



基于Gram-Schmidt过程的判别变量筛选方法

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Variable selection in discriminant analysis based on Gram-Schmidt process

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摘要 利用Gram-Schmidt过程,在自变量集合中选择对判别分类解释性最强的信息,删除对分类无显著解释作用的信息以及重复解释的信息,并把挑选出来的解释变量集合变换成若干直交变量.一方面实现了判别分析模型中的变量筛选,同时也解决了自变量多重共线条件下的有效建模问题.在选入变量的过程中运用F统计量检验变量的判别作用,更容易被统计应用人员所接受.为了说明所提算法的合理性和有效性,以Fisher判别分析建模为例,通过仿真数据建模取得了合理准确的分析结论.

关键词: Gram-Schmidt正交变换 判别分析 变量筛选 多重相关性

Abstract: A new linear discriminant analysis modeling method based on Gram-Schmidt process was introduced, which firstly selected the most effective variables for classification in the independent variables set. In the meantime, the insignificant variables and the redundant information were identified and removed from the independent variables set. The selected variables were transformed into a set of orthogonal vectors by Gram-Schmidt process. Not only can the proposed method accomplish variable selection in linear discrimination, but also overcome the multi-collinearity problem effectively. Since F-statistic works as a criterion to verify the discrimination effect of each selected variable, it helps analysts to understand the analysis result. In order to test the reasonableness and effectiveness of the method, a simulation experiment was carried out. The result indicates that the proposed method can lead to a reasonable and precise conclusion.

Keywords: Gram-Schmidt orthogonal transformation discriminant analysis variable selection multiple correlation

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