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Using Open data in analyzing urban growth: urban density and change detection

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In recent years a great attention has been paid to the evolution and the use of spatial data. Internet technologies accelerated such a process, allowing more direct access to spatial information. It is estimated that more than 600 million people have been connected to the Internet at least once to display maps on the web. Consequently, there is an irreversible process which considers geographical dimension as a fundamental attribute for the management of information flows.
Furthermore, the great activity produced by open data movement leads to an easier and clearer access to geospatial information. This trend concerns, in a less evident way, also satellite data, which are increasingly accessible through the web.
Spatial planning, geography and other regional sciences find it difficult to build knowledge related to spatial transformation. These problems can be significantly reduced due to a large data availability, producing significant opportunities to capture knowledge useful for a better territorial governance.
This study has been developed in a heavily anthropized area in southern Italy, Apulia region, using free spatial data and free multispectral and multitemporal satellite data (Apulia region was one of the first regions in Italy to adopt open data policies).
The analysis concerns urban growth, which, in recent decades, showed a rapid increase. In a first step the evolution in time and change detection of urban areas has been analyzed paying particular attention to soil consumption. In the second step Kernel Density has been adopted in order to assess development pressures.
KDE (Kernel Density Estimation) function is a technique that provides the density of a phenomenon based on point data. A mobile three dimensional surface has been produced from a set of points distributed over a region of space, which weighs the events within its sphere of influence, depending on their distance from the point from which intensity is estimated.
It produces, considering as input point data (vector), a density continuous raster as an output. In this case, the intensity of phenomenon will be given by buildings volume.

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