

ABSTRACT

The thesis attempts to describe the contemporary development in quantitative analysis used in geography. First by reviewing developments in quantitative geography and spatial statistics, and second by presenting the examples of recent applications. In quantitative geography, there has been a large number of major changes within the past decade. These changes often do not necessarily represent the development of new techniques but mainly reflect the philosophical changes in the way quantitative analysis are approached. A much greater emphasis is given to the development of new techniques for spatial analysis which do not necessarily conform to the traditional statistical ways of thinking. For example, there is the emphasis on exploratory spatial data analysis, GIS-based forms of spatial analysis, local statistics, computational power, visualizing data and model outputs. One purpose of this thesis therefore is to describe these developments and to review some of the related issues.

It is focused primarily on spatial data analysis as a part of a geographical research. Spatial data have unique qualities which make the use of methods borrowed from non-spatial disciplines highly questionable. Three major analytical issues (the modifiable areal unit problem, spatial autocorrelation and spatial nonstationarity) are reviewed also with techniques designed to handle these issues as well as with empirical examples. The emphasis is given to spatial nonstationarity and local forms of spatial analysis instead of global ones. For example, global regression has been applied in many cases to explore relationships between socioeconomic variables. Although these analytical approaches have proved useful, they have the shortcoming that they can mask geographical variations in relationships. In regression models where the subjects are geographical locations, regression coefficients sometimes do not remain fixed over space. A technique for exploring this phenomenon, geographically weighted regression (GWR), is being introduced.

All quantitative analysis are based on aggregate statistical data referring to voting behaviour in the Czech Republic in the parliamentary election in 2002. The examples highlight the relevance and usefulness of the reviewed techniques including GWR and show how contemporary developments in quantitative analysis can improve geographical research and potentially also our understanding of geographical processes.