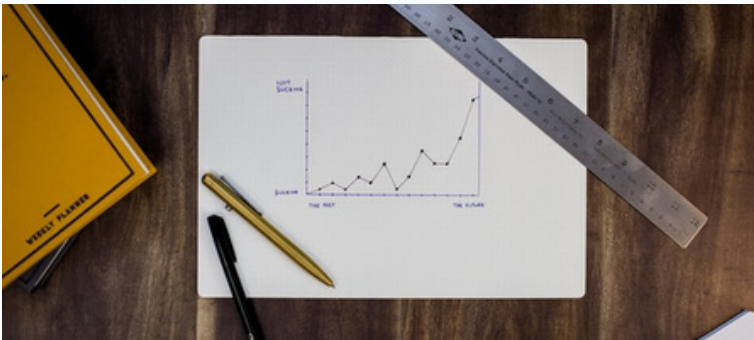


# Newsletter on Statistics

BY TAVISH AGGARWAL



## HYPOTHESIS TESTING EXPLAINED USING A PRACTICAL EXAMPLE

The article provides an intuitive explanation of hypothesis testing using real-world examples. It outlines the process of hypothesis testing, including stating the null hypothesis, defining test statistics, generating simulated data, computing test statistics, and calculating the p-value.

It uses an analogy of a court case to explain the concept of null and alternative hypotheses and emphasizes that a null hypothesis can only be rejected or failed to be rejected, but never accepted.

It also discusses significance levels, standard error, and the Central Limit Theorem, using an example of a missing bus from an athlete competition to illustrate the application of these concepts in hypothesis testing.

It further explains one-tailed and two-tailed tests, the types of errors that can occur in hypothesis testing, and different statistical tests that can be used based on data characteristics.

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## UNDERSTANDING POPULAR STATISTICAL TESTS TO PERFORM HYPOTHESIS TESTING IS NOT DIFFICULT AT ALL!

The article outlines the steps of hypothesis testing, including defining the hypothesis, identifying the distribution, determining the test statistic, and making a decision using critical value or p-value approaches.

It also discusses choosing the right statistical test based on data attributes, such as whether the data is continuous or categorical, the distribution, and the number of samples. Popular statistical tests like Z-Test, T-Test, Chi-Square Test, and F-Test are briefly described with examples.

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## DOES PROBABILITY REALLY HELP BUSINESSES?



The article discusses the importance of statistics, particularly inferential statistics, in making business decisions. It explains how statistical inference uses data to draw probabilistic conclusions and make predictions.

It illustrates this with a casino game example, demonstrating how expected value calculations can inform profitable strategies. The article emphasizes that while exact data may not always be available, reasonable estimates can be made using probability, which is crucial when certainty is limited.

The piece concludes by highlighting the potential of statistics in various industries for decision-making.

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1.30	0.9177	1.80	0.9706	2.30	0.9896
1.40	0.9192	1.90	0.9713	2.40	0.9918
1.41	0.9207	1.91	0.9719	2.41	0.9920
1.42	0.9222	1.92	0.9726	2.42	0.9922
1.43	0.9236	1.93	0.9732	2.43	0.9925
1.44	0.9251	1.94	0.9738	2.44	0.9927
1.45	0.9265	1.95	0.9744	2.45	0.9929
1.46	0.9279	1.96	0.9750	2.46	0.9931
1.47	0.9292	1.97	0.9756	2.47	0.9932
1.48	0.9306	1.98	0.9761	2.48	0.9933
1.49	0.9319	1.99	0.9767	2.49	0.9934

$\Phi(-u) = 1 - \Phi(u)$

## PMF, PDF AND CDF AND ITS IMPLEMENTATION IN PYTHON

The article discusses the concepts of Probability Mass Function (PMF), Probability Density Function (PDF), and Cumulative Distribution Function (CDF) in the context of probability distributions.

PMF is used for discrete random variables to calculate the probability of a specific outcome, while PDF and CDF are used for both discrete and continuous variables, with PDF focusing on probability at a specific point and CDF on the cumulative probability.

The article also provides Python code examples for plotting PDF and CDF curves, demonstrating practical applications of these functions in data analysis.

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## A COMPLETE GUIDE TO THE PROBABILITY DISTRIBUTION

The article provides a comprehensive guide to probability distributions. It distinguishes between discrete and continuous distributions. It delves into several continuous distributions, such as Normal, T, and Exponential, highlighting their applications and characteristics.

It also covers discrete distributions, including Binomial and Poisson, detailing their properties and use cases.

The article emphasizes the practicality of these distributions in real-world scenarios and statistical problem-solving.

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