

A spatial rough set for extracting the periurban fringe

Beniamino Murgante*, Giuseppe Las Casas*, Anna Sansone*,

* University of Basilicata, Viale dell'Ateneo Lucano 10, 85100, Potenza
[*beniamino.murgante@unibas.it*](mailto:beniamino.murgante@unibas.it)

Abstract. To date the availability of spatial data is increasing together with techniques and methods adopted in geographical analysis. Despite this tendency, classifying in a sharp way every part of the city is more and more complicated. This is due to the growth of city complexity. Rough Set theory may be a useful method to employ in combining great amounts of data in order to build complex knowledge about territory. It represents a different mathematical approach to uncertainty by capturing the indiscernibility. Two different phenomena can be indiscernible in some contexts and classified in the same way when combining available information about them. Several experiences exist in the use of Rough Set theory in data mining, knowledge analysis and approximate pattern classification, but the spatial component lacks in all these research streams.

This paper aims to the use of Rough Set methods in geographical analyses. This approach has been applied in a case of study, comparing the results achieved by means of both Map Algebra technique and Spatial Rough set. The study case area, Potenza Province, is particularly suitable for the application of this theory, because it includes 100 municipalities with a different number of inhabitants and morphologic features.

1 Introduction

In a few years' time a transition has been occurred from the traditional town, characterized by static social contexts, to today's city more dynamic and very hard to control in small details. Until few decades ago the social structure of the city was characterized by a population with strong social ties, whose life was oriented by institutions, rules, authorities.

These inhabitants are now leaving the historic part of the cities more and more occupied by transition population (students, tourists, etc.). Often the centre of town is a big shopping centre with museums, libraries and other services but without residents. The new population neither has roots in those places nor the prospect of living there for the whole life. Older inhabitants have moved out of the urban area by creating a sort of dispersed spatial form (Indovina, 1990). This phenomenon occurs on the fringe of urban areas through progressive "coagulation" of buildings. Neighbourhoods without centre and with poor social relationships have been realized. These form of urban sprawl has been encouraged by the increase of number of infrastructures, the growth of income and demand for goods and services. Urban sprawl can be considered a long-term trend for successful economic-territorial systems (Camagni, et al. 2002), characterized by soil consumption generating loss of competitiveness for agricultural activities (Murgante, et al. 2008).