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Predict assessed property value for the purpose of property tax assessment

I.Problem Description

Predict assessed property value for the purpose of property tax assessment

Here, we have data of properties collected by a Municipal Council for the purpose of computation of assessed value and assessment of property tax within the framework of state laws. An individual tax lot may range from multiple buildings to just one residential or commercial unit in a condominium.

Assessed value depends on the variables such as location, building class for understanding constructive use, area (land and/or buildup), year of construction etc. Location can be measured by certain data elements like ZIP code, longitudinal, latitudinal measures etc.

Hint : Please refer to the online resources to get the building class category details for the specific state.

The Municipal council is facing the problem of many citizens challenging the assessment of property taxes and is criticized for complicated assessment procedure system as well as multiple required filings throughout the year to challenge one's assessment. Therefore, the Council wants to rationalise the tax assessment system. They also want to structure benefit programs based on certain variables of statistical significance to incentivise additional construction activity or activity of conversion/modification of properties for reducing tax burden and/or to make the contemplated projects more economically feasible.

Therefore the idea is to achieve consistent, rational and objective assessment of properties based on a predictive model by automating the property valuation process to reduce the unfairness within the tax system.

You are expected to create an analytical and modelling framework to predict the property evaluation value based on the quantitative and qualitative features provided in the dataset while answering other questions too cited below.

II.The datasets are provided as cited below for forecasting the value of building asset:

1. **Data :**
   i. Train.xlsx (To build the model and tune the model & visualization)
   ii. Test.xlsx (Model will be tested on this dataset in tool)

Target attribute : "PropertyEvaluationvalue"

III.Tasks:

Main task :

You are expected to create an analytical and modelling framework to predict the property evaluation value based on the quantitative and qualitative features provided in the dataset. You may derive new features from the existing features and also from the domain knowledge, which may help in improving the model efficiency.

Visualization Tasks:

I. Exploratory Data Analysis using visualizations in R Notebook or Jupiter notebook format . **(Train.xlsx should be used for this task)**

a) Based on domain and data understanding, which attributes do you intuitively think would impact the property evaluation value?

b) Identify the data points that are responsible for inconsistencies in the assessed value. For ex: identify inconsistent data points involving properties expected to be of equal value but assessed with a great amount of variation in their assessed value.

c) If you find inconsistencies, please elaborate on how it can be handled.

d) Using the ML methods, which attributes do you find as important and do you agree with the observations as per (a) above under visualization tasks? Explain

IV. Accuracy Metric:

- Consider the '**mape**' as the error metric for regression task to tune the model.