Conflation of Maps for the Integration of Geospatial Data and Enhancement of Building Registry Quality

Gianluigi Salvucci, Damiano Abbatini, Daniela Ichim, Juri Corradi and Stefania Lucchetti (Istat, Italy)
salvucci@istat.it

Abstract

The Integrated System of Statistical Registers (ISSR) is a major strategic programme of the Italian Statistical Institute. Statistical registers are mainly built by a massive integration of administrative data. In different production stages, e.g. construction, quality assessment or dissemination, other data sources may be employed as well. The Statistical Register of Places is a pillar of ISSR. It is a multidimensional and complex register integrating and connecting different spatial units, e.g. addresses, buildings, administrative regions, etc. Among the various components, the Building Registry is the subject of our work. Currently, the only source feeding the Building Registry is the cadastre, which needs to be integrated with other information. As a component of the Statistical Registry of Places, a significant dimension of buildings is its territorial positioning. The quality standards of its cartographic representation can be improved through the integration of other data sources of the same nature, i.e. digital maps. This paper discusses the potential of collecting the information included in a novel geographical database, namely the National Synthesis Database (DBSN). The DBSN is a database released by the Military Geographic Institute, the Italian cartographic institute. This database contains detailed information on buildings from various sources, including regions and OpenStreetMap. The DBSN includes variables like type of building (e.g., palace, tower, skyscraper), usage category (e.g., residential, public office, hospitals…), construction state (built, under construction, ruined), as well as identification of monumental buildings. The paper concentrates on the DBSN usage to improve the completeness of the Statistical Register of Buildings. Indeed, the completeness of the building registry relies on its ability to associate each statistical unit from other registries/sources with a logical entity, e.g. residence or premises. By ensuring spatial accuracy, the geographic integration of the building register and DBSN is expected to enhance data quality evaluations. In the absence of a unique identifying code, the enrichment of the Building Registry, both in terms of statistical units and information, is possible only by leveraging cartographic elements. In other words, object recognition should be performed through spatial overlay operations. When assessing the similarity between different maps, comparisons are geometrically derived. Common indicators include number of vertices, perimeter, area of intersection or some synthesis indicator of similarity. All these measures allow for the consideration of objects in relation to each other through overlapping shapes, taking into account the that discrepancies between maps could lead to incorrect associations. The paper will illustrate some preliminary results obtained by geographically integrating the Istat building register and DBSN. A main objective of the Istat project is the selection of a battery of indicators to be analysed when collecting a new geographical dataset on buildings.