On comparison between logistic regression and geographically weighted logistic regression: with application to Indonesian poverty data

ABSTRACT

The linear models generally rely on the assumption of independence. This assumption is not accomplished in social sciences in which observations are usually correlated. In the case of socioeconomic data, the phenomenon of spatial dependence will lead to the problem of spatial-nonstationarity. There are many methods proposed in dealing with spatial-nonstationarity, including geographically weighted regression (GWR), to accommodate local-spatial effect on the observations. The method estimates local parameters in each location rather than single parameter in the global model. GWR can be applied to linear, logistic and Poisson regression. This paper explores properties of GWR for logistic regression, i.e. geographically weighted logistic regression. Application of the model to Indonesia poverty give a contradict results compared to the global logistic model. Statistical tools of model comparison are residuals sum of square, Pearson X^2, deviance, log likelihood, Akaike information criterion, Bayesian information criterion, spatial autocorrelation coefficient and power of classification accuracy. In general, the logistic GWR performed better than the global one.

Keyword: Spatial analysis; Spatial nonstationarity; Geographically weighted logistic regression; Poverty data