

ABSTRACT

THESIS: A Survey on Generalized Linear Models (GLMs) and their Diagnostic Tools

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PAGES: 62

An important statistical development in the last four decades has been the advancement in the field of regression analysis for a variety of response variables under the umbrella of an exponential family of distributions. The basic idea is to use a generalized linear modeling scheme for the response variables distributed as an exponential family of distributions. Regression analysis for a single response is conceptually a simple method for investigating functional relationships among the response and a number of predictor variables. The general linear regression model requires that the response variable follows the normal distribution whereas the generalized linear regression models is an extension of the general linear model which allows the response variables to be non-normal within the exponential family of distributions. An important aspect of any regression analysis is the diagnostic tools for evaluating whether and to what extent the assumption for the regression models are valid. Diagnostics tools are well studied and understood for linear regression models. In this research, a survey on the diagnostic tools for generalized linear regression models such as, Poisson regression, Logistic regression and Multinomial regression are conducted. Also, numerical examples are provided to illustrate these tools for Poisson regression, Logistic regression and Multinomial regression.