

Optimal Results for Curse of Dimensionality Problems Using Orthogonal Transformation

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ABSTRACT

The amount of data needed to produce a statistically significant result grows exponentially as the number of features or dimensions in a dataset rises. This could result in problems like over fitting, higher computation times, and less accurate machine learning models. When working with high-dimensional data, it is referred to as the curse of dimensionality problems. The number of possible feature combinations exponentially grows with the number of dimensions, making it computationally challenging to get a representative sample of the data and making tasks like clustering or classification more expensive and involve more variables. Furthermore, some machine learning algorithms may be sensitive to the number of dimensions, necessitating more information to reach the same degree of accuracy as data with lower dimensions. With the use of orthogonal transformation, a statistical process that transforms the observations of correlated features into a set of linearly uncorrelated data. The principal components are these newly altered features. Further, we identify significant patterns in the provided test dataset by adopting the least variances.

Keywords: Dimensional reduction, feature engineering, orthogonal transformation

