model_ridge

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Fit in Ridge with clean data and see its performance. Use grid search to improve performance. I also tried ensemble Lasso and Ridge here. Wenyu/remove outliers and log chang y to improve performance.ipynb

I try to remove some outliers in X for better performance. Also use log transfer y. Fit in Ridge and Lasso with clean data. Use grid search to improve performance.

In [1]:
```
import numpy as np
import pandas as pd
from matplotlib import pyplot as plt
import seaborn as sns

%matplotlib inline
```

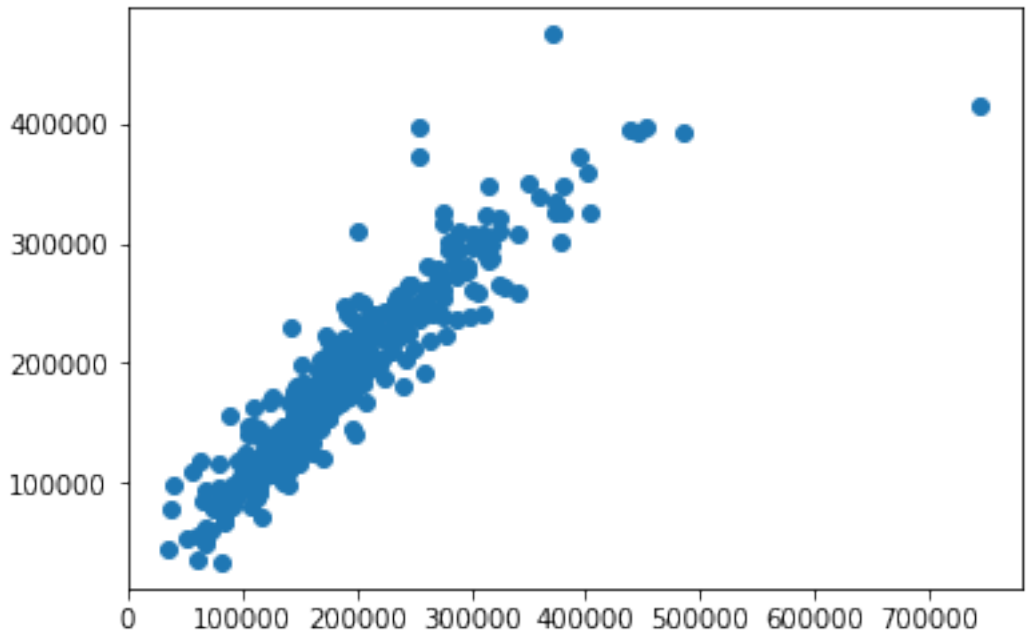
In [2]:
```
clean_data = pd.read_csv('clean_data.csv')
y=clean_data['SalePrice']
clean_data=clean_data.drop(['SalePrice'],axis=1) #drop the y in clean_data
X = clean_data.iloc[:,1:] # drop the id column
```

In [59]:
```
import warnings
warnings.filterwarnings('ignore')
```

In [60]:
```
from sklearn.model_selection import train_test_split
from sklearn.linear_model import Ridge
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size=0.3, random_state=
# scaling
from sklearn.preprocessing import StandardScaler
scaler = StandardScaler()
X_train_sc = scaler.fit_transform(X_train)
X_test_sc = scaler.transform(X_test)
```

In [61]:
```
rg = Ridge()
rg.fit(X_train_sc,y_train)
y_test_pred = rg.predict(X_test_sc)
y_train_pred = rg.predict(X_train_sc)
from sklearn.metrics import mean_squared_error
from math import sqrt
mse = mean_squared_error(y_test, y_test_pred)
sqrt(mse) #ridge's score is not so good
```

```
Out[61]: 32846.437585314496

In [62]: #use gridsearch on ridge
         from sklearn.model_selection import GridSearchCV
         parameters = { 'alpha':[0.1,1, 10,100,1000,10000]}
         rg = Ridge(random_state=42)
         clf = GridSearchCV(rg, parameters, cv=5)
         clf.fit(X_train_sc,y_train)
         y_test_pred = clf.predict(X_test_sc)
         y_train_pred = clf.predict(X_train_sc)

In [63]: mse = mean_squared_error(y_test, y_test_pred)
         sqrt(mse)

Out[63]: 30723.944334034182

In [64]: clf.best_estimator_

Out[64]: Ridge(alpha=100, copy_X=True, fit_intercept=True, max_iter=None,
            normalize=False, random_state=42, solver='auto', tol=0.001)

In [98]: plt.scatter(y_test, y_test_pred)

Out[98]: <matplotlib.collections.PathCollection at 0x10e8ad048>
```



```
In [74]: #ensemble lasso and ridge
         from sklearn.model_selection import cross_validate
         from sklearn.metrics import mean_squared_error
         from sklearn.linear_model import Lasso
         rg = Ridge(random_state=42,alpha=100)
         ls = Lasso(random_state=42,alpha=1000)
         regresers= [rg,ls]

         for regreser in regresers:

             scores = cross_validate(regreser,X_train_sc,y_train,
                                     scoring='neg_mean_squared_error',cv=5,return_train_score=
             print(regreser)
             for k,v in scores.items():
                 print(k+" : %0.2f +/- %0.2f" % (v.mean(), v.std()))

Ridge(alpha=100, copy_X=True, fit_intercept=True, max_iter=None,
   normalize=False, random_state=42, solver='auto', tol=0.001)
fit_time : 0.02 +/- 0.00
score_time : 0.00 +/- 0.00
test_score : -1354644906.00 +/- 713770211.47
train_score : -219848276.68 +/- 6110185.84
Lasso(alpha=1000, copy_X=True, fit_intercept=True, max_iter=1000,
   normalize=False, positive=False, precompute=False, random_state=42,
   selection='cyclic', tol=0.0001, warm_start=False)
fit_time : 0.02 +/- 0.01
score_time : 0.00 +/- 0.00
test_score : -1269186256.26 +/- 894450161.36
train_score : -355650029.71 +/- 4793514.48


In [76]: from sklearn.ensemble import BaggingRegressor
         bagged_config = dict(n_estimators=20, max_samples=.6, max_features=.7, random_state=4
         bagging_rg = BaggingRegressor(Ridge(alpha=100), **bagged_config)
         bagging_ls = BaggingRegressor(Lasso(alpha=1000), **bagged_config)

In [77]: regresers= [bagging_rg,bagging_ls]

         for regreser in regresers:

             scores = cross_validate(regreser,X_train_sc,y_train,
                                     scoring='neg_mean_squared_error',cv=5,return_train_score=
             print(regreser)
             for k,v in scores.items():
                 print(k+" : %0.2f +/- %0.2f" % (v.mean(), v.std()))

BaggingRegressor(base_estimator=Ridge(alpha=100, copy_X=True, fit_intercept=True, max_iter=None
   normalize=False, random_state=None, solver='auto', tol=0.001),
         bootstrap=True, bootstrap_features=False, max_features=0.7,
```

```
         max_samples=0.6, n_estimators=20, n_jobs=None, oob_score=False,
         random_state=42, verbose=0, warm_start=False)
fit_time : 0.16 +/- 0.01
score_time : 0.00 +/- 0.00
test_score : -1332284719.05 +/- 700794400.09
train_score : -668039547.95 +/- 71215202.36
BaggingRegressor(base_estimator=Lasso(alpha=1000, copy_X=True, fit_intercept=True, max_iter=100
   normalize=False, positive=False, precompute=False, random_state=None,
   selection='cyclic', tol=0.0001, warm_start=False),
         bootstrap=True, bootstrap_features=False, max_features=0.7,
         max_samples=0.6, n_estimators=20, n_jobs=None, oob_score=False,
         random_state=42, verbose=0, warm_start=False)
fit_time : 0.29 +/- 0.04
score_time : 0.00 +/- 0.00
test_score : -1373306492.90 +/- 865519408.52
train_score : -701705217.53 +/- 84580216.40
```

```
In [97]: from math import sqrt
         test_score = -scores['test_score'].mean()
         sqrt(test_score)

Out[97]: 37058.150154907366
```