

Abstract

THESIS: STATISTICAL AND NEURAL NETWORK MODELING OF PROPORTIONAL DATA

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In this thesis, we consider models of data with a proportional response. Data analysis, when there is a proportional response, has wide application in many domains including finance, insurance, population studies, and many others. In this thesis, we focus on the application of such models to health research. Traditionally, linear regression models, after transformations have been applied, and general linear models (GLMs) are approaches taken for such analysis. However, these conventional approaches may fall short in capturing intricate relationships and interactions within the data. To address this limitation, we explore the use of neural networks to model data with a proportional response. Neural networks offer a more flexible alternative, with a focus on prediction, while effectively handling non-linearity and interactions. On several real data sets, concerning relevant health issues, and on simulated data, we apply and compare different statistical and predictive models for data with a proportional response.