

Real-Estate Price Prediction

Predicting Property Prices in City of New-York

1 PROJECT SCORE

Scope of this project is to explore and analyze the property sales in city of New-York and examine the correlation between criminal activity in a particular location with the price of property sale. Predict the price of the property based on number of crime incidents in the in and around the area where property is located and other charaterstics of the property.

2 DATA UNDERSTANDING

Crime Data:

The data sets used in this study are extracted from “NYC Open Data” Arhives:

“NYPD Complaint Data Historic” :- <https://data.cityofnewyork.us/Public-Safety/NYPD-Complaint-Data-Historic/qgea-i56i> which includes all valid felony, misdemeanor and violaoction crimes reported to the New York City Police Department (NYPD).

Column	Description
CMPLNT_NUM	Randomly generated persistent ID for each complaint
CMPLNT_FR_DT	Exact date of occurrence for the reported event (or starting date of occurrence, if CMPLNT_TO_DT exists)
CMPLNT_FR_TM	Exact time of occurrence for the reported event (or starting time of occurrence, if CMPLNT_TO_TM exists)
CMPLNT_TO_DT	Ending date of occurrence for the reported event, if exact time of occurrence is unknown
CMPLNT_TO_TM	Ending time of occurrence for the reported event, if exact time of occurrence is unknown
RPT_DT	Date event was reported to police
KY_CD	Three digit offense classification code
OFNS_DESC	Description of offense corresponding with key code
PD_CD	Three digit internal classification code (more granular than Key Code)
PD_DESC	Description of internal classification corresponding with PD code (more granular than Offense Description)
CRIM_ATPT_CPTD_CD	Indicator of whether crime was successfully completed or attempted, but failed or was interrupted prematurely
LAW_CAT_CD	Level of offense: felony, misdemeanor, violation
JURIS_DESC	Jurisdiction responsible for incident. Either internal, like Police, Transit, and Housing; or external, like Correction, Port Authority, etc.
BORO_NM	The name of the borough in which the incident occurred
ADDR_PCT_CD	The precinct in which the incident occurred
LOC_OF_OCCUR_DESC	Specific location of occurrence in or around the premises; inside, opposite of, front of, rear of
PREM_TYP_DESC	Specific description of premises; grocery store, residence, street, etc.
PARKS_NM	Name of NYC park, playground or greenspace of occurrence, if applicable (state parks are not included)
HQDEVELOPT	Name of NYCHA housing development of occurrence, if applicable
X_COORD_CD	X-coordinate for New York State Plane Coordinate System, Long Island Zone, NAD 83, units feet (FIPS 3104)
Y_COORD_CD	Y-coordinate for New York State Plane Coordinate System, Long Island Zone, NAD 83, units feet (FIPS 3104)
Latitude	Latitude coordinate for Global Coordinate System, WGS 1984, decimal degrees (EPSG 4326)
Longitude	Longitude coordinate for Global Coordinate System, WGS 1984, decimal degrees (EPSG 4326)

Table1: Attributes in Crime-Data

Sales-data:

“Annualized Rolling Sales Update” :- <https://data.cityofnewyork.us/Housing-Development/Annualized-Rolling-Sales-Update/uzf5-f8n2> which includes Sales Prices of properties.

Column	Description
Borough	The name of the borough in which the property is located.
Neighborhood	Name of Neighborhood in which property is located.
Building Class Category	Category of the Building Class Egr:One Family Homes
Tax Class at Present	one of four tax classes Class 1: Includes most residential property of up to three units (such as one-, two-, and three-family homes and small stores or offices with one or two attached apartments), vacant land that is zoned for residential use, and most condominiums that are not more than three stories. Class 2: Includes all other property that is primarily residential, such as cooperatives and condominiums. Class 3: Includes property with equipment owned by a gas, telephone or electric company. Class 4: Includes all other properties not included in class 1, 2, and 3, such as offices, factories, warehouses, garage buildings, etc.
Block	A Tax Block is a sub-division of the borough on which real properties are located.
Lot	A Tax Lot is a subdivision of a Tax Block and represents the property unique location.
Easement	An easement is a right, such as a right of way, which allows an entity to make limited use of another's real property
Building Class at Present	The Building Classification is used to describe a property's constructive use. The first position of the Building Class is a letter that is used to describe a general class of properties (for example "A" signifies one-family homes, "O" signifies office buildings, "R" signifies condominiums). The second position, a number, adds more specific information about the property's use or construction style (using our previous examples "A0" is a Cape Cod style one family home, "O4" is a tower type office building and "R5" is a commercial condominium unit). The term Building Class used by the Department of Finance is interchangeable with the term Building Code used by the Department of Buildings.
Address	Street Address of the property
Zip Code	The property's postal code
Residential Units	The number of residential units at the listed property.
Commercial Units	The number of commercial units at the listed property.
Total Units	The total number of units at the listed property.
Land Square Feet	The land area of the property listed in square feet
Gross Square Feet	The total area of all the floors of a building as measured from the exterior surfaces of the outside walls of the building, including the land area and space within any building or structure on the property.
Year Built	Year the structure on the property was built.
Building Class at Time of Sale	Building Class at Time of Sale
Sale Price	Price paid for the property.
Sale Date	Date the property sold.

Table2: Attributes in Sale-Data

3 DATA CLEANING & PREPARATION

These data sets have a lot of missing values, inconsistent date-time formats. So, a great deal of time was spent in cleaning the data sets.

Sale-data is coded with zip-code as a location attribute and Crime-data does not have zip-code information but has latitude and longitude data for each reported incident. To join the crime-data with sales data appropriately, we had to use third-party GeoCoding APIs which are

expensive and need high computational times. Open-source solutions frequently timeout and often impose daily limits on number of lat-long pairs can be geo-coded. Python code for following analysis can be found @ <insert link>

3.1 IMPORT NECESSARY LIBRARIES IN IPYTHON NOTEBOOK

Necessary python libraries for analysis have been imported into ipython notebook.

Eg: datetime, csv, glob, zipfile, matplotlib, pandas, numpy, geocoder, scipy and sklearn.

3.2 READ IN AND EXAMINE DATA SET; CHECK FOR MISSING VALUES

File paths for Sales data was loaded into into a list using “glob.glob” and all of Sales-data was read and appended into single dataframe using “pd.read_excel”.

Crime-data was readily available in csv which could read with pd.read_csv into a dataframe in ipython notebook.

Missing values and formatting issues in data have been corrected or eliminated as appropriate.

3.3 REVERSE-GEOCODING THE CRIME DATA WITH ZIP-CODES

GeoCoding is to extract latitude-logitude pair when we have physical address while Reverse-GeoCoding is to extract a physical address when we have latitude-logitude information. In our case, we used python - “geocoder” library to access open-souce GeoCoding APIs “Google geocoder” and “Open Street Maps” to extract zip-codes for each lat-long pair in crime-data. As these are free services, they have daily limit of 10000 geo coding requests. Though, our sample of sales data is not more than 10000, we do not know which of the crime records match with the zip-codes on sales-data sample until we extract the zip-codes for all crime-data which has around 1 Million records. This geo-coding step took 3 weeks time.

3.4 CALCULATING CRIME INCIDENTS FOR SALE RECORDS

Next step is to calculate the number of crime incidents reported (in past 6 months, 1, 2, 3, 4, 5 years) for zip-codes in each record in sales-data as of sale-date.

Written custom python functions for calculating below values for each record in Sale-data: “past_crime_count”, “past6M_crime_count”, “past1Y_crime_count”, “past2Y_crime_count”, “past3Y_crime_count”, “past4Y_crime_count”, “past5Y_crime_count” and “past_MISDEMEANOR_count”, “past_FELONY_count”, “past_VIOLATION_count” ranging from past 6 Months to 5 Years, all-past counts.

This is very time-consuming task as we have to make independent function calls for each record. Each function call for all 8000 sample records takes from 8-10 hours.

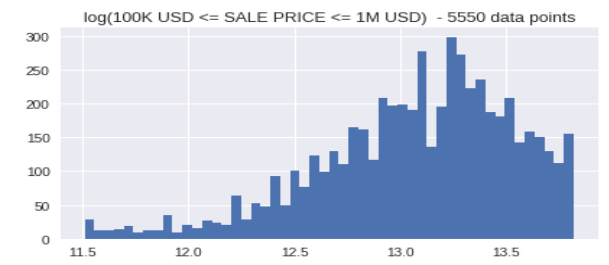
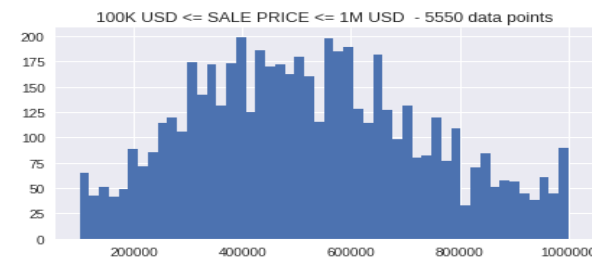
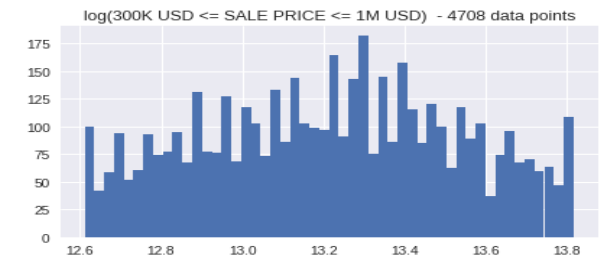
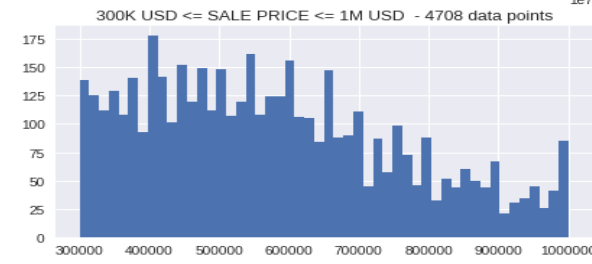
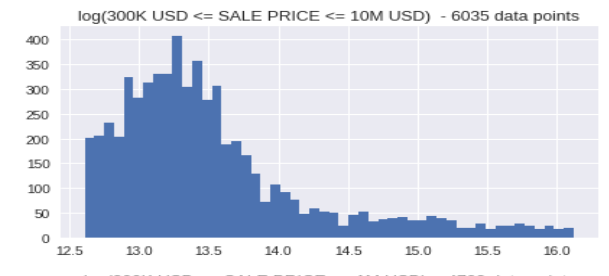
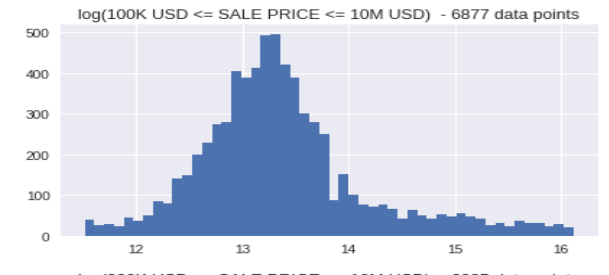
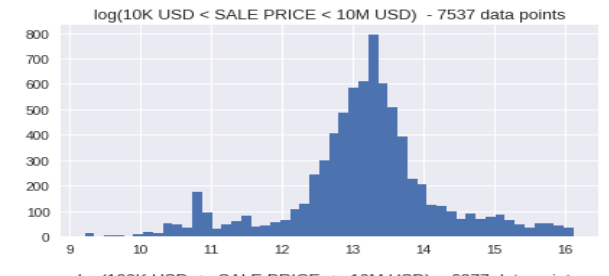
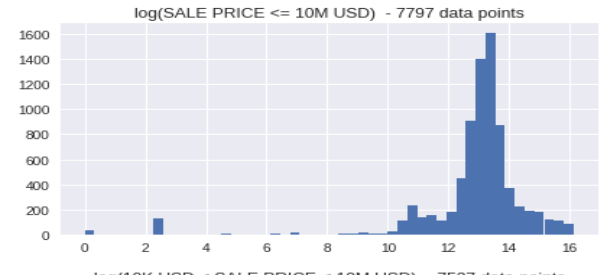
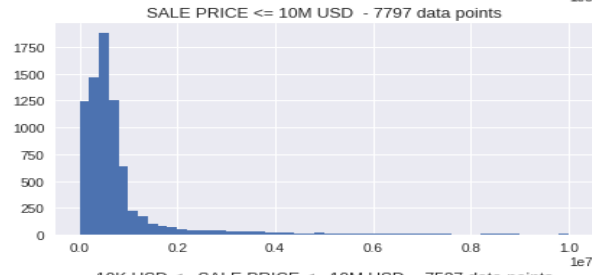
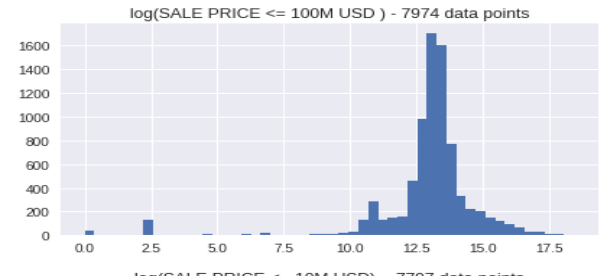
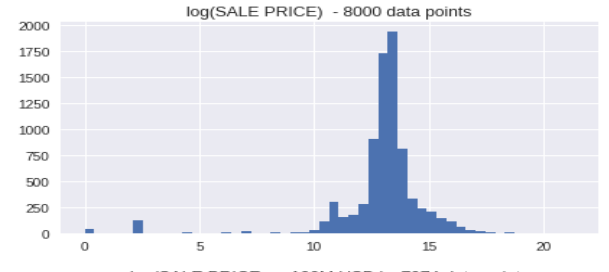
4 EXPLORATORY DATA ANALYSIS

Once we have cleaned sampled data, We started our analysis with an assumption that property values may be inversely proportional to number of criminal incidents in a particular location. Sales-Price, ranges from “zero” through 1B USD. These low price sales (\$0 - \$100K USD) could be result of family transfers, however there is no attribute that explains if the sale is an off-market transfer transactions. From Scatter Plots, its very difficult to realize relation between various features due to high variance in sales-price.

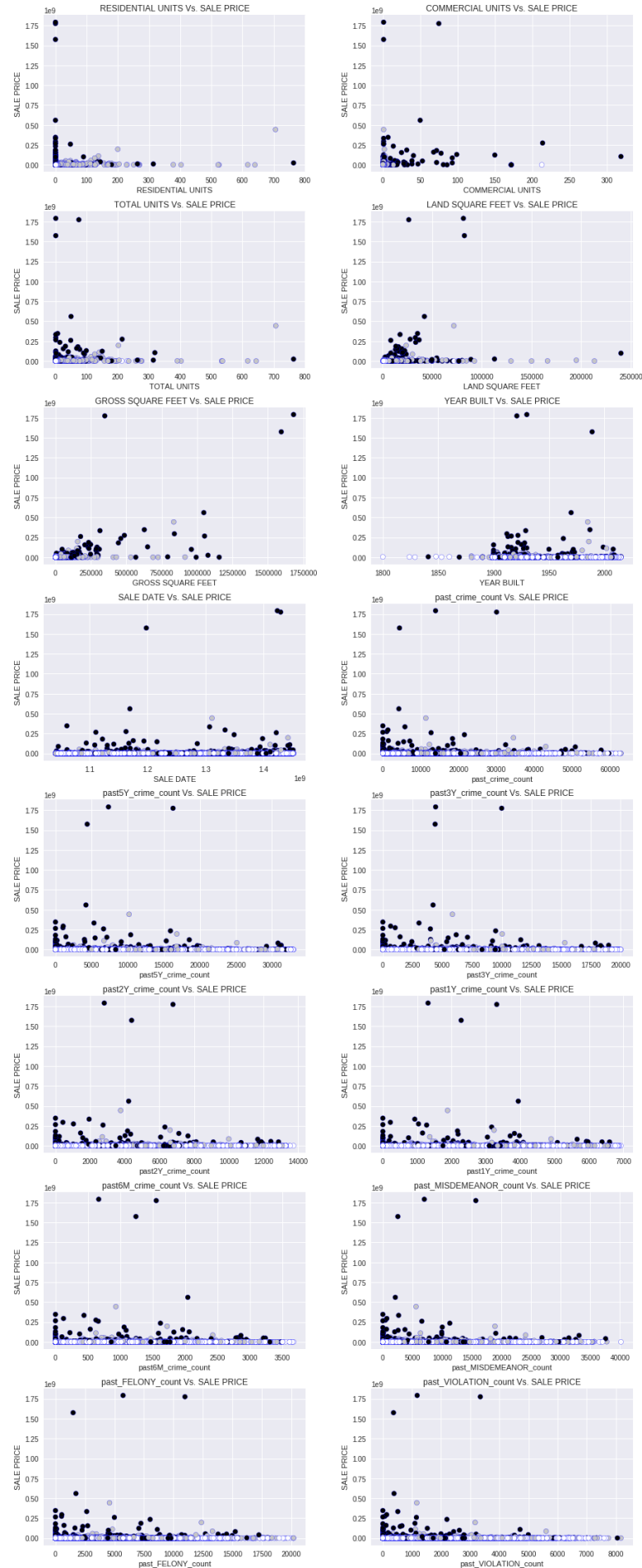
4.1 DISTRIBUTION OF SALES PRICE:

count	8.000000e+03
mean	2.652798e+06
std	3.595869e+07
min	1.000000e+00
25%	3.250000e+05
50%	5.450000e+05
75%	8.500000e+05
max	1.791829e+09

Sales-Price follows an exponential distribution. Please see the histograms in the next page.



4.2 SCATTER PLOTS:



4.3 CORRELATION:

For further analysis, we have considered data with sale-price ranging from 100K USD to 10M USD. Most of the attributes are categorical in nature. So, created dummy variables for further analysis and evaluation.

Surprisingly, the crime_counts are in positive correlation with Sales-Price as per below correlation table.

feature	corr_coef	p_value
past_FELONY_count	0.0970	0.00000
past_MISDEMEANOR_count	0.0905	0.00000
past_crime_count	0.0889	0.00000
past5Y_crime_count	0.0695	0.00000
past3Y_crime_count	0.0654	0.00000
past2Y_crime_count	0.0652	0.00000
past1Y_crime_count	0.0592	0.00000
past_VIOLATION_count	0.0575	0.00000
past6M_crime_count	0.0547	0.00000

Table3: Correlation Table Crime-Data Vs. Sale-Data.
Complete table can be found in Appendix-A.

5 MODELING & EVALUATION

We have started our modeling with a random sample of 8000 data points from original data. We ran multiple models and realized that none of the models are performing well due to high bias in SALES price. There are many “zero” in SALE-PRICE which represent that transaction is a simple property transfer within family members. To eliminate this bias issue and improved the models, we have removed all data between \$0 to \$100,000 from sample with an assumption that a house value cannot be less than \$100,00.

With new data, We have started our modeling again with linear-regressor. Linear regressor has produced very poor results with a negative R-Square value. A Negative R-Square indicates that variance of predicted values from actual values is much higher than that of variance in actual values from actual mean.

Then we tried Ridge-Regression and Lasso Regression which can suppress curse of dimensionality inherent to our data with 470+ features. These 2 models are similar to Linear-Regression but they impose penalty terms in regression equation to deal with curse of Dimensionality. Lasso Regression, in addition will help in choosing right features. Though these models have improved prediction accuracy, they still have low R-square(0.44) and high Root-Mean-Squared Errors > 990000.

Then we tried ensemble methods Random-Forest Regressor and Gradient Boost Regressor. Random-Forest constructs multiple decision-trees by randomly selecting a subset of features and a subset of records from given training data. These random samples and random features for each decision-tree are chosen using boot-strap method. Node-Values are determined by weighted average while predicting continuous data. Random-Forest has given best results with R-Square 0.65 and RMSE = \$788955.

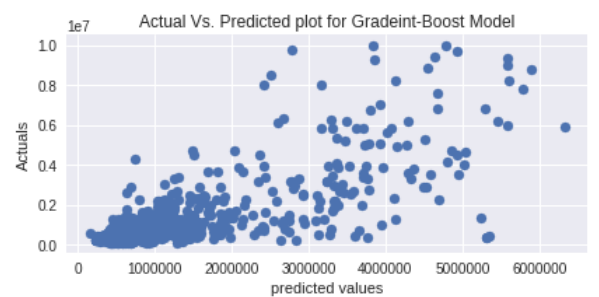
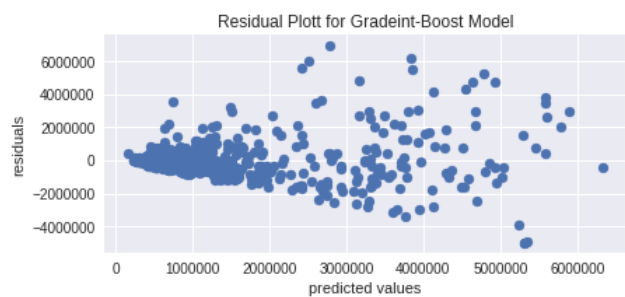
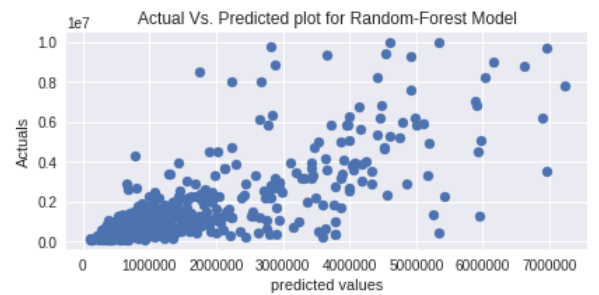
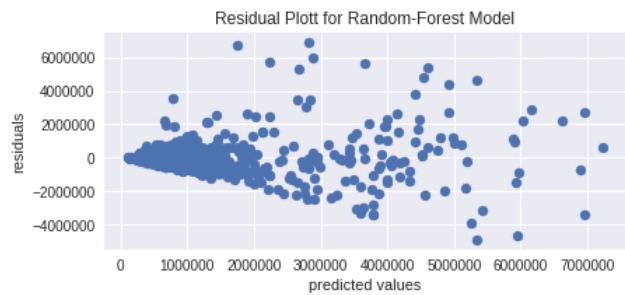
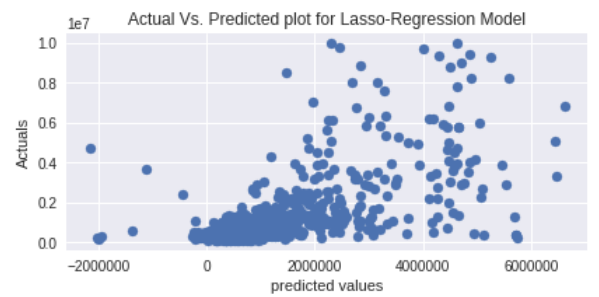
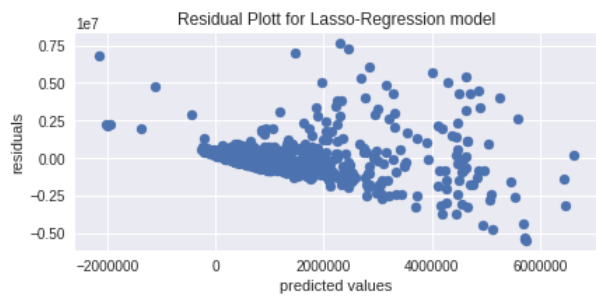
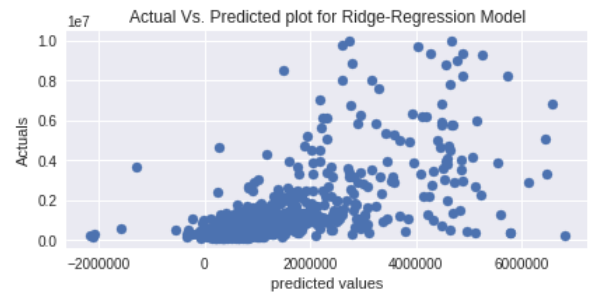
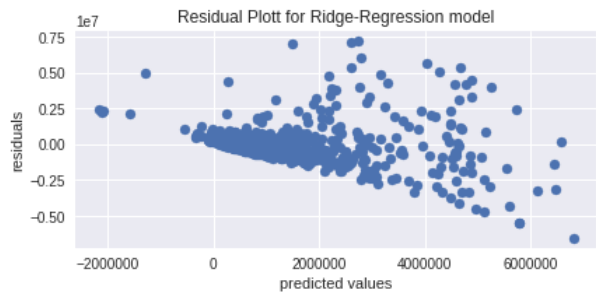
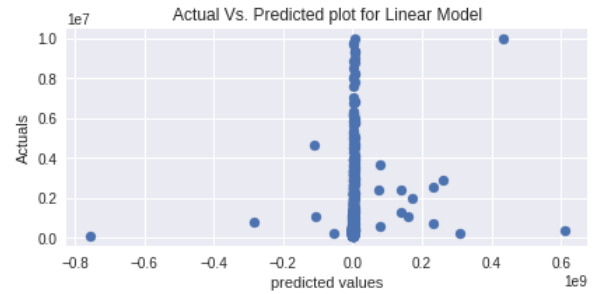
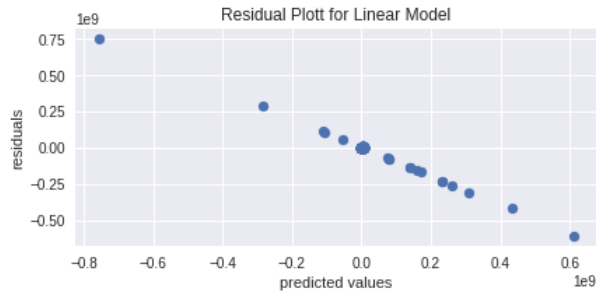
We also tried running Gradient Boost – Regressor. Gradient-boost starts with single tree. After validating results, algorithm will assign more weights to misclassified/high variance records and runs the model again. This cycle repeats until error is minimized. Gradient Boost has performed decently with R-square of 0.61 and RMSE of 833002.

Random-Forest model has performed consistently well over multiple trials

model_name	RMSE	Rsquare	Train_RMSE	Train_Rsquare
Linear – Regression	34143520.00	-659.30	771889.92	0.68
Ridge-Regression	991083.00	0.44	772440.26	0.68
Lasso-Regression	992962.00	0.44	776286.45	0.68
Random-Forest	788955.90	0.65	293070.75	0.95
Gradient-Boost	833002.90	0.61	652447.12	0.77

Table4: Model-Performance Scores

RESIDUAL PLOTS



6 FUTURE WORK

If we can extract reliable neighborhood data for each crime incident, can reveal hidden relations between Sale-Data and Crime-Data.

Collect additional data to support Sale-Data to understand low-value sale-price and improve the model accuracy.

9 ACKNOWLEDGEMENTS

I would like to thank Rajiv Shah for mentoring me on this project.

10 PYTHON- CODE

Ipython notebook:

https://github.com/yerraeer/mY_SpringBoard/blob/master/Capstone1_House_Price_Prediction/mY_CapStone1_HousePrices%20with%20CrimeData-V6.ipynb

Python Code:

https://github.com/yerraeer/mY_SpringBoard/blob/master/Capstone1_House_Price_Prediction/House_Price_Prediction.py

APPENDICES

APPENDIX- A: CORRELATION TABLE

feature	corr_coef	p_value
0 TAX CLASS AT PRESENT_2	0.45	0.0000
1 BOROUGH	-0.35	0.0000
2 TAX CLASS AT PRESENT_1	-0.35	0.0000
BUILDING CLASS CATEGORY_08 RENTALS - ELEVATOR		
3 APARTMENTS	0.35	0.0000

4 TAX CLASS AT TIME OF SALE	0.30	0.0000
5 ZIP CODE	-0.29	0.0000
6 BUILDING CLASS AT TIME OF SALE_D1	0.29	0.0000
7 BUILDING CLASS AT PRESENT_D1	0.27	0.0000
8 NEIGHBORHOOD_GREENWICH VILLAGE-WEST	0.24	0.0000
9 TOTAL UNITS	0.24	0.0000
10 RESIDENTIAL UNITS	0.24	0.0000
11 LAND SQUARE FEET	0.23	0.0000
12 BUILDING CLASS AT TIME OF SALE_C7	0.23	0.0000
13 BUILDING CLASS AT PRESENT_C7	0.22	0.0000
14 BLOCK	-0.20	0.0000
15 NEIGHBORHOOD_UPPER EAST SIDE (79-96)	0.19	0.0000
16 NEIGHBORHOOD_UPPER EAST SIDE (59-79)	0.19	0.0000
17 BUILDING CLASS AT TIME OF SALE_C1	0.19	0.0000
18 BUILDING CLASS AT PRESENT_C1	0.19	0.0000
BUILDING CLASS CATEGORY_07 RENTALS - WALKUP		
19 APARTMENTS	0.18	0.0000
20 BUILDING CLASS CATEGORY_02 TWO FAMILY HOMES	-0.18	0.0000
21 GROSS SQUARE FEET	0.17	0.0000
22 SALE DATE	0.16	0.0000
23 TAX CLASS AT PRESENT_4	0.15	0.0000
24 BUILDING CLASS AT PRESENT_A4	0.14	0.0000
25 YEAR BUILT	-0.13	0.0000
26 BUILDING CLASS AT TIME OF SALE_D3	0.13	0.0000
27 BUILDING CLASS AT TIME OF SALE_A5	-0.12	0.0000
28 NEIGHBORHOOD_WASHINGTON HEIGHTS UPPER	0.12	0.0000
29 BUILDING CLASS AT PRESENT_C0	-0.12	0.0000
30 BUILDING CLASS AT PRESENT_A5	-0.12	0.0000
31 NEIGHBORHOOD_UPPER WEST SIDE (79-96)	0.12	0.0000
32 BUILDING CLASS AT TIME OF SALE_D7	0.12	0.0000
33 NEIGHBORHOOD_EAST VILLAGE	0.11	0.0000
34 BUILDING CLASS AT PRESENT_C4	0.11	0.0000
35 BUILDING CLASS AT TIME OF SALE_C4	0.11	0.0000
36 BUILDING CLASS CATEGORY_23 LOFT BUILDINGS	0.11	0.0000
37 BUILDING CLASS AT PRESENT_B1	-0.11	0.0000
38 BUILDING CLASS AT PRESENT_D3	0.11	0.0000
39 BUILDING CLASS AT TIME OF SALE_D9	0.10	0.0000
40 NEIGHBORHOOD_GRAMERCY	0.10	0.0000
41 BUILDING CLASS AT TIME OF SALE_C0	-0.10	0.0000
42 BUILDING CLASS CATEGORY_03 THREE FAMILY HOMES	-0.10	0.0000
43 BUILDING CLASS AT TIME OF SALE_B1	-0.10	0.0000
44 BUILDING CLASS AT PRESENT_B2	-0.10	0.0000
45 past_FELONY_count	0.10	0.0000
46 BUILDING CLASS AT TIME OF SALE_B2	-0.10	0.0000

47 BUILDING CLASS AT PRESENT_D7	0.10	0.0000
48 NEIGHBORHOOD_FASHION	0.09	0.0000
49 BUILDING CLASS CATEGORY_01 ONE FAMILY HOMES	-0.09	0.0000
50 BUILDING CLASS AT PRESENT_D9	0.09	0.0000
51 TAX CLASS AT PRESENT_2B	0.09	0.0000
52 past_MISDEMEANOR_count	0.09	0.0000
53 past_crime_count	0.09	0.0000
54 BUILDING CLASS AT TIME OF SALE_A4	0.09	0.0000
55 NEIGHBORHOOD_CHINATOWN	0.09	0.0000
56 BUILDING CLASS CATEGORY_22 STORE BUILDINGS	0.09	0.0000
57 NEIGHBORHOOD_UPPER WEST SIDE (59-79)	0.09	0.0000
58 NEIGHBORHOOD_HARLEM-CENTRAL	0.09	0.0000
59 NEIGHBORHOOD_MURRAY HILL	0.09	0.0000
60 NEIGHBORHOOD_UPPER WEST SIDE (96-116)	0.09	0.0000
61 NEIGHBORHOOD_GREENWICH VILLAGE-CENTRAL	0.08	0.0000
62 NEIGHBORHOOD_WASHINGTON HEIGHTS LOWER	0.08	0.0000
63 BUILDING CLASS CATEGORY_21 OFFICE BUILDINGS	0.08	0.0000
64 NEIGHBORHOOD_BUSHWICK	-0.08	0.0000
65 NEIGHBORHOOD_LOWER EAST SIDE	0.08	0.0000
66 NEIGHBORHOOD_CIVIC CENTER	0.08	0.0000
67 BUILDING CLASS CATEGORY_27 FACTORIES	0.08	0.0000
68 NEIGHBORHOOD_MIDTOWN CBD	0.08	0.0000
69 BUILDING CLASS AT TIME OF SALE_E7	0.08	0.0000
70 BUILDING CLASS AT TIME OF SALE_L9	0.08	0.0000
BUILDING CLASS CATEGORY_33 EDUCATIONAL		
71 FACILITIES	0.08	0.0000
72 BUILDING CLASS AT TIME OF SALE_L8	0.08	0.0000
73 BUILDING CLASS CATEGORY_30 WAREHOUSES	0.08	0.0000
74 NEIGHBORHOOD_BROOKLYN HEIGHTS	0.08	0.0000
75 BUILDING CLASS AT TIME OF SALE_K9	0.08	0.0000
76 NEIGHBORHOOD_INWOOD	0.07	0.0000
77 BUILDING CLASS AT PRESENT_E7	0.07	0.0000
78 NEIGHBORHOOD_MANHATTAN VALLEY	0.07	0.0000
79 BUILDING CLASS AT TIME OF SALE_W1	0.07	0.0000
80 BUILDING CLASS AT PRESENT_K9	0.07	0.0000
81 past5Y_crime_count	0.07	0.0000
82 BUILDING CLASS AT PRESENT_L8	0.07	0.0000
83 NEIGHBORHOOD_MIDTOWN EAST	0.07	0.0000
84 NEIGHBORHOOD_CLINTON	0.07	0.0000
85 NEIGHBORHOOD_BEDFORD STUYVESANT	-0.07	0.0000
86 BUILDING CLASS AT PRESENT_W2	0.07	0.0000
87 BUILDING CLASS AT TIME OF SALE_W2	0.07	0.0000
88 NEIGHBORHOOD_SOHO	0.07	0.0000

89 past2Y_crime_count	0.07	0.0000
90 past3Y_crime_count	0.07	0.0000
91 NEIGHBORHOOD_FLATIRON	0.07	0.0000
92 NEIGHBORHOOD_WILLIAMSBURG-NORTH	0.07	0.0000
93 BUILDING CLASS AT TIME OF SALE_C5	0.06	0.0000
94 BUILDING CLASS AT PRESENT_F1	0.06	0.0000
95 NEIGHBORHOOD_OCEAN HILL	-0.06	0.0000
96 past1Y_crime_count	0.06	0.0000
97 BUILDING CLASS AT PRESENT_M2	0.06	0.0000
98 BUILDING CLASS AT TIME OF SALE_M2	0.06	0.0000
99 past_VIOLATION_count	0.06	0.0000
100 BUILDING CLASS AT PRESENT_C5	0.06	0.0000
101 BUILDING CLASS AT TIME OF SALE_O7	0.06	0.0000
102 NEIGHBORHOOD_COBBLE HILL	0.06	0.0000
103 NEIGHBORHOOD_EAST NEW YORK	-0.06	0.0000
104 NEIGHBORHOOD_FINANCIAL	0.06	0.0000
105 past6M_crime_count	0.06	0.0000
106 BUILDING CLASS AT TIME OF SALE_H9	0.06	0.0000
107 NEIGHBORHOOD_PARK SLOPE	0.06	0.0000
108 BUILDING CLASS AT PRESENT_L9	0.05	0.0000
109 BUILDING CLASS AT TIME OF SALE_O9	0.05	0.0000
110 BUILDING CLASS AT TIME OF SALE_J9	0.05	0.0000
111 NEIGHBORHOOD_KIPS BAY	0.05	0.0000
112 BUILDING CLASS AT PRESENT_B3	-0.05	0.0000
113 BUILDING CLASS AT PRESENT_J5	0.05	0.0000
114 BUILDING CLASS AT TIME OF SALE_J5	0.05	0.0000
115 NEIGHBORHOOD_ARDEN HEIGHTS	-0.05	0.0000
116 BUILDING CLASS CATEGORY_14 RENTALS - 4-10 UNIT	0.05	0.0000
117 BUILDING CLASS AT TIME OF SALE_F9	0.05	0.0000
118 BUILDING CLASS AT PRESENT_O5	0.05	0.0000
119 BUILDING CLASS AT PRESENT_K2	0.05	0.0000
120 NEIGHBORHOOD_LONG ISLAND CITY	0.05	0.0001
121 NEIGHBORHOOD_DOWNTOWN-METROTECH	0.05	0.0001
122 NEIGHBORHOOD_CHELSEA	0.05	0.0001
123 BUILDING CLASS AT TIME OF SALE_B3	-0.05	0.0001
124 BUILDING CLASS CATEGORY_34 THEATRES	0.05	0.0001
125 BUILDING CLASS AT PRESENT_O9	0.05	0.0001
126 BUILDING CLASS AT TIME OF SALE_F4	0.05	0.0001
127 BUILDING CLASS AT TIME OF SALE_B9	-0.05	0.0001
128 BUILDING CLASS AT TIME OF SALE_E1	0.05	0.0001
129 BUILDING CLASS AT TIME OF SALE_O5	0.05	0.0001
130 COMMERCIAL UNITS	0.05	0.0001
131 BUILDING CLASS AT PRESENT_O7	0.05	0.0001
132 BUILDING CLASS AT PRESENT_A7	0.05	0.0001
133 BUILDING CLASS AT TIME OF SALE_A7	0.05	0.0001
134 BUILDING CLASS AT TIME OF SALE_K2	0.05	0.0002

135 NEIGHBORHOOD_DOWNTOWN-FULTON MALL	0.05	0.0002
136 BUILDING CLASS AT PRESENT_B9	-0.05	0.0002
137 NEIGHBORHOOD_CYPRESS HILLS	-0.04	0.0003
138 BUILDING CLASS AT PRESENT_D8	0.04	0.0003
139 NEIGHBORHOOD_BEDFORD PARK/NORWOOD	0.04	0.0003
140 NEIGHBORHOOD_FORDHAM	0.04	0.0004
141 NEIGHBORHOOD_CARROLL GARDENS	0.04	0.0005
142 BUILDING CLASS AT PRESENT_C3	-0.04	0.0005
143 NEIGHBORHOOD_FLATBUSH-CENTRAL	0.04	0.0006
144 BUILDING CLASS AT TIME OF SALE_E9	0.04	0.0007
145 BUILDING CLASS AT TIME OF SALE_S9	0.04	0.0008
146 BUILDING CLASS AT PRESENT_K1	0.04	0.0011
147 NEIGHBORHOOD_ALPHABET CITY	0.04	0.0012
148 BUILDING CLASS AT TIME OF SALE_C3	-0.04	0.0013
149 NEIGHBORHOOD_HARLEM-EAST	0.04	0.0013
150 NEIGHBORHOOD_CANARSIE	-0.04	0.0014
151 BUILDING CLASS AT PRESENT_F4	0.04	0.0016
152 BUILDING CLASS CATEGORY_38 ASYLUMS AND HOMES	0.04	0.0017
153 BUILDING CLASS AT TIME OF SALE_N9	0.04	0.0017
154 BUILDING CLASS AT PRESENT_N9	0.04	0.0018
155 BUILDING CLASS AT TIME OF SALE_K1	0.04	0.0022
156 NEIGHBORHOOD_BAYCHESTER	-0.04	0.0023
157 BUILDING CLASS AT PRESENT_H9	0.04	0.0025
BUILDING CLASS CATEGORY_05 TAX CLASS 1 VACANT		
158 LAND	-0.04	0.0029
159 NEIGHBORHOOD_TRIBECA	0.04	0.0031
160 NEIGHBORHOOD_RIDGEWOOD	-0.04	0.0032
161 BUILDING CLASS AT PRESENT_E9	0.04	0.0036
162 BUILDING CLASS AT TIME OF SALE_F1	0.04	0.0036
163 BUILDING CLASS AT TIME OF SALE_V0	-0.03	0.0041
164 BUILDING CLASS CATEGORY_25 LUXURY HOTELS	-0.03	0.0044
165 BUILDING CLASS AT TIME OF SALE_H2	-0.03	0.0044
166 NEIGHBORHOOD_FLATBUSH-NORTH	-0.03	0.0048
167 NEIGHBORHOOD_SOUTHBRIDGE	0.03	0.0056
168 BUILDING CLASS AT TIME OF SALE_A1	-0.03	0.0063
169 NEIGHBORHOOD_SOUTH JAMAICA	-0.03	0.0063
170 BUILDING CLASS AT PRESENT_E1	0.03	0.0070
171 BUILDING CLASS AT PRESENT_H2	-0.03	0.0071
172 NEIGHBORHOOD_RICHMOND HILL	-0.03	0.0089
173 BUILDING CLASS AT PRESENT_A1	-0.03	0.0110
174 NEIGHBORHOOD_FLATBUSH-EAST	-0.03	0.0119
175 BUILDING CLASS AT PRESENT_F9	0.03	0.0147
176 BUILDING CLASS AT PRESENT_S9	0.03	0.0151
177 NEIGHBORHOOD_MORRISANIA/LONGWOOD	-0.03	0.0154
178 NEIGHBORHOOD_GLENDALE	-0.03	0.0168

179 BUILDING CLASS AT PRESENT_S5	0.03	0.0179
180 BUILDING CLASS AT PRESENT_C2	-0.03	0.0185
181 NEIGHBORHOOD_SOUNDVIEW	-0.03	0.0188
182 NEIGHBORHOOD_ROCKAWAY PARK	0.03	0.0192
183 BUILDING CLASS AT TIME OF SALE_S2	-0.03	0.0206
184 BUILDING CLASS AT TIME OF SALE_G1	0.03	0.0212
185 NEIGHBORHOOD_FAR ROCKAWAY	-0.03	0.0218
186 NEIGHBORHOOD_OZONE PARK	-0.03	0.0219
187 NEIGHBORHOOD_MORNINGSIDE HEIGHTS	0.03	0.0231
188 BUILDING CLASS AT PRESENT_D6	0.03	0.0239
189 NEIGHBORHOOD_MARINERS HARBOR	-0.03	0.0304
190 BUILDING CLASS AT TIME OF SALE_F5	0.03	0.0337
191 NEIGHBORHOOD_GREAT KILLS	-0.03	0.0341
192 BUILDING CLASS AT PRESENT_F5	0.03	0.0346
193 NEIGHBORHOOD_GRAVESEND	-0.03	0.0355
194 TAX CLASS AT PRESENT_2A	-0.03	0.0356
195 NEIGHBORHOOD_MOUNT HOPE/MOUNT EDEN	0.03	0.0361
196 NEIGHBORHOOD_HOLLIS	-0.02	0.0395
197 NEIGHBORHOOD_PARKCHESTER	-0.02	0.0411
198 NEIGHBORHOOD_BRIARWOOD	0.02	0.0463
199 BUILDING CLASS AT TIME OF SALE_E3	0.02	0.0464
200 NEIGHBORHOOD_WOODHAVEN	-0.02	0.0496
201 NEIGHBORHOOD_MORRIS PARK/VAN NEST	-0.02	0.0555
202 NEIGHBORHOOD_NEW BRIGHTON	-0.02	0.0558
203 BUILDING CLASS AT TIME OF SALE_C2	-0.02	0.0566
204 NEIGHBORHOOD_ROSSVILLE	-0.02	0.0568
205 NEIGHBORHOOD_LITTLE ITALY	0.02	0.0573
206 NEIGHBORHOOD_TRAVIS	-0.02	0.0578
207 NEIGHBORHOOD_BOERUM HILL	0.02	0.0592
208 NEIGHBORHOOD_WILLIAMSBRIDGE	-0.02	0.0593
209 NEIGHBORHOOD_EAST ELMHURST	-0.02	0.0597
210 NEIGHBORHOOD_WESTCHESTER	-0.02	0.0621
211 NEIGHBORHOOD_MELROSE/CONCOURSE	-0.02	0.0624
212 NEIGHBORHOOD_NEW SPRINGVILLE	-0.02	0.0660
213 BUILDING CLASS AT TIME OF SALE_S3	0.02	0.0661
214 NEIGHBORHOOD_THROGS NECK	-0.02	0.0677
BUILDING CLASS CATEGORY_01 ONE FAMILY		
215 DWELLINGS	-0.02	0.0682
216 BUILDING CLASS AT TIME OF SALE_K4	0.02	0.0693
217 BUILDING CLASS AT TIME OF SALE_D6	0.02	0.0698
218 NEIGHBORHOOD_HUNTS POINT	0.02	0.0746
219 NEIGHBORHOOD_QUEENS VILLAGE	-0.02	0.0766
220 NEIGHBORHOOD_ROSEBANK	-0.02	0.0770
221 NEIGHBORHOOD_SCHUYLERVILLE/PELHAM BAY	-0.02	0.0783
222 NEIGHBORHOOD_DOWNTOWN-FULTON FERRY	0.02	0.0833
223 BUILDING CLASS AT TIME OF SALE_A2	-0.02	0.0840

224 BUILDING CLASS CATEGORY_26 OTHER HOTELS	0.02	0.0880
225 NEIGHBORHOOD_VAN CORTLANDT PARK	0.02	0.0914
226 NEIGHBORHOOD_MARINE PARK	-0.02	0.0915
227 NEIGHBORHOOD_CONCORD	-0.02	0.0920
228 BUILDING CLASS AT TIME OF SALE_S5	0.02	0.0947
229 NEIGHBORHOOD_HARLEM-UPPER	0.02	0.0947
230 BUILDING CLASS AT PRESENT_O4	0.02	0.0954
231 BUILDING CLASS AT PRESENT_O6	0.02	0.0964
232 BUILDING CLASS AT TIME OF SALE_O6	0.02	0.0964
233 BUILDING CLASS AT TIME OF SALE_W9	0.02	0.0980
BUILDING CLASS CATEGORY_02 TWO FAMILY		
234 DWELLINGS	-0.02	0.1000
235 NEIGHBORHOOD_WESTERLEIGH	-0.02	0.1015
BUILDING CLASS CATEGORY_03 THREE FAMILY		
236 DWELLINGS	-0.02	0.1079
237 NEIGHBORHOOD_FLATLANDS	-0.02	0.1109
238 BUILDING CLASS AT PRESENT_S2	-0.02	0.1125
239 NEIGHBORHOOD_SOUTH OZONE PARK	-0.02	0.1128
240 BUILDING CLASS AT PRESENT_W3	0.02	0.1130
241 NEIGHBORHOOD_MIDDLE VILLAGE	-0.02	0.1160
242 BUILDING CLASS AT PRESENT_A3	0.02	0.1163
243 NEIGHBORHOOD_BROWNSVILLE	-0.02	0.1167
244 NEIGHBORHOOD_WYCKOFF HEIGHTS	-0.02	0.1179
245 NEIGHBORHOOD_CORONA	-0.02	0.1208
246 NEIGHBORHOOD_WILLIAMSBURG-SOUTH	0.02	0.1220
247 NEIGHBORHOOD_CROWN HEIGHTS	-0.02	0.1241
248 NEIGHBORHOOD_PORT RICHMOND	-0.02	0.1404
249 NEIGHBORHOOD_BATHGATE	-0.02	0.1413
250 BUILDING CLASS AT TIME OF SALE_C9	0.02	0.1423
251 NEIGHBORHOOD_OLD MILL BASIN	-0.02	0.1424
252 BUILDING CLASS AT PRESENT_K4	0.02	0.1455
253 NEIGHBORHOOD_CONCORD-FOX HILLS	-0.02	0.1455
254 BUILDING CLASS AT TIME OF SALE_O1	0.02	0.1475
255 NEIGHBORHOOD_FLUSHING-SOUTH	-0.02	0.1485
256 NEIGHBORHOOD_SUNSET PARK	-0.02	0.1501
257 BUILDING CLASS AT TIME OF SALE_M3	0.02	0.1539
258 NEIGHBORHOOD_CASTLE HILL/UNIONPORT	-0.02	0.1554
259 NEIGHBORHOOD_PROSPECT HEIGHTS	0.02	0.1562
260 NEIGHBORHOOD_STAPLETON	-0.02	0.1595
261 BUILDING CLASS AT TIME OF SALE_E4	0.02	0.1616
262 BUILDING CLASS AT PRESENT_D5	0.02	0.1667
263 BUILDING CLASS AT PRESENT_W9	0.02	0.1683
264 NEIGHBORHOOD_HARLEM-WEST	0.02	0.1701
265 NEIGHBORHOOD_DYKER HEIGHTS	-0.02	0.1705
266 NEIGHBORHOOD_GERRITSEN BEACH	0.02	0.1711
267 NEIGHBORHOOD_ROSSVILLE-CHARLESTON	-0.02	0.1740

268 NEIGHBORHOOD_ARVERNE	-0.02	0.1778
269 NEIGHBORHOOD_WAKEFIELD	-0.02	0.1811
270 NEIGHBORHOOD_COUNTRY CLUB	-0.02	0.1823
271 NEIGHBORHOOD_ELTINGVILLE	-0.02	0.1846
272 BUILDING CLASS AT PRESENT_A9	-0.02	0.1869
273 BUILDING CLASS CATEGORY_37 RELIGIOUS FACILITIES	0.02	0.1889
274 NEIGHBORHOOD_RIVERDALE	0.02	0.1892
275 NEIGHBORHOOD_FORT GREENE	0.02	0.1942
276 NEIGHBORHOOD_MADISON	-0.02	0.1955
277 BUILDING CLASS AT PRESENT_G1	0.02	0.1960
278 NEIGHBORHOOD_CROTONA PARK	-0.02	0.1970
279 NEIGHBORHOOD_ST. ALBANS	-0.02	0.1990
280 NEIGHBORHOOD_MIDWOOD	0.02	0.1994
281 NEIGHBORHOOD_STAPLETON-CLIFTON	-0.02	0.2003
282 NEIGHBORHOOD_WEST NEW BRIGHTON	-0.02	0.2020
283 NEIGHBORHOOD_BULLS HEAD	-0.02	0.2025
284 BUILDING CLASS AT PRESENT_G2	0.02	0.2029
285 NEIGHBORHOOD_MIDLAND BEACH	-0.02	0.2040
286 BUILDING CLASS AT TIME OF SALE_A9	-0.02	0.2051
287 NEIGHBORHOOD_WOODROW	-0.02	0.2133
288 TAX CLASS AT PRESENT_2C	0.01	0.2163
289 BUILDING CLASS AT PRESENT_S3	0.01	0.2208
290 NEIGHBORHOOD_TOTTENVILLE	-0.01	0.2233
291 NEIGHBORHOOD_GRASMERE	-0.01	0.2266
292 NEIGHBORHOOD_SO. JAMAICA-BAISLEY PARK	-0.01	0.2297
293 NEIGHBORHOOD_SPRINGFIELD GARDENS	0.01	0.2298
294 NEIGHBORHOOD_PRINCES BAY	-0.01	0.2317
295 NEIGHBORHOOD_BRIGHTON BEACH	0.01	0.2336
296 BUILDING CLASS AT PRESENT_I4	0.01	0.2403
297 BUILDING CLASS AT TIME OF SALE_I4	0.01	0.2403
298 NEIGHBORHOOD_SOUTH BEACH	-0.01	0.2423
299 NEIGHBORHOOD_ANNADALE	-0.01	0.2475
300 NEIGHBORHOOD_KENSINGTON	0.01	0.2475
301 NEIGHBORHOOD_MASPETH	-0.01	0.2477
302 NEIGHBORHOOD_COLLEGE POINT	-0.01	0.2609
303 BUILDING CLASS AT TIME OF SALE_S4	0.01	0.2624
304 NEIGHBORHOOD_HAMMELS	-0.01	0.2647
305 BUILDING CLASS AT TIME OF SALE_V1	-0.01	0.2654
306 BUILDING CLASS CATEGORY_06 TAX CLASS 1 - OTHER	-0.01	0.2669
307 BUILDING CLASS AT TIME OF SALE_G0	-0.01	0.2669
BUILDING CLASS CATEGORY_13 CONDOS - ELEVATOR		
308 APARTMENTS	0.01	0.2717
309 BUILDING CLASS AT PRESENT_RR	0.01	0.2717
310 BUILDING CLASS AT TIME OF SALE_R4	0.01	0.2717
311 NEIGHBORHOOD_WILLIAMSBURG-EAST	0.01	0.2725

312 NEIGHBORHOOD_CONEY ISLAND	-0.01	0.2797
313 NEIGHBORHOOD_BENSONHURST	-0.01	0.2805
BUILDING CLASS CATEGORY_31 COMMERCIAL VACANT		
314 LAND	-0.01	0.2839
315 NEIGHBORHOOD_MANOR HEIGHTS	-0.01	0.2869
316 NEIGHBORHOOD_JAMAICA	-0.01	0.2940
317 NEIGHBORHOOD_KINGSBRIDGE/JEROME PARK	0.01	0.2958
318 NEIGHBORHOOD_TOMPKINSVILLE	-0.01	0.2972
319 NEIGHBORHOOD_SPRING CREEK	-0.01	0.3173
320 NEIGHBORHOOD_ASTORIA	-0.01	0.3184
321 NEIGHBORHOOD_BERGEN BEACH	-0.01	0.3193
322 NEIGHBORHOOD_SHEEPSHEAD BAY	-0.01	0.3201
323 BUILDING CLASS AT PRESENT_A2	-0.01	0.3225
324 NEIGHBORHOOD_PLEASANT PLAINS	-0.01	0.3239
325 NEIGHBORHOOD_PARK SLOPE SOUTH	0.01	0.3424
326 NEIGHBORHOOD_ROSEDALE	-0.01	0.3430
327 BUILDING CLASS CATEGORY_41 TAX CLASS 4 - OTHER	-0.01	0.3490
328 BUILDING CLASS AT TIME OF SALE_Z9	-0.01	0.3490
329 NEIGHBORHOOD_WOODSIDE	-0.01	0.3490
330 BUILDING CLASS AT PRESENT_S4	0.01	0.3570
331 NEIGHBORHOOD_MILL BASIN	-0.01	0.3573
332 NEIGHBORHOOD_BAY RIDGE	-0.01	0.3696
333 BUILDING CLASS AT TIME OF SALE_D5	0.01	0.3715
334 NEIGHBORHOOD_FOREST HILLS	0.01	0.3755
335 NEIGHBORHOOD_NEW DORP-BEACH	-0.01	0.3765
336 NEIGHBORHOOD_CASTLETON CORNERS	-0.01	0.3932
337 NEIGHBORHOOD_DONGAN HILLS	0.01	0.3950
338 NEIGHBORHOOD_GRYMES HILL	-0.01	0.3990
339 NEIGHBORHOOD_BELMONT	-0.01	0.4006
340 BUILDING CLASS AT TIME OF SALE_H4	-0.01	0.4026
341 NEIGHBORHOOD_CAMBRIA HEIGHTS	-0.01	0.4055
342 BUILDING CLASS AT PRESENT_I5	0.01	0.4072
343 NEIGHBORHOOD_FLATBUSH-LEFFERTS GARDEN	0.01	0.4149
344 NEIGHBORHOOD_BATH BEACH	-0.01	0.4242
345 NEIGHBORHOOD_GOWANUS	0.01	0.4333
346 NEIGHBORHOOD_HOWARD BEACH	-0.01	0.4407
347 NEIGHBORHOOD_JACKSON HEIGHTS	-0.01	0.4421
348 BUILDING CLASS AT PRESENT_F2	0.01	0.4465
349 BUILDING CLASS AT TIME OF SALE_F2	0.01	0.4465
350 BUILDING CLASS AT PRESENT_O1	0.01	0.4465
351 NEIGHBORHOOD_BUSH TERMINAL	-0.01	0.4570
352 NEIGHBORHOOD_BOROUGH PARK	-0.01	0.4613
353 BUILDING CLASS AT PRESENT_E3	0.01	0.4642
354 NEIGHBORHOOD_AIRPORT LA GUARDIA	-0.01	0.4695
355 NEIGHBORHOOD_WILLOWBROOK	-0.01	0.4792
356 NEIGHBORHOOD_LAURELTON	-0.01	0.4800

357 BUILDING CLASS AT PRESENT_S0	-0.01	0.4864
358 BUILDING CLASS AT PRESENT_P9	0.01	0.4901
359 BUILDING CLASS AT TIME OF SALE_P9	0.01	0.4901
360 NEIGHBORHOOD_OAKWOOD-BEACH	-0.01	0.4936
361 NEIGHBORHOOD_JAMAICA HILLS	-0.01	0.4971
362 NEIGHBORHOOD_PELHAM PARKWAY SOUTH	-0.01	0.5104
363 BUILDING CLASS AT TIME OF SALE_G2	0.01	0.5120
364 BUILDING CLASS AT PRESENT_H4	-0.01	0.5179
365 BUILDING CLASS AT TIME OF SALE_V2	-0.01	0.5277
366 BUILDING CLASS AT PRESENT_M9	-0.01	0.5311
367 BUILDING CLASS AT TIME OF SALE_S1	-0.01	0.5536
368 BUILDING CLASS AT TIME OF SALE_S0	-0.01	0.5620
369 NEIGHBORHOOD_MOTT HAVEN/PORT MORRIS	-0.01	0.5640
BUILDING CLASS CATEGORY_29 COMMERCIAL		
370 GARAGES	0.01	0.5676
371 BUILDING CLASS AT TIME OF SALE_G9	-0.01	0.5680
372 BUILDING CLASS AT PRESENT_N2	-0.01	0.5699
BUILDING CLASS CATEGORY_32 HOSPITAL AND		
373 HEALTH FACILITIES	0.01	0.5716
374 BUILDING CLASS AT TIME OF SALE_V3	-0.01	0.5728
375 BUILDING CLASS AT PRESENT_N3	-0.01	0.5756
376 NEIGHBORHOOD_NEW DORP	-0.01	0.5804
377 BUILDING CLASS AT PRESENT_I6	-0.01	0.5805
378 BUILDING CLASS AT TIME OF SALE_I6	-0.01	0.5805
379 BUILDING CLASS AT PRESENT_J1	-0.01	0.5824
380 BUILDING CLASS AT TIME OF SALE_J1	-0.01	0.5824
381 BUILDING CLASS AT PRESENT_H3	-0.01	0.5875
382 NEIGHBORHOOD_ELMHURST	0.01	0.5929
BUILDING CLASS CATEGORY_09 COOPS - WALKUP		
383 APARTMENTS	0.01	0.6064
384 BUILDING CLASS AT PRESENT_C6	0.01	0.6064
385 BUILDING CLASS AT TIME OF SALE_C6	0.01	0.6064
386 NEIGHBORHOOD_GREAT KILLS-BAY TERRACE	-0.01	0.6064
387 NEIGHBORHOOD_FLORAL PARK	-0.01	0.6094
388 BUILDING CLASS AT TIME OF SALE_G7	-0.01	0.6098
389 NEIGHBORHOOD_FRESH MEADOWS	-0.01	0.6104
390 BUILDING CLASS AT TIME OF SALE_I5	0.01	0.6137
391 BUILDING CLASS AT PRESENT_N1	-0.01	0.6236
392 NEIGHBORHOOD_PELHAM PARKWAY NORTH	-0.01	0.6269
393 NEIGHBORHOOD_CLINTON HILL	0.01	0.6295
394 BUILDING CLASS AT TIME OF SALE_D4	-0.01	0.6306
395 NEIGHBORHOOD_RICHMONDTOWN	-0.01	0.6329
396 NEIGHBORHOOD_HIGHBRIDGE/MORRIS HEIGHTS	0.01	0.6330
397 BUILDING CLASS AT TIME OF SALE_G6	0.01	0.6373
398 NEIGHBORHOOD_REGO PARK	-0.01	0.6379
399 BUILDING CLASS AT PRESENT_D0	0.01	0.6448
400 BUILDING CLASS AT TIME OF SALE_D0	0.01	0.6448

401 BUILDING CLASS AT PRESENT_O8	-0.01	0.6479
402 BUILDING CLASS AT PRESENT_H8	-0.01	0.6599
403 NEIGHBORHOOD_HILLCREST	-0.01	0.6599
404 BUILDING CLASS AT PRESENT_P5	-0.01	0.6599
405 BUILDING CLASS AT TIME OF SALE_P5	-0.01	0.6599
406 NEIGHBORHOOD_FRESH KILLS	-0.01	0.6626
407 BUILDING CLASS AT TIME OF SALE_O4	-0.01	0.6783
408 NEIGHBORHOOD_BELLEROSE	0.00	0.6794
409 BUILDING CLASS AT TIME OF SALE_K7	0.00	0.6894
410 BUILDING CLASS AT PRESENT_O2	0.00	0.6926
BUILDING CLASS CATEGORY_10 COOPS - ELEVATOR		
411 APARTMENTS	0.00	0.6976
412 NEIGHBORHOOD_NEW BRIGHTON-ST. GEORGE	0.00	0.6984
413 BUILDING CLASS AT PRESENT_J4	0.00	0.6984
414 BUILDING CLASS AT TIME OF SALE_J4	0.00	0.6984
415 NEIGHBORHOOD_PELHAM GARDENS	0.00	0.7002
416 BUILDING CLASS AT PRESENT_M1	0.00	0.7021
417 NEIGHBORHOOD_LIVINGSTON	0.00	0.7028
BUILDING CLASS CATEGORY_35 INDOOR PUBLIC AND		
418 CULTURAL FACILITIES	0.00	0.7057
419 BUILDING CLASS AT PRESENT_D4	0.00	0.7076
420 NEIGHBORHOOD_NAVY YARD	0.00	0.7131
421 BUILDING CLASS AT PRESENT_S1	0.00	0.7251
422 NEIGHBORHOOD_BELLE HARBOR	0.00	0.7292
423 BUILDING CLASS AT PRESENT_K7	0.00	0.7299
424 NEIGHBORHOOD_FLUSHING-NORTH	0.00	0.7390
425 NEIGHBORHOOD_WOODLAWN	0.00	0.7502
426 NEIGHBORHOOD_PORT IVORY	0.00	0.7504
427 BUILDING CLASS AT TIME OF SALE_O2	0.00	0.7528
428 NEIGHBORHOOD_WINDSOR TERRACE	0.00	0.7561
429 NEIGHBORHOOD_BAYSIDE	0.00	0.7576
430 NEIGHBORHOOD_BRONXDALE	0.00	0.7697
431 BUILDING CLASS CATEGORY_17 CONDOPS	0.00	0.7716
432 BUILDING CLASS AT PRESENT_R9	0.00	0.7716
433 BUILDING CLASS AT TIME OF SALE_R9	0.00	0.7716
434 NEIGHBORHOOD_HOLLISWOOD	0.00	0.7719
435 NEIGHBORHOOD_SUNNYSIDE	0.00	0.7830
436 BUILDING CLASS AT TIME OF SALE_A0	0.00	0.7834
437 LOT	0.00	0.7890
438 NEIGHBORHOOD_MANHATTAN BEACH	0.00	0.7893
439 BUILDING CLASS AT TIME OF SALE_M1	0.00	0.7984
440 NEIGHBORHOOD_GREENPOINT	0.00	0.8127
441 NEIGHBORHOOD_DONGAN HILLS-COLONY	0.00	0.8166
442 BUILDING CLASS AT TIME OF SALE_O8	0.00	0.8177
443 NEIGHBORHOOD_OAKLAND GARDENS	0.00	0.8265
444 NEIGHBORHOOD_KINGSBRIDGE HTS/UNIV HTS	0.00	0.8280

445 BUILDING CLASS AT PRESENT_I1	0.00	0.8299
446 BUILDING CLASS AT TIME OF SALE_I1	0.00	0.8299
447 BUILDING CLASS AT PRESENT_M4	0.00	0.8299
448 BUILDING CLASS AT TIME OF SALE_M4	0.00	0.8299
449 NEIGHBORHOOD_COBBLE HILL-WEST	0.00	0.8341
450 NEIGHBORHOOD_MIDTOWN WEST	0.00	0.8448
451 BUILDING CLASS AT TIME OF SALE_M9	0.00	0.8493
452 NEIGHBORHOOD_WILLIAMSBURG-CENTRAL	0.00	0.8692
453 NEIGHBORHOOD_OCEAN PARKWAY-SOUTH	0.00	0.8705
454 NEIGHBORHOOD_RED HOOK	0.00	0.8718
455 BUILDING CLASS AT TIME OF SALE_I9	0.00	0.8724
456 BUILDING CLASS AT PRESENT_G0	0.00	0.8842
457 NEIGHBORHOOD_OCEAN PARKWAY-NORTH	0.00	0.8863
458 BUILDING CLASS AT TIME OF SALE_A3	0.00	0.8948
459 NEIGHBORHOOD_KEW GARDENS	0.00	0.8983
460 NEIGHBORHOOD_SEAGATE	0.00	0.9008
461 NEIGHBORHOOD_LITTLE NECK	0.00	0.9020
462 BUILDING CLASS AT TIME OF SALE_H3	0.00	0.9038
463 NEIGHBORHOOD_JAMAICA ESTATES	0.00	0.9314
464 BUILDING CLASS AT TIME OF SALE_G5	0.00	0.9483
465 BUILDING CLASS AT PRESENT_Z9	0.00	0.9769
466 NEIGHBORHOOD_EAST TREMONT	0.00	0.9791
467 BUILDING CLASS AT PRESENT_G9	0.00	0.9844
468 BUILDING CLASS AT TIME OF SALE_V9	0.00	0.9906
469 NEIGHBORHOOD_WHITESTONE	0.00	0.9936
470 BUILDING CLASS AT PRESENT_W6	0.00	0.9962
471 BUILDING CLASS AT TIME OF SALE_W6	0.00	0.9962

APPENDIX- B: MODELING & EVALUATION-RESULTS

model_data shape for 100K USD <= SALE PRICE <= 10M USD: (6877, 477)

Linear Regression results:

Model Performance on Training data

Mean-Squared Error: 595814053656.5806

Root-Mean-Squared Error: 771889.923277005

Rsquare: 0.6792300693862764

Predictions on Test Data:

	deviation%	residuals	y_pred_train	y_train
0	-26.521538	-1.152626e+05	5.498626e+05	434600.0
1	12.429187	8.762577e+04	6.173742e+05	705000.0
2	44.776289	6.089575e+05	7.510425e+05	1360000.0
3	-13.846654	-8.654159e+04	7.115416e+05	625000.0

4	0.001767	3.214864e+00	1.819758e+05	181979.0
5	27.938762	2.690503e+05	6.939497e+05	963000.0
6	-11.923327	-6.438596e+04	6.043860e+05	540000.0
7	-37.441196	-1.419021e+06	5.209021e+06	3790000.0
8	-47.961883	-1.270990e+06	3.920990e+06	2650000.0
9	35.213647	1.250084e+05	2.299916e+05	355000.0

Model Performance on Test data

Mean-Squared Error: 1165780012302866.0

Root-Mean-Squared Error: 34143520.79535539

Rsquare: -659.2990051845629

Predictions on Test Data:

	deviation%	residuals	y_pred_test	y_test
0	-8.087768	-3.569941e+04	4.770994e+05	441400.0
1	18.716681	2.058835e+05	8.941165e+05	1100000.0
2	20.631039	2.019779e+05	7.770221e+05	979000.0
3	15.297568	7.296940e+04	4.040306e+05	477000.0
4	-15.141165	-1.362705e+05	1.036270e+06	900000.0
5	-17.671929	-1.042644e+05	6.942644e+05	590000.0
6	-103.872306	-1.324372e+06	2.599372e+06	1275000.0
7	-12.912516	-6.843633e+04	5.984363e+05	530000.0
8	-160.103274	-6.083924e+05	9.883924e+05	380000.0
9	11.287104	9.876216e+04	7.762378e+05	875000.0

Ridge-Regression results:

best parameters: {'alpha': 0.1, 'normalize': 'True'}

Model Performance on Training data:

Mean-Squared Error: 596663954982.3667

Root-Mean-Squared Error: 772440.2598145482

Rsquare: 0.6787725058433761

Predictions on Training Data:

	deviation%	residuals	y_pred_train	y_train
0	-28.022801	-1.217871e+05	5.563871e+05	434600.0
1	12.891153	9.088263e+04	6.141174e+05	705000.0
2	44.904912	6.107068e+05	7.492932e+05	1360000.0
3	-13.252986	-8.283116e+04	7.078312e+05	625000.0
4	72.253697	1.314866e+05	5.049245e+04	181979.0
5	27.546179	2.652697e+05	6.977303e+05	963000.0
6	-9.341394	-5.044353e+04	5.904435e+05	540000.0
7	-36.528105	-1.384415e+06	5.174415e+06	3790000.0
8	-46.653036	-1.236305e+06	3.886305e+06	2650000.0
9	33.337100	1.183467e+05	2.366533e+05	355000.0

Model Performance on Test data:

Mean-Squared Error: 982245520019.0864

Root-Mean-Squared Error: 991083.0035971187

Rsquare: 0.4436551211455335

Predictions on Test Data:

	deviation%	residuals	y_pred_test	y_test
0	-8.599854	-3.795975e+04	4.793598e+05	441400.0
1	19.197741	2.111752e+05	8.888248e+05	1100000.0
2	20.304357	1.987797e+05	7.802203e+05	979000.0
3	15.111723	7.208292e+04	4.049171e+05	477000.0
4	-17.434603	-1.569114e+05	1.056911e+06	900000.0
5	-17.359893	-1.024234e+05	6.924234e+05	590000.0
6	-103.667808	-1.321765e+06	2.596765e+06	1275000.0
7	-12.303972	-6.521105e+04	5.952111e+05	530000.0
8	-159.810459	-6.072797e+05	9.872797e+05	380000.0
9	11.934221	1.044244e+05	7.705756e+05	875000.0

Lasso-Regression results:

best parameters: {'alpha': 100, 'normalize': 'True'}

/home/mahesh_yerra/anaconda3/lib/python3.6/site-packages/sklearn/linear_model/coordinate_descent.py:484: ConvergenceWarning: Objective did not converge. You might want to increase the number of iterations. Fitting data with very small alpha may cause precision problems.

ConvergenceWarning)

Model Performance on Training data:

Mean-Squared Error: 602620646093.4557

Root-Mean-Squared Error: 776286.4459034795

Rsquare: 0.675565586868127

Predictions on Training Data:

	deviation%	residuals	y_pred_train	y_train
0	-31.284650	-1.359631e+05	5.705631e+05	434600.0
1	13.488077	9.509094e+04	6.099091e+05	705000.0
2	44.630952	6.069809e+05	7.530191e+05	1360000.0
3	-13.912498	-8.695311e+04	7.119531e+05	625000.0
4	302.230630	5.499963e+05	-3.680173e+05	181979.0
5	26.261799	2.529011e+05	7.100989e+05	963000.0
6	13.894280	7.502911e+04	4.649709e+05	540000.0
7	-34.714097	-1.315664e+06	5.105664e+06	3790000.0
8	-45.470305	-1.204963e+06	3.854963e+06	2650000.0
9	25.204987	8.947770e+04	2.655223e+05	355000.0

Model Performance on Test data:

Mean-Squared Error: 985973464195.0726

Root-Mean-Squared Error: 992961.9651301214

Rsquare: 0.44154360970700346

Predictions on Test Data:

	deviation%	residuals	y_pred_test	y_test
0	-9.417477	-4.156874e+04	4.829687e+05	441400.0
1	20.330260	2.236329e+05	8.763671e+05	1100000.0
2	20.604790	2.017209e+05	7.772791e+05	979000.0
3	17.249344	8.227937e+04	3.947206e+05	477000.0
4	-18.169995	-1.635300e+05	1.063530e+06	900000.0
5	-17.111114	-1.009556e+05	6.909556e+05	590000.0
6	-100.862105	-1.285992e+06	2.560992e+06	1275000.0
7	-9.981315	-5.290097e+04	5.829010e+05	530000.0
8	-159.368857	-6.056017e+05	9.856017e+05	380000.0
9	12.200753	1.067566e+05	7.682434e+05	875000.0

Random-Forest results:

Model Performance on Training data:

Mean-Squared Error: 85890465413.07838

Root-Mean-Squared Error: 293070.75154828804

Rsquare: 0.9537589312272019

Predictions on Training Data:

	deviation%	residuals	y_pred_train	y_train
0	-7.251157	-31513.53	466113.53	434600.0
1	8.739121	61610.80	643389.20	705000.0
2	10.384782	141233.03	1218766.97	1360000.0
3	10.296000	64350.00	560650.00	625000.0
4	-373.227944	-679196.48	861175.48	181979.0
5	-0.581501	-5599.85	968599.85	963000.0
6	-7.300120	-39420.65	579420.65	540000.0
7	1.597999	60564.17	3729435.83	3790000.0
8	-10.242944	-271438.02	2921438.02	2650000.0
9	-1.811741	-6431.68	361431.68	355000.0

Model Performance on Test data:

Mean-Squared Error: 622451444612.2367

Root-Mean-Squared Error: 788955.9205761984

Rsquare: 0.6474428577298541

Predictions on Test Data:

	deviation%	residuals	y_pred_test	y_test
0	-16.428550	-72515.62	513915.62	441400.0

1	21.839157	240230.73	859769.27	1100000.0
2	18.280885	178969.86	800030.14	979000.0
3	-16.406174	-78257.45	555257.45	477000.0
4	13.965028	125685.25	774314.75	900000.0
5	-3.896624	-22990.08	612990.08	590000.0
6	-21.969339	-280109.07	1555109.07	1275000.0
7	-5.892102	-31228.14	561228.14	530000.0
8	-117.557861	-446719.87	826719.87	380000.0
9	43.056571	376745.00	498255.00	875000.0

Gradient-Boost results:

Model Performance on Training data:

Mean-Squared Error: 425687249236.16003

Root-Mean-Squared Error: 652447.1237090098

Rsquare: 0.7708216706829574

Predictions on Training Data:

	deviation%	residuals	y_pred_train	y_train
0	-19.797332	-8.603920e+04	5.206392e+05	434600.0
1	37.293509	2.629192e+05	4.420808e+05	705000.0
2	31.196439	4.242716e+05	9.357284e+05	1360000.0
3	-21.345360	-1.334085e+05	7.584085e+05	625000.0
4	-570.229450	-1.037698e+06	1.219677e+06	181979.0
5	6.212833	5.982958e+04	9.031704e+05	963000.0
6	-19.720364	-1.064900e+05	6.464900e+05	540000.0
7	-8.689507	-3.293323e+05	4.119332e+06	3790000.0
8	-30.053201	-7.964098e+05	3.446410e+06	2650000.0
9	-4.578965	-1.625533e+04	3.712553e+05	355000.0

Model Performance on Test data:

Mean-Squared Error: 693893792693.9021

Root-Mean-Squared Error: 833002.8767620806

Rsquare: 0.6069778378560038

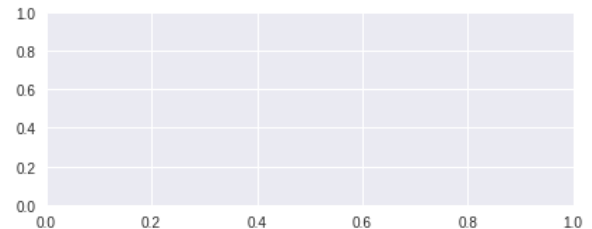
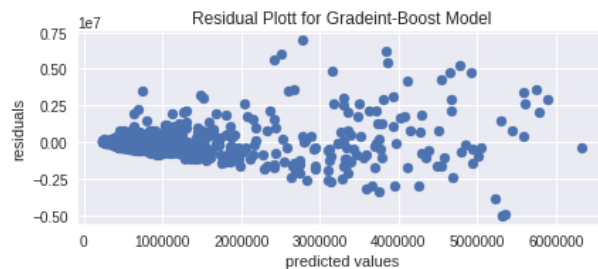
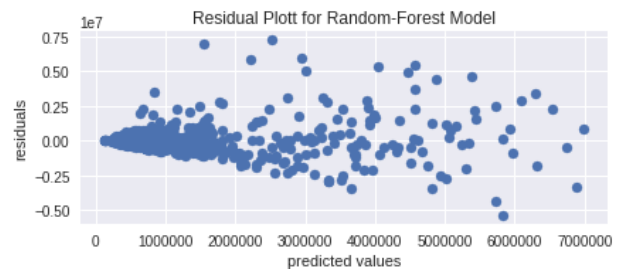
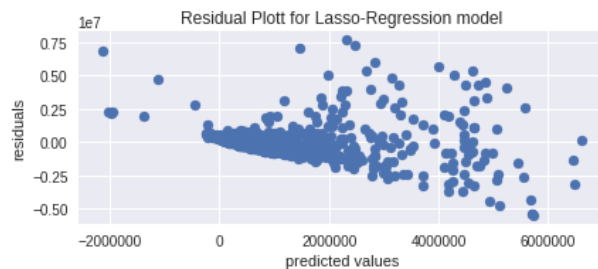
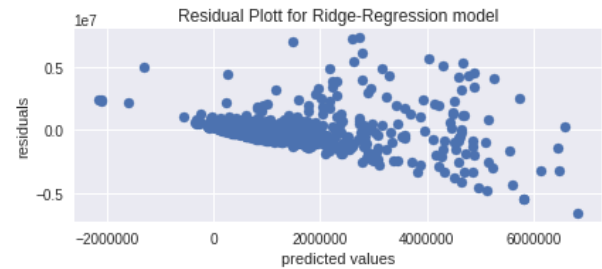
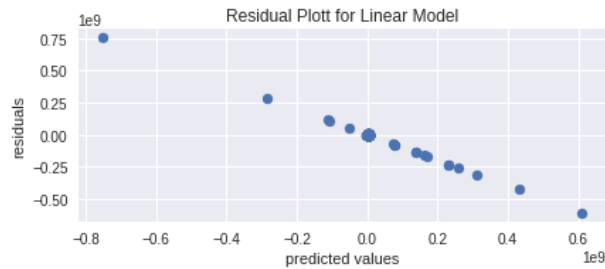
Predictions on Test Data:

	deviation%	residuals	y_pred_test	y_test
0	-12.442170	-54919.736346	4.963197e+05	441400.0
1	36.833227	405165.500919	6.948345e+05	1100000.0
2	35.616842	348688.882739	6.303111e+05	979000.0
3	-31.810146	-151734.397501	6.287344e+05	477000.0
4	29.633264	266699.378118	6.333006e+05	900000.0
5	0.669065	3947.486353	5.860525e+05	590000.0
6	-13.409035	-170965.192223	1.445965e+06	1275000.0
7	-10.756549	-57009.707929	5.870097e+05	530000.0
8	-99.388666	-377676.931686	7.576769e+05	380000.0

9 25.154606 220102.806149 6.548972e+05 875000.0

Model-Performance Table:

	model_name	RMSE	Rsquare	Train_RMSE	Train_Rsquare
0	Linear	3.414352e+07	-659.299005	771889.923277	0.679230
1	Ridge-Regression	9.910830e+05	0.443655	772440.259815	0.678773
2	Lasso-Regression	9.929620e+05	0.441544	776286.445903	0.675566
3	Random-Forest	7.889559e+05	0.647443	293070.751548	0.953759
4	Gradient-Boost	8.330029e+05	0.606978	652447.123709	0.770822



Model-Coefficients/Estimators:

Linear-Regression Model Coefficients:

```
[ -1.26726025e+06 -1.38214742e+00 2.77208076e+02 -6.90876684e+02
 1.53336362e+06 1.54804236e+06 -1.54469983e+06 4.49437509e+01
 1.51148231e+00 2.48156507e+02 8.24893246e+08 2.38302816e-03
-2.50802973e+09 -1.24730464e+02 6.48919302e+01 6.63853964e+01
-4.87311228e+01 3.58330056e+01 2.50802979e+09 2.50802987e+09
 2.50802948e+09 1.67065813e+06 -2.10972106e+06 2.00901704e+06
 1.89118555e+06 1.68566802e+06 1.42452915e+06 2.65191494e+05]
```

-1.86488057e+06	3.54786956e+05	-1.69139109e+06	1.57149420e+06
-1.65024704e+06	2.07532436e+05	-3.49074553e+05	1.23479491e+06
-1.79704166e+06	2.82099093e+05	2.46755003e+05	7.40212043e+05
3.20258110e+05	1.53321557e+06	6.00950645e+05	-1.58249283e+06
2.87871216e+06	1.82277582e+05	2.05514865e+06	-1.44726244e+05
7.64039187e+04	1.25198942e+06	2.16837297e+05	1.33143248e+06
-1.73391071e+06	1.98140139e+06	-8.10257197e+05	2.75464081e+05
1.84473134e+06	-2.01417826e+06	1.75879722e+05	1.98690522e+06
4.53364433e+05	1.56104804e+06	1.93771832e+06	-5.05239698e+05
1.99276012e+04	1.62645054e+06	-1.68422149e+06	-1.88098390e+06
2.15848428e+05	2.72570461e+04	1.43218302e+06	2.25930866e+06
4.43369131e+06	2.68993802e+06	-1.62597537e+05	2.41682140e+05
1.53014452e+06	6.25992674e+04	-2.12662232e+06	-1.38376871e+06
1.66503782e+06	1.83523455e+06	1.67470142e+06	1.27634315e+06
2.92567898e+06	3.74371303e+05	4.85288210e+04	4.82189922e+05
2.93495105e+04	1.38092504e+06	6.04486823e+04	1.12476322e+06
1.72608256e+06	1.40216797e+06	-1.55009417e+06	1.98725844e+06
8.95527019e+05	2.10660945e+06	1.30015290e+06	5.53298538e+05
1.49040722e+06	5.03005771e+05	-7.21160715e+05	2.10002445e+06
2.59973741e+05	2.02165991e+06	9.06369361e+03	3.08160904e+05
5.07567236e+05	9.15331417e+05	2.03673673e+06	1.70393818e+06
-2.23215614e+06	-2.41438187e+06	-2.51627809e+06	-2.96183563e+06
-1.67922446e+06	1.64240556e+06	1.26049448e+06	1.76883195e+06
9.14950842e+05	-1.60597889e+06	-2.32040065e+06	1.60189567e+06
1.64087299e+06	2.05609943e+06	1.65862979e+06	2.52245051e+05
1.86783850e+06	-1.66577034e+06	-1.84088912e+06	-1.91656267e+06
1.24875616e+06	-2.58045918e+06	-6.72704334e+02	1.86627532e+06
1.95781754e+06	-1.73224203e+06	2.04220328e+05	6.08948844e+05
-5.79834173e+05	2.04654494e+06	1.14762068e+05	1.86964236e+06
1.53312302e+06	-1.89072181e+06	1.48001945e+06	2.05478724e+06
2.99778389e+06	-7.33865112e+05	-6.57636207e+05	4.71998187e+05
8.97406647e+04	-1.39430445e+06	-1.72233929e+06	-1.84359727e+06
-1.63781773e+06	-1.57644440e+06	-8.80907549e+05	6.61275508e+05
1.97819878e+06	-1.01465910e+08	1.74990466e+06	1.98101687e+06
2.08296181e+06	2.17413738e+06	2.08843221e+06	8.40985304e+04
8.17543472e+04	5.85633194e+05	1.67130293e+05	1.46200194e+06
1.03502752e+06	5.11944720e+05	-1.76057285e+06	-1.58956252e+06
-1.67038237e+06	-1.70069084e+06	1.90247793e+06	7.02055298e+05
1.80107797e+06	1.95926036e+06	6.99798160e+05	1.46455571e+06
4.34376280e+05	1.59328563e+06	1.59166116e+06	2.00148685e+06
1.56696196e+06	-1.63383483e+06	1.27293833e+06	1.98192531e+06
1.39446693e+06	1.92648082e+06	2.00282407e+06	-1.72653140e+06
3.55712369e+05	2.07171147e+05	1.21377937e+06	-1.95178603e+05
-1.66825030e+06	1.94869587e+06	1.44994076e+06	1.37806042e+06
-1.47722700e+06	-3.68218233e+05	2.09222401e+06	1.28218283e+06
1.86180260e+06	1.89184980e+06	1.74959230e+06	2.61161201e+05
-1.77062541e+06	1.98939160e+06	1.94692965e+06	1.88149212e+06

-1.85095204e+06	5.70684802e+05	-1.20989363e+05	-9.70679379e+05
-2.33778937e+05	-1.06153705e+06	-8.47524108e+05	-1.73909024e+06
-1.91883688e+06	-8.55694928e+05	1.78662415e+06	-1.85675294e+06
1.99302532e+06	1.80014226e+06	-1.67654768e+06	2.91578874e+05
5.02763236e+05	1.37193387e+06	3.82724743e+05	2.33164036e+06
5.77198649e+05	1.51056257e+06	-1.28496737e+06	2.04171297e+06
1.38020722e+06	9.06101440e+04	1.22095956e+09	1.22133766e+09
1.07762702e+09	1.07796451e+09	5.02727356e+08	5.03106971e+08
1.13190811e+09	7.54639284e+08	5.90433332e+08	5.77256121e+08
2.13463994e+08	3.85637235e+08	2.13043521e+08	5.47595546e+08
2.13429213e+08	-7.96175366e+08	-8.04402545e+08	-6.43074140e+08
-3.56325754e+08	-6.60692451e+08	-7.43692293e+08	-8.03814390e+08
-8.03072132e+08	-6.43430480e+08	-6.82585973e+08	-7.08611240e+08
-6.06538991e+08	-3.04010639e+08	-7.10192128e+08	-4.82047697e+08
-4.82822114e+08	-2.36026182e+07	8.59741645e+06	7.13508786e+06
7.46445363e+06	8.72707794e+07	-8.79809165e+07	-1.13451382e+07
-1.12730960e+07	-8.96930353e+06	-1.04224991e+07	-1.11917082e+07
1.40619685e+08	-1.14576317e+07	-1.11087631e+07	-1.11630117e+07
-1.11380431e+07	-1.10054309e+07	-1.10873723e+07	-4.21307177e+07
-4.17740676e+07	-4.19519334e+07	2.61649695e+07	-4.20577890e+07
2.13484692e+08	-4.25900578e+07	8.72790431e+07	-4.24574497e+07
-4.17619392e+07	-4.40073459e+07	3.09823238e+07	-4.19608163e+07
-4.26564252e+07	-4.01938958e+07	-4.24328511e+07	5.28097930e+07
5.32410118e+07	5.62128515e+07	5.22288768e+07	5.42789028e+07
9.89530236e-10	5.28472601e+07	-8.33375584e+07	5.19874165e+07
-1.12061630e+07	5.11656131e+07	5.30885577e+07	6.15410287e+07
5.16277631e+07	-2.03048234e+08	-2.03821430e+08	5.69743545e+07
5.19391490e+07	5.28441813e+07	-9.31322575e-10	-8.14907253e-10
5.47885721e+07	-1.15539099e+08	2.56113708e-09	-1.01470489e+08
-1.51627793e+08	5.30932742e+07	5.35713650e+07	5.35589388e+07
5.35619263e+07	5.35858963e+07	5.43401479e+07	5.24967219e+07
5.30429509e+07	-9.84083403e+07	-1.01010288e+08	5.27978311e+07
5.32989696e+07	5.33221701e+07	-1.04773790e-09	5.48422338e+07
-5.71401089e+07	-5.83252977e+07	-6.15414852e+07	-5.64413516e+07
-5.70519496e+07	5.36115658e+07	5.33411052e+07	5.26288264e+07
1.04773790e-09	-3.04007419e+08	2.13465851e+08	2.13042555e+08
-1.08209858e+07	-1.07605038e+07	-1.07819975e+07	-4.21508065e+07
-4.15849342e+07	-4.11871559e+07	-4.25471828e+07	-9.85433095e+07
5.40268540e+07	-1.04482066e+08	5.22907226e+07	2.32830644e-10
5.33840008e+07	2.88115313e+08	2.88028185e+08	2.87816831e+08
5.82076609e-10	2.87821792e+08	2.87962377e+08	1.40608114e+08
2.88197744e+08	4.31311539e+08	4.31371689e+08	4.31377487e+08
4.31194190e+08	1.00621798e+09	9.44179383e+07	9.39349780e+07
9.40704666e+07	2.63085440e+07	9.34423541e+07	2.13484692e+08
9.50731730e+07	9.37299026e+07	8.72790431e+07	1.10221823e+08
1.09598792e+08	2.98475707e+08	3.09966005e+07	1.07460753e+08
1.10365509e+08	1.07976721e+08	-1.61172104e+08	-1.62005085e+08

-1.60969409e+08	-1.58155607e+08	-1.60713307e+08	-2.19031603e+08
0.00000000e+00	-2.20831274e+08	-8.33492867e+07	-2.20548882e+08
7.54647232e+08	-1.58842609e+08	-1.60880772e+08	0.00000000e+00
-1.61595249e+08	-1.61446675e+08	-1.60844856e+08	-3.56191672e+08
-5.03072453e+07	-3.08462387e+08	-3.01828999e+08	0.00000000e+00
0.00000000e+00	-2.84265538e+08	-1.15539609e+08	-2.82807038e+08
0.00000000e+00	-1.01470489e+08	-1.51631038e+08	-3.53484718e+08
-1.60232036e+08	-1.60552352e+08	-1.61238505e+08	-1.61017352e+08
-1.61310145e+08	-3.22688158e+08	-3.20270139e+08	-2.55313416e+08
-9.84347897e+07	0.00000000e+00	-1.01009692e+08	-2.55398140e+08
-4.82027261e+08	-5.83236193e+07	-5.83311330e+07	-6.15394783e+07
-5.52556067e+07	-5.70407226e+07	-1.67653676e+08	-1.69787064e+08
-1.68051886e+08	0.00000000e+00	-3.04007419e+08	2.13042555e+08
2.13465851e+08	2.87432582e+08	2.87690936e+08	4.31121344e+08
1.37086988e+08	1.36749981e+08	1.35985289e+08	1.37650878e+08
3.77336556e+08	-3.22306013e+08	3.77208772e+08	3.77214731e+08
-3.20939167e+08	-2.51219389e+08	-9.85398971e+07	-1.04476572e+08
-2.54513743e+08	0.00000000e+00	0.00000000e+00	-4.82812505e+08]

Ridge-Regression Model Coefficients:

[-4.80275763e+05	-9.33080927e+00	2.59675698e+02	-3.66693324e+02
1.35213534e+06	1.35873530e+06	-1.36203925e+06	4.40472618e+01
5.97660510e-01	2.34730868e+02	3.05228055e+05	2.38960194e-03
-1.26908506e+01	-1.25049129e+02	6.33692582e+01	6.40854146e+01
-4.59380751e+01	3.64474855e+01	7.51842987e+01	1.53118191e+02
-2.41769789e+02	2.83101825e+05	-6.92857288e+05	2.30929417e+05
1.11806665e+05	3.27584441e+05	1.32367562e+05	-2.27445953e+05
-1.32236012e+06	-1.43749367e+05	-1.16206468e+06	2.46371078e+05
-1.12616330e+06	-3.23293867e+05	0.00000000e+00	-1.09846896e+05
-1.28372259e+06	-2.13386367e+05	-2.35206854e+05	1.95124891e+05
-1.78881471e+05	2.07262387e+05	1.15530553e+05	-1.05447547e+06
2.32588040e+06	-3.29785498e+05	2.44538902e+05	-6.92193926e+05
-4.40703648e+05	-5.28482171e+04	-2.68583889e+05	7.80852012e+05
-1.21212743e+06	1.53997398e+05	5.44383219e+05	1.66945227e+06
2.98578061e+06	-4.03769964e+05	-3.49623424e+05	1.43734458e+06
-9.22401508e+04	2.16903699e+05	1.34383407e+05	-2.24254359e+06
-4.64613459e+05	2.63212680e+05	-1.14141186e+06	-1.35513235e+06
-3.18224211e+05	-4.82020815e+05	-3.52745937e+05	4.09007412e+05
3.54411265e+06	2.08147669e+06	0.00000000e+00	-2.57301810e+05
1.39990569e+05	-4.46996298e+05	-1.58975142e+06	5.71220726e+04
2.95375757e+05	5.36638930e+04	3.16257606e+05	2.60680135e+06
3.91372529e+06	-1.27978949e+05	-4.54517127e+05	-3.02897218e+04
-4.74324670e+05	2.49643370e+06	-4.24862352e+05	-6.54158041e+04
3.88318032e+05	7.56471453e+04	-1.02790663e+06	6.27533795e+05
3.66130777e+05	3.00550263e+05	-2.46044536e+04	1.16363132e+05
1.34343682e+05	-4.99171373e+04	6.65649411e+05	2.98258304e+05
-2.30680014e+05	2.37208177e+05	0.00000000e+00	-2.19316998e+05

1.81491662e+06	2.32862226e+06	2.12872551e+05	3.45649815e+05
-8.02887324e+05	-1.00542664e+06	-1.07578663e+06	-1.51624325e+06
-1.15549227e+06	2.70330169e+05	-5.72002491e+04	4.18276215e+05
-3.56220586e+05	-1.08013044e+06	-9.04960033e+05	2.27856889e+05
3.15616586e+05	6.44634884e+05	3.33534469e+05	-2.45546956e+05
5.23043628e+05	-1.14036152e+06	-1.30194047e+06	-4.96297602e+05
-4.17784386e+04	-1.10782316e+06	0.00000000e+00	4.45126631e+04
6.88073617e+05	-3.22840975e+05	-2.83370364e+05	1.32485649e+05
8.32236017e+05	2.25094515e+05	-3.73205985e+05	5.62293965e+04
1.78245416e+05	-1.37652040e+06	1.19677577e+05	2.56022584e+05
4.17325813e+06	6.31965787e+05	6.81895918e+05	-1.52746606e+04
-3.86671237e+05	2.69049279e+04	-1.19755369e+06	-1.32854785e+06
-1.12281219e+06	-1.05683459e+06	5.21294633e+05	1.29176057e+05
1.58275793e+05	-1.00178114e+06	-3.18857857e+04	1.84536072e+05
2.76205099e+05	7.25435192e+05	2.89212146e+05	-4.52091674e+05
-4.10974611e+05	9.96797369e+04	-3.10477779e+05	1.39667806e+05
4.96202575e+05	-2.75648649e+04	-1.23479695e+06	-1.01078976e+06
-1.11080037e+06	-1.14834798e+06	1.37803107e+05	-1.00171517e+06
-1.27811701e+04	1.87287419e+05	1.54160092e+05	1.36164068e+05
-1.08462455e+05	2.32802710e+05	2.68070679e+05	1.91850380e+05
2.06772020e+05	-1.05137094e+06	-2.80870022e+04	1.79757707e+05
1.02273255e+05	1.56610451e+05	2.40373431e+05	-1.19560723e+06
-1.19779176e+05	-2.92970506e+05	-8.67328509e+04	1.17830707e+06
-1.14870689e+06	1.49520210e+05	1.28545177e+05	7.24243970e+04
-1.75170089e+05	-8.54206337e+05	7.89947136e+05	-2.26979426e+04
4.13060841e+04	9.42930230e+04	3.83406150e+05	-2.76348246e+05
-1.23184754e+06	1.62686096e+05	1.80621169e+05	7.53598715e+04
-2.16876931e+05	2.02184245e+06	1.27767100e+06	4.87857174e+05
1.18472861e+06	3.80163012e+05	-2.73800112e+05	-1.20404882e+06
-4.83183356e+05	5.73321621e+05	-4.47080690e+04	-1.33207055e+06
1.79100470e+05	4.60286799e+05	-1.14813386e+06	-2.28146555e+05
-2.46144540e+04	8.32858135e+05	-1.50489018e+05	5.03674910e+05
5.67566088e+04	1.81173652e+05	-7.59384556e+05	2.67815595e+05
4.07798407e+03	-4.35024587e+05	-1.35331899e+03	3.77430996e+05
-1.36027132e+05	2.01363710e+05	-1.53316255e+05	2.25987116e+05
1.00202941e+05	1.12684575e+05	1.47302979e+05	1.30615774e+06
-5.44825737e+05	-5.69666764e+05	-9.34739537e+05	1.57822333e+04
-6.63083886e+05	-2.63608187e+05	-4.41087702e+05	2.86300289e+05
-1.57506404e+06	-7.09939574e+05	6.79753805e+05	9.41382033e+04
8.35349593e+05	-2.42918427e+05	-1.07856467e+06	1.51824315e+06
1.71443469e+06	-2.20353787e+05	1.89998931e+04	3.33972784e+05
-4.33555673e+05	2.47157953e+05	9.13454687e+05	-5.24502701e+05
-2.02428635e+05	-5.25157370e+05	9.14760675e+04	-5.34420803e+05
-4.05433103e+05	1.75569989e+06	3.93523172e+05	-3.95388700e+05
1.79353562e+06	-6.34547257e+05	-2.97136630e+05	-3.47286443e+05
-3.29527797e+05	-1.94195185e+05	-2.76789464e+05	2.01415897e+05
5.44283743e+05	3.65048993e+05	3.21896455e+05	2.23588665e+05

-5.44825737e+05	-2.22823349e+05	-5.25157370e+05	-1.15298057e+05
5.03091031e+05	-1.35937494e+06	-1.94408064e+06	2.97513589e+05
-2.68282410e+05	1.99057250e+06	-8.46205811e+04	-5.71728141e+05
-1.70822276e+05	2.75229057e+06	-1.10489310e+06	9.38731455e+05
0.00000000e+00	-5.24919319e+05	1.46986180e+05	-1.33286397e+06
-3.34890629e+05	-1.78458562e+06	-2.78691385e+05	6.77030392e+06
-1.66270191e+06	-8.79833901e+05	-1.62475007e+06	2.03581645e+06
8.25803265e+03	-3.19488906e+05	0.00000000e+00	0.00000000e+00
1.19761151e+06	-5.60371144e+05	0.00000000e+00	-1.00178114e+06
-2.40950348e+04	-2.63506274e+05	2.36093352e+05	1.46114314e+05
1.21772399e+05	2.04283559e+05	5.13190870e+05	-6.82480784e+05
-3.44068926e+05	2.03342431e+06	-4.32667873e+05	-5.89821968e+05
-1.18736857e+05	5.29923438e+04	0.00000000e+00	1.33666983e+06
4.59790006e+05	-5.86329803e+05	-3.08484336e+06	1.25677111e+06
6.49274988e+05	2.73034577e+05	-1.12786503e+05	-7.62649554e+05
0.00000000e+00	-2.20353787e+05	-6.63083886e+05	-9.34739537e+05
-2.73758615e+04	5.22018370e+04	2.91892985e+04	1.82715921e+05
7.38134811e+05	1.13981101e+06	-1.84420128e+05	1.99554131e+06
6.22152167e+05	-3.55201135e+06	-1.02174858e+06	0.00000000e+00
-4.60956307e+04	4.49621719e+04	-3.47125267e+04	-2.59294227e+05
0.00000000e+00	-2.47262390e+05	-8.55170203e+04	1.79353562e+06
1.24320809e+05	4.68910353e+04	1.03083033e+05	1.16614445e+05
-6.77906134e+04	7.26708613e+04	2.59310531e+05	-2.18790953e+05
-8.02944628e+04	3.21896455e+05	-6.71529036e+05	-5.44825737e+05
8.99952729e+05	-3.63242285e+05	-5.25157370e+05	1.70794157e+06
1.16009960e+06	-4.45093936e+04	-1.94408064e+06	-9.19142001e+05
1.81747997e+06	-5.16140763e+05	-3.31727527e+05	-1.14482422e+06
-1.20265912e+05	2.35601046e+06	7.61567928e+04	1.20608836e+06
0.00000000e+00	-4.60932633e+05	1.46986180e+05	-2.12388098e+05
1.12684575e+05	1.62347570e+06	-7.41202864e+04	0.00000000e+00
-7.95757465e+05	-6.20376185e+05	-3.90835566e+04	-1.57506404e+06
-9.29519930e+05	-2.43219886e+06	2.65177921e+06	0.00000000e+00
0.00000000e+00	-8.84733058e+05	-5.60371144e+05	3.66539534e+05
0.00000000e+00	-1.00178114e+06	-2.40950348e+04	2.74031087e+06
5.01914218e+05	2.01271217e+05	-4.40307132e+05	-2.06294364e+05
-4.97671641e+05	-6.92395911e+05	9.78696200e+05	-7.85502177e+05
2.03342431e+06	0.00000000e+00	-4.32667873e+05	-7.96254364e+05
3.33972784e+05	-5.08448892e+05	-5.86329803e+05	-3.08484336e+06
2.22501001e+06	6.49274988e+05	1.10107426e+06	-8.65961195e+05
8.06615811e+05	0.00000000e+00	-2.20353787e+05	-9.34739537e+05
-6.63083886e+05	-5.95595304e+05	-3.64359461e+05	-1.33461322e+05
2.26448057e+05	-1.03512103e+05	-8.80297557e+05	7.73143836e+05
1.17008732e+05	-7.59710974e+05	-1.46716441e+04	-2.13414740e+03
5.16792547e+05	3.05378667e+06	1.99554131e+06	-3.55201135e+06
2.09265162e+04	0.00000000e+00	0.00000000e+00	-4.33555673e+05]

Lasso-Regression Model Coefficients:

[-2.52973516e+05 -1.87159158e+01 1.95712553e+02 -1.90065556e+02
 -7.05533536e+03 -2.18333847e+03 -1.53686514e+03 4.27918686e+01
 -4.06139132e-01 2.27985825e+02 1.57652028e+05 2.39681463e-03
 -2.72525150e+00 -1.24651322e+02 6.30739395e+01 5.84859932e+01
 -4.11832361e+01 3.47792656e+01 6.28268330e+01 1.52343789e+02
 -2.63590634e+02 0.00000000e+00 0.00000000e+00 0.00000000e+00
 -2.82671489e+04 1.97167349e+05 6.75899979e+03 -5.74409981e+04
 -7.44698360e+05 0.00000000e+00 -6.50710588e+05 7.39234099e+04
 -6.04265131e+05 -2.14023268e+05 0.00000000e+00 -3.06673045e+04
 -7.99537944e+05 -6.46378793e+04 -2.24769018e+04 2.67110659e+05
 -3.25242519e+04 5.07099822e+04 2.42635204e+05 -5.38026449e+05
 2.39099623e+06 -1.66044375e+05 0.00000000e+00 -5.16208069e+05
 -3.16468324e+05 -0.00000000e+00 -9.33386306e+04 8.51843078e+05
 -6.94370766e+05 -0.00000000e+00 1.06770824e+06 2.34798175e+06
 3.56471045e+06 3.69489864e+05 -2.11301055e+05 1.51019593e+06
 -0.00000000e+00 7.68352566e+04 -0.00000000e+00 -2.28625552e+06
 -2.30904466e+05 1.14037652e+05 -5.95984495e+05 -8.30114668e+05
 -2.13092372e+05 -3.42731806e+05 -2.90301195e+05 0.00000000e+00
 3.48643076e+06 2.06117938e+06 0.00000000e+00 -9.82203339e+04
 -1.48774210e+04 -3.15616864e+05 -1.00036017e+06 7.95134265e+05
 1.47216826e+05 -2.13171646e+04 2.38749685e+05 3.25402272e+06
 4.46134645e+06 8.91416128e+03 -3.20365692e+05 7.75976966e+04
 -3.26621676e+05 2.96546842e+06 -2.37430568e+05 -0.00000000e+00
 2.63594611e+05 -0.00000000e+00 -4.96019153e+05 4.59186783e+05
 4.47819989e+05 0.00000000e+00 -0.00000000e+00 2.05200306e+05
 0.00000000e+00 0.00000000e+00 1.27278841e+06 2.29703239e+04
 -8.01008432e+04 4.55567742e+04 0.00000000e+00 -1.04611099e+05
 2.55179897e+06 3.08474179e+06 0.00000000e+00 2.18234300e+05
 -3.68723651e+04 -2.30360205e+05 -2.66813970e+05 -6.67254490e+05
 -6.44611849e+05 0.00000000e+00 -1.17032022e+05 0.00000000e+00
 -2.08336532e+05 -5.61059277e+05 -9.57834094e+04 5.30732053e+04
 2.13839868e+05 0.00000000e+00 1.84418170e+05 -4.45306685e+04
 3.55370796e+05 -6.10276892e+05 -7.54061354e+05 0.00000000e+00
 -0.00000000e+00 -1.30843170e+05 0.00000000e+00 -0.00000000e+00
 5.80418000e+05 3.65931519e+05 -1.18287853e+05 1.28266809e+05
 1.49292630e+06 0.00000000e+00 -1.93726472e+05 -1.02103410e+05
 3.09230055e+04 -8.72637882e+05 -0.00000000e+00 0.00000000e+00
 4.84462067e+06 1.25330791e+06 1.21256974e+06 1.18707882e+05
 -1.34805472e+05 2.28567194e+05 -6.99609762e+05 -8.32084315e+05
 -6.47633041e+05 -5.27928399e+05 1.22143664e+06 6.47481666e+04
 -0.00000000e+00 -6.65000309e+05 -0.00000000e+00 0.00000000e+00
 5.42411967e+04 0.00000000e+00 0.00000000e+00 -3.46507912e+05
 -2.58122101e+05 2.31944475e+05 -7.01825616e+04 3.99759193e+04
 5.82941355e+05 5.26261725e+04 -7.26297378e+05 -2.74933989e+05
 -4.71506054e+05 -5.43310213e+05 0.00000000e+00 -6.83193870e+05
 -1.51541010e+05 0.00000000e+00 2.17767988e+05 3.29231254e+03
 -0.00000000e+00 5.45753736e+04 1.69077811e+05 0.00000000e+00

6.41868222e+04	-3.59200894e+05	-0.00000000e+00	0.00000000e+00
0.00000000e+00	0.00000000e+00	6.54703286e+04	-6.82550449e+05
0.00000000e+00	-1.47167416e+05	-0.00000000e+00	1.76912868e+06
-6.44670294e+05	-0.00000000e+00	1.38470176e+04	0.00000000e+00
1.54794938e+05	-5.80926028e+05	6.65847688e+05	-2.15496941e+03
-7.65694881e+04	-0.00000000e+00	1.98565213e+05	-1.69283805e+05
-6.92141489e+05	-0.00000000e+00	0.00000000e+00	-3.41202283e+04
1.97464054e+05	2.83877688e+06	1.98848214e+06	1.23352684e+06
1.93266285e+06	1.09940092e+06	0.00000000e+00	-6.88181295e+05
2.60281294e+05	1.31652093e+06	-1.10499676e+05	-8.09423613e+05
-0.00000000e+00	2.92338959e+05	-6.40188689e+05	-4.91383714e+04
4.39178430e+04	8.98158796e+05	-0.00000000e+00	1.85213653e+05
1.47049938e+05	7.47171211e+04	-2.00675905e+05	0.00000000e+00
-1.27983752e+05	-3.09445790e+05	-3.15162138e+05	6.13589896e+04
-2.55835633e+05	7.65049570e+04	-2.52703496e+05	1.19045287e+05
0.00000000e+00	-0.00000000e+00	4.37552603e+04	6.47977719e+05
-4.80934784e+05	-9.50971573e+05	-1.18367740e+06	2.39228093e+04
-7.20973559e+05	2.27967659e+05	-8.98273525e+03	0.00000000e+00
-3.21964697e+06	-1.46161892e+06	5.78719992e+05	7.12015723e+04
6.76199152e+05	-0.00000000e+00	-1.11137666e+06	1.11477350e+06
1.26130754e+06	-1.69717403e+04	-2.46955153e+05	7.43684357e+05
-3.59017357e+05	2.38173765e+04	1.08258612e+06	-2.51769853e+05
-0.00000000e+00	-3.91817741e+05	0.00000000e+00	-1.37517462e+05
0.00000000e+00	1.92149526e+06	6.52043250e+05	-3.11595056e+04
3.96106988e+06	-2.47672489e+05	-3.62006547e+03	-1.48991373e+04
-0.00000000e+00	6.43197649e+04	2.65683578e+04	8.79361199e+04
3.40963294e+05	1.59025322e+05	5.70479403e+05	-0.00000000e+00
-9.91975856e+05	-1.14093133e+05	-2.45415060e+03	-1.14469197e+05
5.41864498e+05	-1.06430930e+06	-2.74965143e+06	9.90224641e+03
-1.47556924e+05	1.75100566e+06	-0.00000000e+00	-2.40172940e+05
-0.00000000e+00	2.63139835e+06	-6.09546439e+05	1.14697819e+06
0.00000000e+00	-3.40107095e+05	5.09869497e+05	-9.21243297e+05
-0.00000000e+00	-7.08805369e+05	9.74310823e+03	7.00807062e+06
-1.19402078e+06	-1.07421808e+04	-8.18451137e+05	1.33807888e+06
0.00000000e+00	-0.00000000e+00	0.00000000e+00	0.00000000e+00
6.29635561e+05	-6.93561603e+04	0.00000000e+00	-1.14701388e+06
2.96649203e+05	2.58049097e+04	4.10355506e+05	1.50853609e+05
-0.00000000e+00	1.32528973e+05	6.44917543e+05	0.00000000e+00
-1.06220023e+05	4.38287940e+06	-0.00000000e+00	-3.02520623e+05
0.00000000e+00	1.05424470e+05	0.00000000e+00	1.17709410e+06
0.00000000e+00	-6.93666904e+05	-4.58895450e+06	5.97826002e+05
7.00851123e+05	5.75158951e+05	-6.16416151e+04	-3.49545758e+05
0.00000000e+00	-0.00000000e+00	-9.97413941e+05	-9.96812959e+05
-0.00000000e+00	2.49667066e+05	2.32052443e+05	0.00000000e+00
4.01071896e+05	7.90574806e+05	-2.17681496e+05	4.53865682e+06
5.97756020e+05	-5.83877392e+06	-1.42138811e+05	0.00000000e+00
-0.00000000e+00	0.00000000e+00	4.51584572e+04	-1.03155350e+05

0.00000000e+00	-5.20608845e+04	0.00000000e+00	4.54668344e+04
1.84712593e+05	-0.00000000e+00	1.88566945e+04	3.71155244e+04
-7.83612059e+04	-0.00000000e+00	3.32201369e+05	-1.32890024e+05
0.00000000e+00	1.64245680e+04	-4.93038714e+05	-2.76168647e+04
7.89508766e+05	-0.00000000e+00	-1.74246018e+04	2.21804715e+06
1.57752683e+06	-0.00000000e+00	-6.38213415e+03	-7.91141229e+04
2.19329562e+06	-0.00000000e+00	-0.00000000e+00	-6.81442064e+05
0.00000000e+00	2.78911973e+06	1.62051051e+05	1.22566004e+06
0.00000000e+00	-0.00000000e+00	6.63879163e+04	-0.00000000e+00
-0.00000000e+00	1.23023448e+06	4.79946843e+04	0.00000000e+00
-3.07536507e+05	-3.52957202e+05	1.19384629e+04	-0.00000000e+00
-1.58956441e+05	-9.95996560e+05	3.40483751e+06	0.00000000e+00
0.00000000e+00	-0.00000000e+00	-1.25632746e+02	0.00000000e+00
0.00000000e+00	-1.08735838e+02	2.87870786e+04	3.23860125e+06
1.83231581e+05	3.18193431e+04	-4.33102365e+05	-0.00000000e+00
-3.58989309e+05	-0.00000000e+00	1.02864355e+06	-2.43701399e+05
6.44584170e+04	0.00000000e+00	-0.00000000e+00	-0.00000000e+00
9.17501407e+04	0.00000000e+00	-1.71692671e+03	-1.71056622e+03
2.45451383e+06	6.52084474e+04	7.00407568e+05	-7.45263778e+05
3.55314651e+05	0.00000000e+00	-0.00000000e+00	-1.62722251e+03
-1.62468229e+03	-7.50599724e+04	-1.08228095e+05	-8.61244185e+04
1.76168863e+05	0.00000000e+00	-7.21863846e+05	6.14455174e+05
1.63000403e+04	-7.52077625e+05	-0.00000000e+00	-0.00000000e+00
0.00000000e+00	3.55106583e+06	5.15291058e+04	-4.84994213e+03
0.00000000e+00	0.00000000e+00	0.00000000e+00	-2.52346503e+04]

Random Forest-Model estimators:

```
[DecisionTreeRegressor(criterion='mse', max_depth=None, max_features='auto',
    max_leaf_nodes=None, min_impurity_split=1e-07,
    min_samples_leaf=1, min_samples_split=2,
    min_weight_fraction_leaf=0.0, presort=False,
    random_state=1106026783, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
    max_leaf_nodes=None, min_impurity_split=1e-07,
    min_samples_leaf=1, min_samples_split=2,
    min_weight_fraction_leaf=0.0, presort=False,
    random_state=1450320500, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
    max_leaf_nodes=None, min_impurity_split=1e-07,
    min_samples_leaf=1, min_samples_split=2,
    min_weight_fraction_leaf=0.0, presort=False,
    random_state=35292500, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
    max_leaf_nodes=None, min_impurity_split=1e-07,
    min_samples_leaf=1, min_samples_split=2,
    min_weight_fraction_leaf=0.0, presort=False,
```

```

        random_state=74067342, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=199356566, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1396897818, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=80115917, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1700585817, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=2061033840, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1375790332, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=382266742, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1470011698, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=784306543, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',

```

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max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,
min_weight_fraction_leaf=0.0, presort=False,
random_state=516668512, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,
min_weight_fraction_leaf=0.0, presort=False,
random_state=1133736769, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,
min_weight_fraction_leaf=0.0, presort=False,
random_state=969353358, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,
min_weight_fraction_leaf=0.0, presort=False,
random_state=1646081382, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,
min_weight_fraction_leaf=0.0, presort=False,
random_state=2025561715, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,
min_weight_fraction_leaf=0.0, presort=False,
random_state=370265412, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,
min_weight_fraction_leaf=0.0, presort=False,
random_state=726436093, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,
min_weight_fraction_leaf=0.0, presort=False,
random_state=716644271, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,
min_weight_fraction_leaf=0.0, presort=False,
random_state=614282912, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,

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        min_weight_fraction_leaf=0.0, presort=False,
        random_state=912566240, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=978348514, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=2133382757, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1889899936, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=579337070, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=137589179, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=2127804938, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=701295966, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=808750105, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,

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        random_state=729468242, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1095257522, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1062465622, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1875751635, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=354446661, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1257060344, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1060269552, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=649925456, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1146688048, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=600138914, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',

```

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max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,
min_weight_fraction_leaf=0.0, presort=False,
random_state=1467365030, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,
min_weight_fraction_leaf=0.0, presort=False,
random_state=1210913491, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,
min_weight_fraction_leaf=0.0, presort=False,
random_state=670327258, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,
min_weight_fraction_leaf=0.0, presort=False,
random_state=1118209815, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,
min_weight_fraction_leaf=0.0, presort=False,
random_state=55651732, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,
min_weight_fraction_leaf=0.0, presort=False,
random_state=338979080, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,
min_weight_fraction_leaf=0.0, presort=False,
random_state=336346086, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,
min_weight_fraction_leaf=0.0, presort=False,
random_state=899565831, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,
min_weight_fraction_leaf=0.0, presort=False,
random_state=1237981705, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,

```



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        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1575813462, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=2106859399, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=162859676, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1257829947, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1394676870, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1669660523, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1540003779, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1559332908, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=776622168, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,

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        random_state=1894425278, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1740718291, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1153949403, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1819064642, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1786278106, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1459604146, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1627226873, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1121189631, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=694294159, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=728984405, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',

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max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,
min_weight_fraction_leaf=0.0, presort=False,
random_state=630273904, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,
min_weight_fraction_leaf=0.0, presort=False,
random_state=2050449381, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,
min_weight_fraction_leaf=0.0, presort=False,
random_state=159559656, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,
min_weight_fraction_leaf=0.0, presort=False,
random_state=249099915, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,
min_weight_fraction_leaf=0.0, presort=False,
random_state=378702679, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,
min_weight_fraction_leaf=0.0, presort=False,
random_state=1512530579, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,
min_weight_fraction_leaf=0.0, presort=False,
random_state=2009571403, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,
min_weight_fraction_leaf=0.0, presort=False,
random_state=903617210, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,
min_weight_fraction_leaf=0.0, presort=False,
random_state=1223304578, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,

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        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1276332733, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1328106412, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1949784140, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1587429547, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=630787136, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=742945993, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1141906432, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1060570581, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1352556903, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,

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        random_state=2024467656, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1312012422, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=106255929, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1498880311, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1181209167, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=125921567, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1916934476, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=830978602, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=336273047, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
        max_leaf_nodes=None, min_impurity_split=1e-07,
        min_samples_leaf=1, min_samples_split=2,
        min_weight_fraction_leaf=0.0, presort=False,
        random_state=1329698102, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',

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max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,
min_weight_fraction_leaf=0.0, presort=False,
random_state=2112654263, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,
min_weight_fraction_leaf=0.0, presort=False,
random_state=1002340526, splitter='best'), DecisionTreeRegressor(criterion='mse',
max_depth=None, max_features='auto',
max_leaf_nodes=None, min_impurity_split=1e-07,
min_samples_leaf=1, min_samples_split=2,
min_weight_fraction_leaf=0.0, presort=False,
random_state=1251628904, splitter='best')]
```

Random Forest-Model Feature-Importances:

```

[ 8.13217203e-02  6.24675235e-02  2.38490506e-02  1.57832199e-01
 1.88345967e-02  1.02681124e-02  1.66891485e-02  3.40255195e-02
 2.82705362e-01  3.65432146e-02  2.24453167e-03  7.11691665e-02
 3.72233492e-03  5.32792027e-03  6.40691070e-03  9.80197434e-03
 1.09116101e-02  8.11553212e-03  5.71248537e-03  7.64509826e-03
 8.78438123e-03  2.12146404e-07  5.65271594e-04  8.35457972e-08
 5.73730709e-07  1.80653578e-06  5.49647769e-05  1.24822896e-05
 1.75183751e-05  2.56508709e-04  2.17154775e-06  2.41799690e-06
 1.11339100e-04  3.35048964e-04  0.00000000e+00  2.74057871e-06
 1.23829144e-04  5.38076717e-04  1.08627919e-06  1.63275535e-04
 3.90027790e-04  1.23343878e-06  2.22410694e-04  8.87486875e-05
 1.94987009e-03  1.58019577e-04  4.72829946e-08  3.51363362e-06
 1.47402864e-04  1.73306629e-07  2.18792849e-05  3.45381304e-04
 9.16339035e-07  1.18766810e-08  1.03681946e-04  1.11792721e-04
 2.09841736e-05  2.98819434e-04  2.69591316e-04  1.17802897e-03
 2.72131495e-05  4.16947203e-05  4.36624100e-07  9.06600489e-09
 1.12882111e-05  2.69286440e-04  1.27445672e-06  2.54873776e-06
 8.60749752e-04  6.46577849e-06  2.02607613e-05  2.39532891e-06
 9.81164797e-05  1.58592356e-05  0.00000000e+00  2.33118954e-05
 7.23719129e-06  1.07465431e-04  6.89800935e-05  3.18924415e-04
 1.77928719e-04  3.84928968e-07  1.91279736e-05  2.39577754e-05
 3.79012512e-05  1.37168466e-03  3.41307299e-05  1.09535065e-03
 7.27717974e-05  1.14026949e-04  4.40171845e-06  4.22491305e-08
 4.23632112e-04  1.84556045e-05  6.52419957e-05  1.83512264e-03
 1.52175841e-03  3.17160812e-08  1.13091897e-07  1.47470083e-04
 2.23120756e-05  1.31031446e-04  3.53478569e-04  1.95061581e-07
 3.49538457e-05  1.06408715e-06  0.00000000e+00  2.60067710e-04
 8.91844851e-05  1.82119108e-03  1.56662788e-07  7.39106174e-07
 1.76445481e-03  5.06026171e-04  9.83751396e-05  1.22052918e-04
 4.30106412e-05  1.73087642e-08  3.08611061e-06  1.61683491e-07
 2.30794910e-07  1.37409394e-04  9.00713928e-05  4.65071838e-05]
```

9.00359586e-06	2.89044214e-09	1.18730936e-05	1.00276257e-04
7.32710596e-05	6.65530893e-05	5.88081250e-05	7.53627435e-05
8.62039891e-08	1.28654771e-04	0.00000000e+00	5.51831656e-09
8.65591998e-04	1.37805366e-04	4.12146483e-05	7.94039974e-05
2.59585669e-04	3.81292099e-08	7.20208193e-07	8.37178032e-07
4.94011124e-05	7.10533778e-06	4.76234966e-05	2.60879903e-07
3.35476775e-04	2.06896407e-04	1.39062492e-03	1.04885018e-04
2.24156255e-06	5.84105225e-05	1.32531113e-06	1.30718323e-04
1.11426028e-04	3.08938649e-05	2.25137529e-04	1.67232454e-04
1.42723597e-06	4.52466552e-05	1.52142178e-06	3.78235396e-08
2.33144426e-06	1.65408813e-07	2.82455710e-08	2.37855105e-05
1.16330412e-03	4.63095511e-04	1.79608853e-06	6.16477409e-06
2.34461052e-03	5.73633140e-04	2.23960837e-06	4.19486212e-08
1.73770180e-07	1.54585767e-07	9.71384547e-08	7.09814116e-07
1.59832065e-06	1.00528543e-06	4.30402858e-04	1.16652548e-06
7.45334291e-05	1.15234237e-05	6.44987154e-06	1.41942939e-07
5.47029059e-05	3.25536784e-05	5.17244027e-05	1.80028934e-07
1.25524554e-07	1.14037377e-07	1.07396650e-06	7.18558893e-06
5.63246410e-10	6.98505037e-05	1.14272754e-07	3.12546800e-04
3.38991401e-04	6.46886436e-07	9.58253165e-06	1.47282944e-06
4.87862033e-05	7.01884460e-07	4.36567989e-04	2.24341433e-06
4.31092289e-06	5.01817437e-08	3.13365154e-05	4.29519614e-04
2.50761861e-06	4.47303001e-07	1.86753012e-08	6.45637709e-07
1.21755462e-05	9.15585038e-03	6.51057518e-03	1.41995865e-04
3.47334510e-04	3.13418608e-04	4.14153214e-06	4.15947576e-05
9.22381798e-05	5.54721261e-04	5.61835966e-08	1.82805845e-06
4.97843193e-07	3.29716451e-05	1.85165989e-04	6.52530658e-05
1.97341152e-03	5.17016047e-03	4.67537097e-04	7.99387476e-05
1.80818393e-04	3.31724611e-06	1.44514178e-05	3.65784895e-08
1.49012746e-04	2.04440883e-05	3.05965692e-04	8.59400157e-04
2.86776839e-04	4.39781013e-04	5.43510832e-04	3.62335248e-04
3.64426559e-05	4.66471684e-06	1.67944699e-03	2.10563321e-02
6.45008578e-07	2.58433566e-03	1.93133710e-05	3.90550173e-04
2.39253234e-06	8.65389031e-04	2.91343390e-03	1.33015910e-04
6.73994549e-05	1.01204275e-04	2.83797657e-04	2.05070152e-04
4.32355018e-04	8.87080543e-05	2.00644751e-04	7.81609819e-05
2.87937921e-04	2.80791356e-05	5.10727793e-05	4.26179147e-05
2.88922954e-05	9.56086766e-04	6.39716603e-04	6.58976144e-04
1.25885544e-03	1.07497480e-09	7.45465181e-04	4.04995152e-06
4.14657503e-07	1.52134422e-03	1.87508337e-03	1.44455173e-04
6.37183604e-09	1.36003446e-04	2.93599177e-04	5.04263068e-05
3.15462547e-04	2.63589035e-04	3.29731836e-04	1.37617270e-03
8.44822155e-05	1.98073243e-04	1.19301184e-03	1.33955958e-04
1.49243033e-05	3.64121163e-04	2.30096134e-07	4.45216093e-04
4.55434241e-04	6.50764706e-04	3.01536522e-05	5.24856382e-05
9.27794856e-05	1.85657966e-04	2.62566231e-04	4.65035687e-05
6.04888908e-05	1.66624023e-04	3.09563831e-04	2.06739183e-03

0.00000000e+00	2.46288162e-04	9.93413045e-06	3.25006135e-05
4.05342769e-06	7.72942336e-05	6.64982745e-05	1.07676153e-03
5.56303224e-05	1.07939614e-05	1.06229300e-04	2.24582943e-06
5.85245900e-07	7.83396804e-05	0.00000000e+00	0.00000000e+00
1.92059471e-05	6.07328097e-06	0.00000000e+00	6.92550963e-05
6.95427765e-05	4.83291997e-04	1.16659905e-03	6.83637142e-04
4.38281848e-06	5.79957458e-04	3.43194450e-05	2.66589300e-05
4.85765051e-06	2.31808918e-05	2.74529348e-07	2.90276197e-06
1.53248927e-08	3.24899136e-06	0.00000000e+00	2.70154144e-05
1.36373637e-07	7.11773302e-09	8.37984495e-09	2.49147660e-04
0.00000000e+00	3.65613009e-04	5.51674973e-06	1.64664975e-04
0.00000000e+00	2.60931837e-05	4.99835955e-06	8.78554155e-07
9.00120976e-08	2.26025174e-04	4.32727771e-04	7.76055461e-05
3.29890258e-04	3.04051748e-04	2.68637601e-04	9.58610465e-08
1.84118035e-05	8.23358276e-07	1.61654786e-05	0.00000000e+00
1.11813351e-05	3.01597975e-07	6.08402684e-05	7.04594200e-06
0.00000000e+00	3.79579367e-04	1.76414441e-04	3.43884500e-05
7.35183607e-05	2.97390145e-04	3.11218403e-04	4.13902519e-04
1.22491291e-04	4.39189401e-04	1.32781968e-03	3.23382997e-04
2.09983936e-04	1.36034992e-03	1.16463456e-04	2.77808804e-06
3.10118987e-04	1.37916873e-06	3.28125337e-09	1.99723284e-04
4.99708829e-04	1.80572896e-03	1.81405701e-06	7.76738205e-05
3.98499261e-05	1.21950807e-04	2.27614715e-04	2.86478865e-05
1.71866057e-08	1.28987389e-05	4.46731037e-04	6.11765710e-05
0.00000000e+00	5.88389717e-04	2.09405835e-05	1.99048216e-04
7.22460718e-06	6.37451142e-05	3.50525285e-04	0.00000000e+00
5.64604524e-06	1.71995779e-05	5.58987740e-05	1.33783034e-06
1.59500907e-04	2.33480019e-05	4.38168131e-04	0.00000000e+00
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0.00000000e+00	5.02530498e-05	1.75691278e-05	2.05821203e-04
5.58154763e-04	6.69382469e-04	4.01017240e-04	1.08948108e-06
3.24895713e-04	6.08359717e-04	2.97331984e-05	3.32353519e-06
3.63241966e-05	0.00000000e+00	0.00000000e+00	3.56969633e-09
3.83276704e-07	3.77018902e-05	8.95148567e-08	2.54508524e-06
6.86762483e-05	4.27120513e-08	6.72210224e-04	5.53791146e-06
3.19803899e-04	0.00000000e+00	1.71803962e-05	2.82823731e-05
4.09799499e-06	2.47525019e-07	2.53309928e-04	2.18117039e-04
9.41506352e-05	2.65090763e-04	2.11213600e-04	3.02860635e-04
1.84987258e-05	8.55634481e-05	2.13412519e-07	1.08126436e-06
8.56913256e-06	9.70915156e-05	5.18146784e-05	9.01141682e-07
1.96146070e-06	0.00000000e+00	0.00000000e+00	2.58482982e-05]

Gradient Boost-Model estimators:

```
[[ DecisionTreeRegressor(criterion='friedman_mse', max_depth=3,
    max_features=None, max_leaf_nodes=None,
    min_impurity_split=1e-07, min_samples_leaf=1,
    min_samples_split=2, min_weight_fraction_leaf=0.0,
```



```
presort='auto',  
random_state=<mtrand.RandomState object at 0x7f5d9009c870>,  
splitter='best')]  
[ DecisionTreeRegressor(criterion='friedman_mse', max_depth=3,  
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[ DecisionTreeRegressor(criterion='friedman_mse', max_depth=3,  
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min_samples_split=2, min_weight_fraction_leaf=0.0,  
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[ DecisionTreeRegressor(criterion='friedman_mse', max_depth=3,  
max_features=None, max_leaf_nodes=None,
```

```

min_impurity_split=1e-07, min_samples_leaf=1,
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presort='auto',
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presort='auto',
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splitter='best')]
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    random_state=<mtrand.RandomState object at 0x7f5d9009c870>,
    splitter='best')]
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```
[ DecisionTreeRegressor(criterion='friedman_mse', max_depth=3,  
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    min_samples_split=2, min_weight_fraction_leaf=0.0,  
    presort='auto',  
    random_state=<mtrand.RandomState object at 0x7f5d9009c870>,  
    splitter='best')]
```

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min_samples_split=2, min_weight_fraction_leaf=0.0,
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splitter='best')]
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presort='auto',
random_state=<mtrand.RandomState object at 0x7f5d9009c870>,
splitter='best')]
[ DecisionTreeRegressor(criterion='friedman_mse', max_depth=3,

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max_features=None, max_leaf_nodes=None,
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[ DecisionTreeRegressor(criterion='friedman_mse', max_depth=3,
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    min samples split=2, min weight fraction leaf=0.0,
```



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splitter='best')]  
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min_samples_split=2, min_weight_fraction_leaf=0.0,  
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max_features=None, max_leaf_nodes=None,
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Gradient Boost-Model Feature-Importances:

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0.00000000e+00	0.00000000e+00	0.00000000e+00	0.00000000e+00
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0.00000000e+00	0.00000000e+00	0.00000000e+00	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	0.00000000e+00
0.00000000e+00	0.00000000e+00	1.92666660e-03	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	0.00000000e+00

0.00000000e+00	2.24596738e-02	1.62178001e-02	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	0.00000000e+00
5.81534297e-04	9.79682231e-03	0.00000000e+00	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	0.00000000e+00
3.75442982e-03	1.74254040e-02	0.00000000e+00	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	1.29027455e-02
2.91812368e-03	1.00892685e-02	0.00000000e+00	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	4.60184386e-04
0.00000000e+00	0.00000000e+00	0.00000000e+00	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	2.74215869e-03
0.00000000e+00	0.00000000e+00	0.00000000e+00	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	1.25912597e-03
0.00000000e+00	0.00000000e+00	0.00000000e+00	0.00000000e+00
0.00000000e+00	4.30154081e-03	1.37798776e-02	0.00000000e+00
3.09342473e-03	0.00000000e+00	0.00000000e+00	0.00000000e+00
6.99029364e-05	0.00000000e+00	0.00000000e+00	0.00000000e+00
0.00000000e+00	7.20094556e-04	0.00000000e+00	0.00000000e+00
1.42974743e-03	0.00000000e+00	0.00000000e+00	0.00000000e+00
1.15019283e-03	2.66964593e-03	0.00000000e+00	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	0.00000000e+00
0.00000000e+00	5.53056309e-03	0.00000000e+00	1.35014973e-02
0.00000000e+00	0.00000000e+00	0.00000000e+00	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	4.59194864e-03
0.00000000e+00	0.00000000e+00	1.41988402e-03	0.00000000e+00
0.00000000e+00	2.01226029e-03	0.00000000e+00	0.00000000e+00
0.00000000e+00	2.17531183e-03	0.00000000e+00	0.00000000e+00
3.38691724e-03	0.00000000e+00	1.72605465e-03	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	0.00000000e+00
0.00000000e+00	2.27934486e-03	0.00000000e+00	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	7.84447384e-03
0.00000000e+00	1.71142349e-03	0.00000000e+00	2.01564631e-03
0.00000000e+00	0.00000000e+00	0.00000000e+00	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	9.52622501e-03
0.00000000e+00	0.00000000e+00	1.10914066e-03	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	1.03178074e-03
0.00000000e+00	0.00000000e+00	1.00425771e-03	0.00000000e+00
0.00000000e+00	0.00000000e+00	4.56377451e-04	8.27648273e-04
0.00000000e+00	0.00000000e+00	1.19419328e-03	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	4.09594720e-03
9.22423791e-03	1.67751336e-03	0.00000000e+00	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	0.00000000e+00

0.00000000e+00	2.02478879e-02	0.00000000e+00	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	1.16798184e-03
0.00000000e+00	0.00000000e+00	0.00000000e+00	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	0.00000000e+00
2.79577824e-03	0.00000000e+00	1.40599417e-03	0.00000000e+00
0.00000000e+00	0.00000000e+00	2.83632929e-03	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	6.03824467e-03
0.00000000e+00	2.73618301e-03	3.52405246e-03	0.00000000e+00
0.00000000e+00	0.00000000e+00	1.16775367e-03	0.00000000e+00
6.13051960e-03	0.00000000e+00	0.00000000e+00	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	0.00000000e+00
4.12873939e-03	0.00000000e+00	1.30550391e-02	0.00000000e+00
4.81050595e-04	0.00000000e+00	0.00000000e+00	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	0.00000000e+00
0.00000000e+00	1.16932150e-02	7.91702441e-03	0.00000000e+00
0.00000000e+00	0.00000000e+00	0.00000000e+00	0.00000000e+00]