

Abstract

This study reviews theory on logistic and extends to auto-logistic regression, which is appropriate for binary data. This auto-logistic regression allows for local spatial autocorrelation by the inclusion in a logistic model of a covariate deprived from neighbouring values of response variable.

The statistical methodology for taking account of spatial autocorrelation is not as developed as for these type of models as it is for least squares regression analysis. After factoring in the auto-covariate factor, the model was compared with logistic regression model. Models having smaller Akaike's Information Criterion (AIC) was considered the better model in the sense of model fitting balanced with model parsimony. The results indicated that auto-logistic model outperforms logistic model.

Auto-logistic model was then fitted to Somalia settlement census data to identify the key possible covariates influencing poverty in Bari region. Parameter estimates were carried out using maximum pseudo-likelihood method which is an alternative of maximum likelihood. Finally, Receiver Operating Characteristics (ROC) curve was used to summarize the predictive accuracy of the model in terms of true positive/false positive pairs given different cut-off values for model prediction of spread events.

Key words: Logistic model, Newton-Raphson method, spatial autocorrelation, auto-logistic model and maximum pseudo-likelihood.