Calculating Land Values by Using Advanced Statistical Approaches in Pendik

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Key words: Land management; Valuation; "advanced statistics", "fuzzy logic", "random forest"

SUMMARY

In sustainable land development concept, primary factor is to obtain reliable and accurate information about land and to manage all this information efficiently. Definitive and reliable information about land and real property promote the geographical enablement and efficient information management which leads to achieve a sustainable development. In addition, governments need reliable value information of the land and real property for implementing many legal practices such as taxation, expropriation, market capitalization, rural-urban transformation and land consolidation. In Turkey, especially with the recent intensively performed urban transformation applications real estate valuation has increased its importance within the sector. Therefore, objective, accurate and reliable estimation of the value of land and real property has vital importance for real estate stakeholders. For this purpose, a variety of valuation techniques has been suggested in the literature, but there is no specific and widely-accepted method for estimating reliable and accurate land value. Classical valuation methods such as sales comparison, cost, income and regression have become sufficient in collective and objective land and property valuation processes. Land valuation consist of a multi-step and complex processes that input parameters are highly correlated and effective on accuracy. In order to overcome this problem, some non-parametric techniques including random forest and fuzzy logic have been recently used for land valuation purposes. In this study, parcel based valuation process for Pendik will be performed by using fuzzy logic and random forest algorithms. Firstly, criteria or parameters affecting the land value were determined according to the literature review. Secondly, ground truth dataset including a number of parcels having up-to-date market value was formed and training and validation samples were selected by applying stratified random sampling strategy in GIS environment. The prediction models of fuzzy logic and random forest were applied to whole dataset to produce land value map of the study area. Resulting maps and performance of the algorithms were compared and analysed in detail. All in all, fuzzy logic and random forest algorithms were found to be effective techniques for producing reliable and accurate land value maps.

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FIG Congress 2018
Embracing our smart world where the continents connect: enhancing the geospatial maturity of societies
Istanbul, Turkey, May 6–11, 2018