

# On the Prediction Performances of SVM and ANN Methods for Mass Appraisal Assessment: A Case Study from Ankara (Turkey)

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**Key words:** Valuation; Mass appraisal; Machine learning; Support vector machine; Artificial Neural Networks

## SUMMARY

Real estate is an important economic factor in many countries. The measurability of the size of the real estate sector plays an effective role in determining the gross national product of the countries and thus their economic scale. The real estate valuation activities are in general time-consuming and labor-intensive processes. In developed countries, mass and automatic valuation property approaches are often preferred to individual valuation based on conventional methods, especially when the outputs are utilized for the real estate tax calculations. The recent developments on data-driven machine learning methods facilitate the mass appraisal studies even though the data quality issues introduce vulnerability to the processes. In this study, two commonly used machine learning methods, namely support vector machine (SVM) and artificial neural networks (ANN), were employed for the mass appraisal of 2850 data samples composed of mostly residential properties and with few commercial ones. The study area is located in Mamak District of Ankara, Turkey, which is an urban expansion area. The property features and the price information were collected in a pilot study previously carried out by the General Directorate of Land Registry and Cadastre, Turkey. According to the accuracy assessment results, the total variance explained from the ANN model was  $R^2$  of 0.84 with an RMSE of 14.805 TRY. The SVM results yield to  $R^2 = 0.76$  and  $RMSE = 16.397$  TRY. Thus, ANN slightly outperforms SVM for the study dataset. The data, methodology and the results of the study will be presented and discussed in detail here.

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