**Property Price Prediction**

**Problem Statement**

There are a number of factors which determine property prices, some are logical, based on economic theories and population density and some are based on more intangible factors, like availability of amenities & necessities, neighborhood, etc.

Build a linear regression model with stochastic gradient descent to predict the price of the property from the dataset having attributes such as sale type, sale condition etc.

**Data Description**

* **Zoning\_Class:** Identifies the general zoning classification of the sale
* **Building\_Class:** Identifies the type of dwelling involved in the sale
* **Lot\_Extent:** Linear feet of street connected to property
* **Lot\_Size:** Lot size in square feet
* **Road\_Type:** Type of road access to property
* **Lane\_Type:** Type of alley access to property
* **Property\_Shape:** General shape of property
* **Land\_Outline:** Flatness of the property
* **Utility\_Type:** Type of utilities available
* **Lot configuration:** Lot configuration
* **Property\_Slope:** Slope of property
* **Neighborhood:** Physical locations within Ames city limits
* **Condition1:** Proximity to various conditions
* **Condition2:** Proximity to various conditions (if more than one is present)
* **House\_Type:** Type of dwelling
* **House\_Design:** Style of dwelling
* **Overall\_Material:** Rates the overall material and finish of the house
* **House\_Condition:** Rates the overall condition of the house
* **Construction\_Year:** Original construction date
* **Remodel\_Year:** Remodel date (same as construction date if no remodeling or additions)
* **Roof\_Design:** Type of roof
* **Roof\_Quality:** Roof material
* **Exterior1st:** Exterior covering on house
* **Exterior2nd:** Exterior covering on house (if more than one material)
* **Brick\_Veneer\_Type:** Masonry veneer type
* **Brick\_Veneer\_Area:** Masonry veneer area in square feet
* **Exterior\_Material:** Evaluates the quality of the material on the exterior
* **Exterior\_Condition**: Evaluates the present condition of the material on the exterior
* **Foundation\_Type:** Type of foundation
* **Basement\_Height:** Evaluates the height of the basement
* **Basement\_Condition:** Evaluates the general condition of the basement
* **Exposure\_Level:** Refers to walkout or garden level walls
* **BsmtFinType1:** Rating of basement finished area
* **BsmtFinSF1:** Type 1 finished square feet
* **BsmtFinType2:** Rating of basement finished area (if multiple types)
* **BsmtFinSF2:** Type 2 finished square feet
* **BsmtUnfSF:** Unfinished square feet of basement area
* **Total\_Basement\_Area:** Total square feet of basement area
* **Heating\_Type:** Type of heating
* **Heating\_Quality:** Heating quality and condition
* **Air\_Conditioning:** Central air conditioning
* **Electrical\_System:** Electrical system
* **First\_Floor\_Area:** First Floor square feet
* **Second\_Floor\_Area:** Second floor square feet
* **LowQualFinSF:** Low quality finished square feet (all floors)
* **Grade\_Living\_Area:** Above grade (ground) living area square feet
* **Underground\_Full\_Bathroom:** Basement full bathrooms
* **Underground\_Half\_Bathroom:** Basement half bathrooms
* **Full\_Bathroom\_Above\_Grade:** Full bathrooms above grade
* **Half\_Bathroom\_Above\_Grade:** Half baths above grade
* **Bedroom:** Bedrooms above grade (does NOT include basement bedrooms)
* **Kitchen:** Kitchens above grade
* **Kitchen\_Quality:** Kitchen quality
* **Rooms\_Above\_Grade:** Total rooms above grade (does not include bathrooms)
* **Functional\_Rate:** Home functionality (Assume typical unless deductions are warranted)
* **Fireplaces:** Number of fireplaces
* **Fireplace\_Quality:** quality of fireplaces
* **Garage**: Garage location
* **Garage\_Built\_Year:** Year garage was built
* **Garage\_Finish\_Year:** Interior finish of the garage
* **Garage\_Size:** Size of garage in car capacity
* **Garage\_Area:** Size of garage in square feet
* **Garage\_Quality:** Garage quality
* **Garage\_Condition:** Garage condition
* **Pavedd\_Drive**: Paved driveway
* **W\_Deck\_Area:** Wood deck area in square feet
* **Open\_Lobby\_Area:** Open porch area in square feet
* **Enclosed\_Lobby\_Area:** Enclosed porch area in square feet
* **Three\_Season\_Lobby\_Area:** Three season porch area in square feet
* **Screen\_Lobby\_Area:** Screen porch area in square feet
* **Pool\_Area:** Pool area in square feet
* **Pool\_Quality:** Pool quality
* **Fence\_Quality:** quality of fence
* **Miscellaneous\_Feature:** Miscellaneous feature not covered in other categories
* **Miscellaneous\_Value:** $Value of miscellaneous feature
* **Month\_Sold:** Month Sold (MM)
* **Year\_Sold:** Year Sold (YYYY)
* **Sale\_Type:** Type of sale
* **Sale\_Condition:** Condition of sale

**Evaluation Parameters**

Evaluation will be based on:

* Data Preprocessing
* Model Comparison
* Model Selection

**Data Preprocessing**

Check the data distribution of variables and perform transformation if a variable’s distribution is skewed. Perform label encoding on categorical variables.

**Model Comparison**

Build linear regression models and compare results.

**Model Selection**

Select the best model. Model selection to be based on model accuracy.

**Expected Outcome**

Low RMSE and high coefficient of determination(R^2) is expected while predicting the outcome using test data.