EU FP6 Project INTELCITIES: Automated Determination of Spatial Environmental Indicators in Urban Areas

Starting Point

Future urban planning will increasingly use Information and Communication Technologies (ICT), in particular Geographic Information Systems (GIS), associated with (semi-)automatic procedures. In the 'e-Land Use Information Management' work package of the EU FP6 project IntelCities, methods for GIS-based assessment of land use changes are developed, tested and presented in three showcases. One of the showcases is developed by EMPA, Definiens Imaging and the City of Berlin.

Objectives

In the context of land use planning, the City of Berlin applies the Strategic Environmental Assessment (SEA) directive 2001/42/EC of the European Commission. The SEA directive prescribes, that the significant environmental effects of the implementation of plans and programmes be monitored. In order to facilitate the calculation of spatial environmental indicators for this monitoring process, a tool will be developed and applied, which makes possible automatic habitat classification in urban areas on the basis of airborne and satellite images.

Materials and Methods

Investigation Objects

For the showcase Berlin, two areas of the city have been chosen as the investigation objects:

– The area of Neu-Venedig, where in the last 15 years an allotment area has steadily changed into a residential area.
– The area «Gosener Wiesen», where increasing shrub coverage is changing the structure of the moor habitat and threatening the living conditions of rare plants and animals.

Digitalisation and Transformation

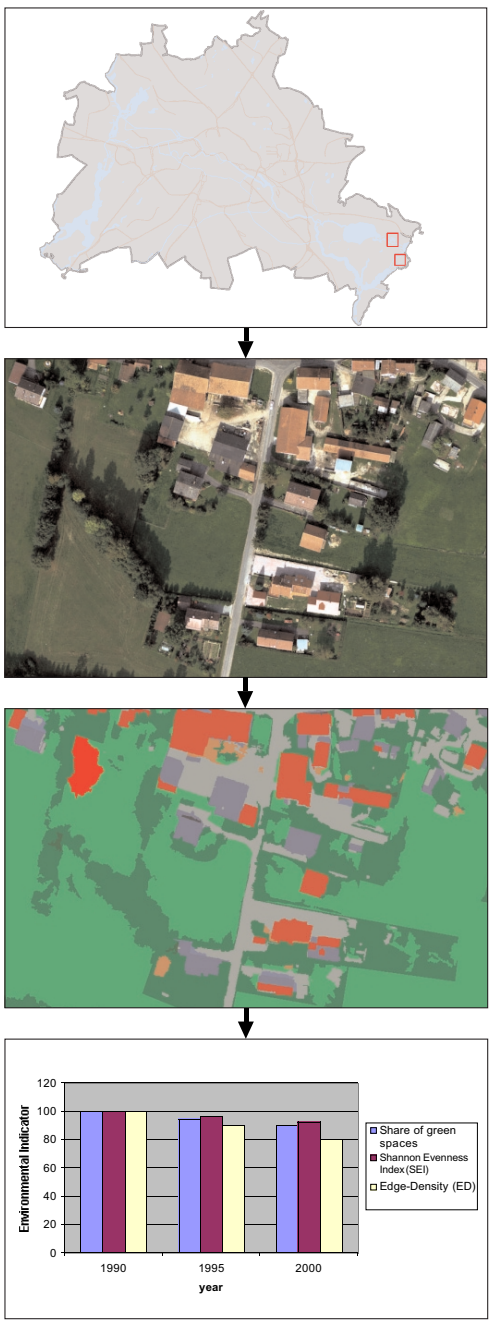
For each of the two areas, airborne false-color infrared images taken at selected points in time are digitalised. Due to the present lack of adequate satellite images for the two areas, the higher resolution of the digitalised airborne images is transformed into a lower resolution typical for satellite images.

Segmentation and Classification

The photos are automatically segmented and classified into defined habitats with the aid of the image classification software eCognition from Definiens Imaging. With eCognition, semantic information necessary to interpret an image is not represented in single pixels, but in meaningful image objects and their mutual relations.

Calculation of Environmental Indicators

Based on the classified images and on GIS data provided by the City of Berlin, spatial environmental indicators are calculated. The results are interpreted and discussed with regard to the possibilities and limitations of an automated determination of spatial environmental indicators in urban areas, including a comparison with traditional, supervised classification of airborne and (simulated) satellite images.



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