Ke Deng
STA303
Polished Writing 2

Maximum Likelihood Estimator and Likelihoods

Hi! How are you doing today? A question about MLE? Of course, I'd be happy to explain it to you here.

So, in the study of statistics, especially in university studies, the idea of the possibility of occurrences is being brought up and discussed in many ways. We use data and distribution to estimate, and there is more than one method of that. A model is often being built to describe the data, where a simple linear regression equation is the simplest case of the study, using the formula. In this case, we refer to 'm' and 'b' as the parameters of the model, where each model has different parameters, and parameters help define the model.

The intuitive definition of maximum likelihood estimation is that it is a method that helps determine the value of the parameters, where the parameter values are such that they maximize the likelihood of the process (Brooks 3). To calculate the values of the parameters using the maximum likelihood method, you can use differentiation and other calculus methods to find a maximum point or value. However, for MLE to perform, there are preconditions, such as the independence of the observations, checking for conditional probabilities, and so on. You see, it is a very helpful tool in estimating.

One possible example I can think of and give you at this moment is that, for example, we have data generated from a normal distribution, given three points: 9, 9.5, and 11. We know the formula for the normal distribution, and we use the three observations to plug them in. For a normal distribution, we are interested in estimating the parameters of mean and variance. The three points are assumed to be independent, hence we can multiply their formulas. Given a probability function, the job is to figure out the values of mean and variance that results in the maximum value of the probability function, which can be done using differentiation. Another way to calculate the maximum value is to take the logarithm of the expression since the log expression gives a monotonically increasing function.

So, overall, MLE is a simple way that helps estimate parameters. Oh, perfect! My order's ready and I got to go. I hope this helps you understand how MLE works a little bit. If not, feel free to drop by during office hours or send me an email! See you!

References

Brooks-Bartlett, J. (2018, January 31). Probability concepts explained: Maximum likelihood estimation. Retrieved February 03, 2021, from https://towardsdatascience.com/probability-concepts-explained-maximum-likelihood-estimation-c7b4342fdbb1