Space Allocation of Urban Facilities Using Constrained Voronoi Diagram

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ABSTRACT: Space allocation of urban facilities plays an important role in urban planning. Geospatial Information System (GIS) is increasingly used by urban planners and provide them with objective parameters for space allocation and analysis. However, the use of GIS in urban planning is based on simple distance criterion and complex spatial analyzes based on the established approaches in urban planning may be constrained by the limitation of GIS analytical functions. In this paper, we propose and develop a new method for deriving service areas for urban facilities based on Constrained Voronoi Diagram (CVD). In order to test and validate the proposed approach we have applied it to define the overpopulation level of schools, comparing their estimated and expected population. The service areas of schools are estimated based on the population, proximity, level of service and safety of access rules that are used for space location of the schools. The obtained results show that the proposed method provides an optimal space allocation, while it does not suppress the established rules of urban planning.