Generalized Dasymetric Mapping Algorithm for Accessing Land-Use Change

Antonio Manuel Rodrigues(✉) and Jose Antonio Tenedorio

CICS.NOVA Interdisciplinary Centre of Social Sciences Faculdade de Cincias Sociais e Humanas, Universidade Nova de Lisboa, Lisbon, Portugal
amrodrigues@fcsh.unl.pt
http://www.cics.nova.fcsh.unl.pt/

Abstract. The use of multivariate micro-data, data aggregated for small-areas, allows detailed analysis of the physical and social structures of regional landscapes. Such exercises are in many cases univariate and static in nature; this happens when geometries are not coincident between datasets. Common solutions to such inconsistencies involve the use of areal interpolation techniques to build coherent information sets; when ancillary information is available, dasymetric mapping using control units may then be used. Techniques vary on the type and quality of the ancillary (or control) information. The purpose of the present article is to present a generalized tool to tackle common practical analytical problems and which produces geometrically coherent datasets. It is generalised because: (1) it is flexible, allowing distinct parametrization depending on the data; (2) it is based on Open Source tools anchored on robust database management systems (DBMS) technologies. Its aim is to provide the regular GIS user with a tool to tackle a common problem of geometric mismatch.

Keywords: Dasymetric mapping · Computational statistics · FOSS · Database Management Systems

1 Introduction

Multivariate or temporal analysis of geographical data aggregated for specific areas, polygons, is highly dependent on the geometrical coherence between these spatial units. When the shape of these units from distinct datasets does not coincide, areal interpolation and Dasymetric mapping techniques are important [2,3,7]. An areal interpolation exercise may be described as the re-allocation of numeric data according to some geometrical schema; original geometries may be called *source* spatial data and the end-geometries as *target* spatial data; the final datasets are spatially coherent because data describing all phenomena studied are aggregated according to the same set of areas (spatial units).

The characteristics of spatial data aggregated for a finite set of spatial units (regions) imply a number of problems which should be tackled, otherwise statistical results may be flawed. When using univariate statistical techniques for

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