```
import pandas as pd
```

```
from sklearn.datasets import fetch_california_housing
```

```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
```

```
df=fetch_california_housing()
```

```
df
```

```
{'data': array([[   8.3252    ,   41.        ,    6.98412698, ...,    2.55555556,
           37.88      , -122.23      ],
        [   8.3014    ,   21.        ,    6.23813708, ...,    2.10984183,
           37.86      , -122.22      ],
        [   7.2574    ,   52.        ,    8.28813559, ...,    2.80225989,
           37.85      , -122.24      ],
        ...,
        [   1.7       ,   17.        ,    5.20554273, ...,    2.3256351 ,
           39.43      , -121.22      ],
        [   1.8672    ,   18.        ,    5.32951289, ...,    2.12320917,
           39.43      , -121.32      ],
        [   2.3886    ,   16.        ,    5.25471698, ...,    2.61698113,
           39.37      , -121.24      ]]),
 'target': array([4.526, 3.585, 3.521, ..., 0.923, 0.847, 0.894]),
 'frame': None,
 'target_names': ['MedHouseVal'],
 'feature_names': ['MedInc',
  'HouseAge',
  'AveRooms',
  'AveBedrms',
  'Population',
  'AveOccup',
  'Latitude',
  'Longitude'],
 'DESCR': '.. _california_housing_dataset:\n\nCalifornia Housing dataset\n--------------------------\n\n**Data Set
Characteristics:**\n\n    :Number of Instances: 20640\n\n    :Number of Attributes: 8 numeric, predictive attributes
and the target\n\n    :Attribute Information:\n        - MedInc        median income in block group\n        - HouseAge
median house age in block group\n        - AveRooms      average number of rooms per household\n        - AveBedrms
average number of bedrooms per household\n        - Population    block group population\n        - AveOccup
average number of household members\n        - Latitude      block group latitude\n        - Longitude     block group
longitude\n\n    :Missing Attribute Values: None\n\nThis dataset was obtained from the StatLib
repository.\nhttps://www.dcc.fc.up.pt/~ltorgo/Regression/cal_housing.html\n\nThe target variable is the median house
value for California districts,\nexpressed in hundreds of dollars ($100,000).\n\nThis dataset was derived
from the 1990 U.S. census, using one row per census\nblock group. A block group is the smallest geographical unit for
which the U.S.\nCensus Bureau publishes sample data (a block group typically has a population\nof 600 to 3,000
people).\n\nA household is a group of people residing within a home. Since the average\nnumber of rooms and bedrooms in
this dataset are provided per household, these\ncolumns may take surprisingly large values for block groups with few
households\nand many empty houses, such as vacation resorts.\n\nIt can be downloaded/loaded using
the\n:func:`sklearn.datasets.fetch_california_housing` function.\n\n.. topic:: References\n\n    - Pace, R. Kelley and
Ronald Barry, Sparse Spatial Autoregressions,\n      Statistics and Probability Letters, 33 (1997) 291-297\n'}
```

```
dataset=pd.DataFrame(df.data)
```

```
dataset
```

	0	1	2	3	4	5	6	7
0	8.3252	41.0	6.984127	1.023810	322.0	2.555556	37.88	-122.23
1	8.3014	21.0	6.238137	0.971880	2401.0	2.109842	37.86	-122.22
2	7.2574	52.0	8.288136	1.073446	496.0	2.802260	37.85	-122.24
3	5.6431	52.0	5.817352	1.073059	558.0	2.547945	37.85	-122.25
4	3.8462	52.0	6.281853	1.081081	565.0	2.181467	37.85	-122.25
...	...	...	...	...	...	...	...	...
20635	1.5603	25.0	5.045455	1.133333	845.0	2.560606	39.48	-121.09
20636	2.5568	18.0	6.114035	1.315789	356.0	3.122807	39.49	-121.21
20637	1.7000	17.0	5.205543	1.120092	1007.0	2.325635	39.43	-121.22
20638	1.8672	18.0	5.329513	1.171920	741.0	2.123209	39.43	-121.32
20639	2.3886	16.0	5.254717	1.162264	1387.0	2.616981	39.37	-121.24

20640 rows × 8 columns

Next steps: Generate code with dataset View recommended plots New interactive sheet

```
dataset.columns=df.feature_names
```

```
dataset.head()
```

	MedInc	HouseAge	AveRooms	AveBedrms	Population	AveOccup	Latitude	Longitude
0	8.3252	41.0	6.984127	1.023810	322.0	2.555556	37.88	-122.23
1	8.3014	21.0	6.238137	0.971880	2401.0	2.109842	37.86	-122.22
2	7.2574	52.0	8.288136	1.073446	496.0	2.802260	37.85	-122.24
3	5.6431	52.0	5.817352	1.073059	558.0	2.547945	37.85	-122.25
4	3.8462	52.0	6.281853	1.081081	565.0	2.181467	37.85	-122.25

Next steps: Generate code with dataset View recommended plots New interactive sheet

```
X=dataset
y=df.target
```

```
y
```

```
array([4.526, 3.585, 3.521, ..., 0.923, 0.847, 0.894])
```

```
from sklearn.model_selection import train_test_split

X_train, X_test, y_train, y_test = train_test_split(
    X, y, test_size=0.30, random_state=42)
```

```
X_train
```

	MedInc	HouseAge	AveRooms	AveBedrms	Population	AveOccup	Latitude	Longitude
7061	4.1312	35.0	5.882353	0.975490	1218.0	2.985294	33.93	-118.02
14689	2.8631	20.0	4.401210	1.076613	999.0	2.014113	32.79	-117.09
17323	4.2026	24.0	5.617544	0.989474	731.0	2.564912	34.59	-120.14
10056	3.1094	14.0	5.869565	1.094203	302.0	2.188406	39.26	-121.00
15750	3.3068	52.0	4.801205	1.066265	1526.0	2.298193	37.77	-122.45
...	...	...	...	...	...	...	...	...
11284	6.3700	35.0	6.129032	0.926267	658.0	3.032258	33.78	-117.96
11964	3.0500	33.0	6.868597	1.269488	1753.0	3.904232	34.02	-117.43
5390	2.9344	36.0	3.986717	1.079696	1756.0	3.332068	34.03	-118.38
860	5.7192	15.0	6.395349	1.067979	1777.0	3.178891	37.58	-121.96
15795	2.5755	52.0	3.402576	1.058776	2619.0	2.108696	37.77	-122.42

14448 rows × 8 columns

Next steps: Generate code with X_train View recommended plots New interactive sheet

```
from sklearn.preprocessing import StandardScaler
scaler = StandardScaler()
```

```
X_train=scaler.fit_transform(X_train)
```

```
X_test=scaler.transform(X_test)
```

```
from sklearn.linear_model import LinearRegression
```

```
from sklearn.model_selection import cross_val_score
```

```
regression=LinearRegression()
regression.fit(X_train,y_train)
```

```
LinearRegression()
```

```
mse=cross_val_score(regression,X_train,y_train,scoring='neg_mean_squared_error',cv=10)
```

```
np.mean(mse)
```

```
-0.5257104326777
```

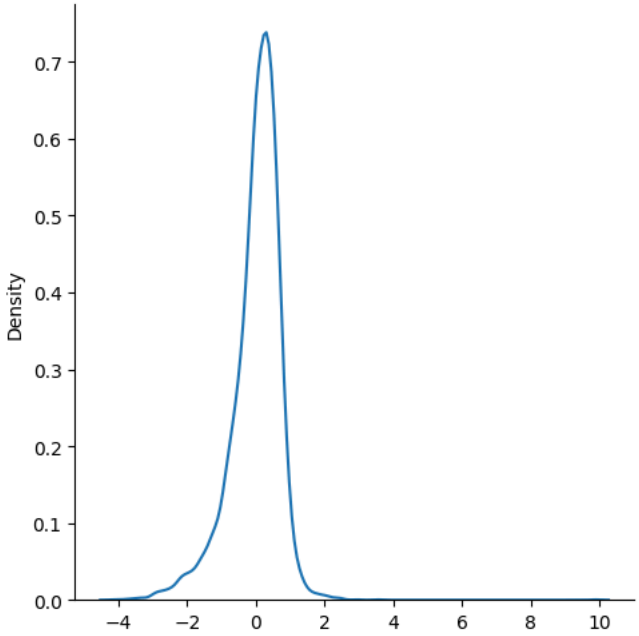
```
reg_pred=regression.predict(X_test)
```

```
reg_pred
```

```
array([0.72604907, 1.76743383, 2.71092161, ..., 2.07465531, 1.57371395,
       1.82744133])
```

```
import seaborn as sns
sns.displot(reg_pred-y_test,kind='kde')
```

```
<seaborn.axisgrid.FacetGrid at 0x7e069993fa60>
```




```
from sklearn.metrics import r2_score
```

```
score=r2_score(reg_pred,y_test)
```

```
score
```

```
0.3451339380943961
```