

# Advanced classification of urban form

## Integrated analysis of land cover and plot boundaries for building type identification

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Land cover data represents an important basis for the fulfillment of numerous analyses. In particular for questions in the context of spatial planning, urban settlement monitoring is essential. The location of various building types, reserved areas, and their future demand in urban settlements are integral information for regional policy. The objective of this study is to develop a method which permits identification of different building types (STEINNOCHER et al., 2011). Seven categories are chosen for the classification: detached houses, semi-detached houses, terraced houses, apartment buildings, perimeter block development, large storage buildings (typical for industry/trade), and high-rise buildings. The methodology relies on integrating location, footprint, and height parameters from the land cover data with plot boundaries from the cadaster. Combination of these data sets enables identification of building structures, from open to closed coverage types. The differentiation of detached, semi-detached, and terraced houses can only be achieved by the integration of plot boundaries. Additional parameters are the number of buildings per plot, as well as the green-area ratio. Small building objects of less than 35 m<sup>2</sup> are eliminated from the data set.

Result of the classification approach is a model, implemented in ArcGIS 9.2 and tested on LISA (Land Information System Austria) data. The LISA project features a newly developed information and monitoring system with the main focus on harmonized, updated, and geometrically exact collection of the status and changes of land use and land cover (LULC) in Austria. LISA prototype data is based on aerial imagery, airborne laser scanning, and remote sensing data (WEICHSELBAUM et al., 2009). The test area covers part of Klagenfurt, Carinthia, including the quarter Annabichl – Welzenegg – St. Peter. Realization in GIS starts with an intersection of land cover data with the plot boundaries and proceeds with a spatial join in order to get information from both data sets. For each building parameters such as height and footprint, number of buildings per plot, green-area ratio, and plot boundaries are calculated. The final classification is based on predefined rules referring to a set of selected parameters for each building type. Applying this rule set to the study area results in a total coverage of over 98% leaving less than 2% of the buildings unclassified. Accuracy assessment is based on a random sample of 5% of all buildings, indicating that 83% of the building objects are classified correctly. Current research is focused on refining the rule set in order to increase classification accuracy.

### References:

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