

Social application with multivariate regression chain graph models

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Abstract. This work studies how the different level of education can be affected by individual characteristics and, at the same time, how the scholastic training can affect other social aspects of the interviewees' life. We propose to describe this kind of relationships through a multivariate logistic regression model based on the Chain Graph model. By following the approach of Marchetti and Lupporelli, [2], in fact, we take advantage from a particular case of Chain Graph model, called “of type IV”, in order to express variables as *purely explicative*, *purely response* and *mixed* variables. In addition, we also study the relationships under the context-specific independence point of view. This means that we study if there are conditional independencies that hold only for a subset of modalities of the conditioning variables. Formally, a context-specific independence has the form $A \perp B|C = i_C$ where A , B and C are three sets of variables and i_C is the vector of certain modalities of the variables in C . Nyman et al. [4] handle with the context-specific independencies in the graphical models, through the so-called *strata* added to the graphs. We improved their approach by implementing the *strata* also in the Chain Graph models, see [3]. This work is finalized in showing the multiple aspects that it is possible to highlight by implementing these models, in both graphical and parametric point of views. The analysis were carried out on the ISTAT dataset on the “*aspects of everyday life*”, [1].

Keywords: Chain Regression Model, Multivariate Logistic Regression Model, Context-specific independence, Educational Study.

References

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