



Matrix Variate Logistic Regression Model with Application to EEG Data

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Logistic regression has been widely applied in the field of biomedical research for a long time. In some applications, covariates of interest have a natural structure, such as being a matrix, at the time of collection. The rows and columns of the covariate matrix then have certain physical meanings, and they must contain useful information regarding the response. If we simply stack the covariate matrix as a vector and fit the conventional logistic regression model, relevant information can be lost, and the problem of inefficiency will arise. Motivated from these reasons, we propose in this paper the matrix variate logistic (MV-logistic) regression model. Advantages of MV-logistic regression model include the preservation of the inherent matrix structure of covariates and the parsimony of parameters needed. In the EEG Database Data Set, we successfully extract the structural effects of covariate matrix, and a high classification accuracy is achieved.

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