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CARTOGRAPHY OF URBAN VEGETATION THROUGH THE USE OF HIGH RESOLUTION SATELLITE IMAGERY

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Detailed thematic maps are needed for managing city space. In the context of sustainable development, urban green areas are a subject of special concern. These areas are often designated for public use such as parks, gardens, or natural landscape spaces. Protection of green areas is currently one of the most important aims of urban development. Recent remote sensing by satellites provides a great deal of data about the state of urban landscapes. Most cartographic work detecting urban green areas is performed with satellite and aerial images manually on a computer screen by a human operator; he or she probably also needs to conduct terrain visits.

In this poster, we present the potential of using SPOT-5 images and LIDAR data to detect urban vegetation. Specifically, we study classification methods such as neural networks in order to automate the process.

A case study has been carried out for part of the city of Alcalá de Henares in Madrid (Spain), corresponding to the Campus of Alcala University and its surroundings. Existing urban maps contain cadastral data, utilities, streets, buildings and other human-made phenomena, but the maps do not show natural objects, such as lawn, grass, bushes, shrubs and trees. Therefore, we decided to use satellite images as a source of thematic data to show green vegetation in detail.

The LIDAR data used in our work has a resolution of half a pulse per square meter and was useful for discriminating between low and high vegetation, such as trees and shrubs versus grass. First, the precise registration of the data was necessary in order to match SPOT-5 images with LIDAR data. The classification method used was a neural network, and its parameters were tuned to optimal performance. Quality analyses were made with confusing matrices that demonstrated the goodness of the method. To interpret the SPOT-5 images, true terrain information as training data for the neural network had to be obtained. Unreadable or uncertain places were surveyed at the site; this was easy since the study area, the university campus and surroundings, is well known to the authors.

Results show that SPOT-5 and LIDAR data together with neuronal classification are convenient tools for detecting and mapping urban green areas. The poster also discusses the appropriateness of the spatial and spectral resolution and the compromises between efficacy and costs.