Measuring urban renewal: a dual kernel density estimation to assess the intensity of building renovation

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In the cities of post-industrialized countries, building renovation is the main part of building construction activity. Measuring that ongoing phenomenon is a problem of visualization and representation at which traditional representation tools and processes have some limitations. Databases are resources open to architectural research that provide new possibilities to develop design practice and theory. Methods related to data-driven tools can improve the analysis of the urban renovation phenomena and its distribution throughout urban areas and be of great usefulness for urban planning and public policies. To support these processes, Kernel Density Estimation (KDE) is an efficient tool that overcomes incomplete data, as not all renovation is reported to city halls. This article aims to provide a vision of the possibilities of integrating dispersed datasets. Using the city of Lisbon building permit alphanumerical and spatial database as a case study, we present preliminary work on a method of measuring building renovation intensity. Using Dual KDE we determine the intensity of building renovation across the city and along the time period, comparing the density of two different variables, the density of building renovation and the density of the city. We further provide two implementations of this methodology, using a parametric modelling environment and a GIS software.