```
import pandas as pd
import numpy as np
import seaborn as sns
import matplotlib.pyplot as plt
import warnings


warnings.filterwarnings('ignore')


data = pd.read_csv('C:/Users/Dell/Downloads/sales forecasting 2/train.csv')


data.sample(5)
```

	Item_Identifier	Item_Weight	Item_Fat_Content	Item_Visibility	Item_Type	Item_MRP	Outlet_Identifier	Outlet_Establishment_Year
5655	FDB22	8.02	Low Fat	0.111667	Snack Foods	155.2998	OUT045	2002
7070	FDY51	NaN	Low Fat	0.080742	Meat	220.8798	OUT027	1985
6323	FDJ53	NaN	Low Fat	0.070913	Frozen Foods	121.5098	OUT027	1985
7956	FDQ24	15.70	Low Fat	0.074083	Baking Goods	253.3724	OUT017	2007
2971	FDO31	6.76	reg	0.028959	Fruits and Vegetables	78.3960	OUT013	1987

Find Shape of Our Dataset (Number of Rows And Number of Columns)

```
data.shape
```

```
(8523, 12)
```

Get Information About Our Dataset Like Total Number Rows, Total Number of Columns, Datatypes of Each Column And Memory Requirement

```
data.describe()
```

	Item_Weight	Item_Visibility	Item_MRP	Outlet_Establishment_Year	Item_Outlet_Sales
count	7060.000000	8523.000000	8523.000000	8523.000000	8523.000000
mean	12.857645	0.066132	140.992782	1997.831867	2181.288914
std	4.643456	0.051598	62.275067	8.371760	1706.499616
min	4.555000	0.000000	31.290000	1985.000000	33.290000
25%	8.773750	0.026989	93.826500	1987.000000	834.247400
50%	12.600000	0.053931	143.012800	1999.000000	1794.331000
75%	16.850000	0.094585	185.643700	2004.000000	3101.296400
max	21.350000	0.328391	266.888400	2009.000000	13086.964800

Check Null Values In The Dataset

```
data.isnull().sum()
```

```
Item_Identifier               0
Item_Weight                1463
Item_Fat_Content              0
Item_Visibility               0
Item_Type                     0
Item_MRP                      0
Outlet_Identifier             0
```

```
Outlet_Establishment_Year       0
Outlet_Size                  2410
Outlet_Location_Type            0
Outlet_Type                     0
Item_Outlet_Sales               0
dtype: int64
```

```
per = data.isnull().sum() * 100 / len(data)
print(per)
```

```
Item_Identifier              0.000000
Item_Weight                 17.165317
Item_Fat_Content             0.000000
Item_Visibility              0.000000
Item_Type                    0.000000
Item_MRP                     0.000000
Outlet_Identifier            0.000000
Outlet_Establishment_Year    0.000000
Outlet_Size                 28.276428
Outlet_Location_Type         0.000000
Outlet_Type                  0.000000
Item_Outlet_Sales            0.000000
dtype: float64
```

Taking Care of Duplicate Values

```
data.duplicated().any()
```

```
np.False_
```

Start coding or generate with AI.

Handling The missing Values

```
data['Item_Weight']
```

```
0        9.300
1        5.920
2       17.500
3       19.200
4        8.930
         ...
8518     6.865
8519     8.380
8520    10.600
8521     7.210
8522    14.800
Name: Item_Weight, Length: 8523, dtype: float64
```

```
data['Outlet_Size']
```

```
0       Medium
1       Medium
2       Medium
3          NaN
4         High
          ...
8518      High
8519       NaN
8520     Small
8521    Medium
8522     Small
Name: Outlet_Size, Length: 8523, dtype: object
```

Univariate Imputation

```
mean_weight = data['Item_Weight'].mean()
median_weight = data['Item_Weight'].median()
```

```
print(mean_weight,median_weight)
```

```
12.857645184135976 12.6
```

```
data['Item_Weight_mean']=data['Item_Weight'].fillna(mean_weight)
data['Item_Weight_median']=data['Item_Weight'].fillna(median_weight)
```

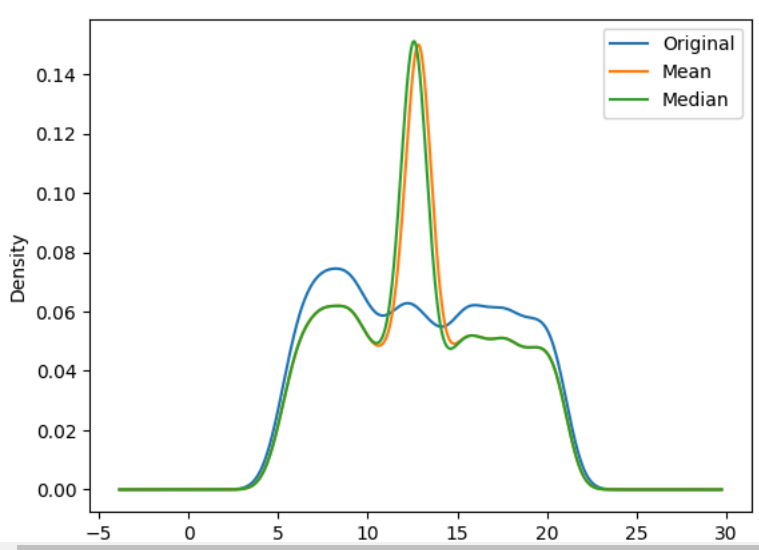
```
data.head(1)
```

	Item_Identifier	Item_Weight	Item_Fat_Content	Item_Visibility	Item_Type	Item_MRP	Outlet_Identifier	Outlet_Establishment_Year	O
0	FDA15	9.3	Low Fat	0.016047	Dairy	249.8092	OUT049	1999	

```
print("Original Weight variable variance",data['Item_Weight'].var())
print("Item Weight variance after mean imputation",data['Item_Weight_mean'].var())
print("Item Weight variance after median imputation",data['Item_Weight_median'].var())
```

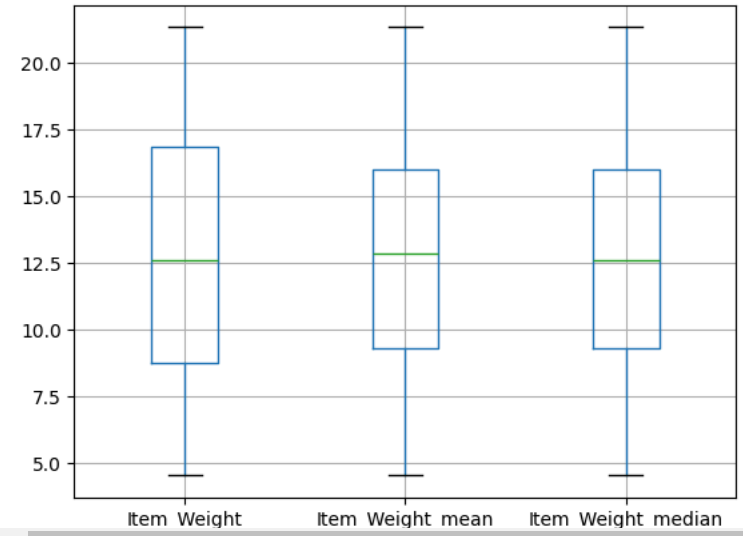
```
Original Weight variable variance 21.561688259836558
Item Weight variance after mean imputation 17.86012173506058
Item Weight variance after median imputation 17.869561454073647
```

```
data['Item_Weight'].plot(kind = "kde",label="Original")

data['Item_Weight_mean'].plot(kind = "kde",label = "Mean")

data['Item_Weight_median'].plot(kind = "kde",label = "Median")

plt.legend()
plt.show()
```

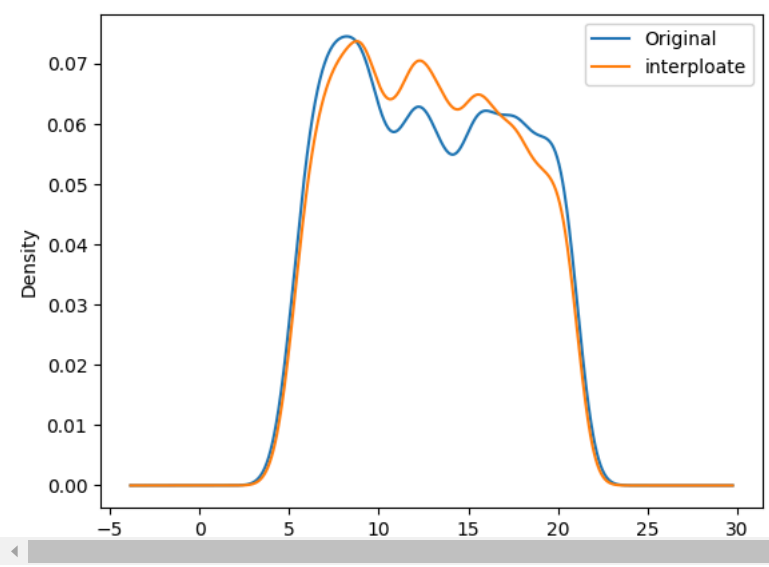



```
data[['Item_Weight','Item_Weight_mean','Item_Weight_median']].boxplot()
```

```
<Axes: >
```




```
data['Item_Weight_interploate']=data['Item_Weight'].interpolate(method="linear")


data['Item_Weight'].plot(kind = "kde",label="Original")

data['Item_Weight_interploate'].plot(kind = "kde",label = "interploate")

plt.legend()
plt.show()
```

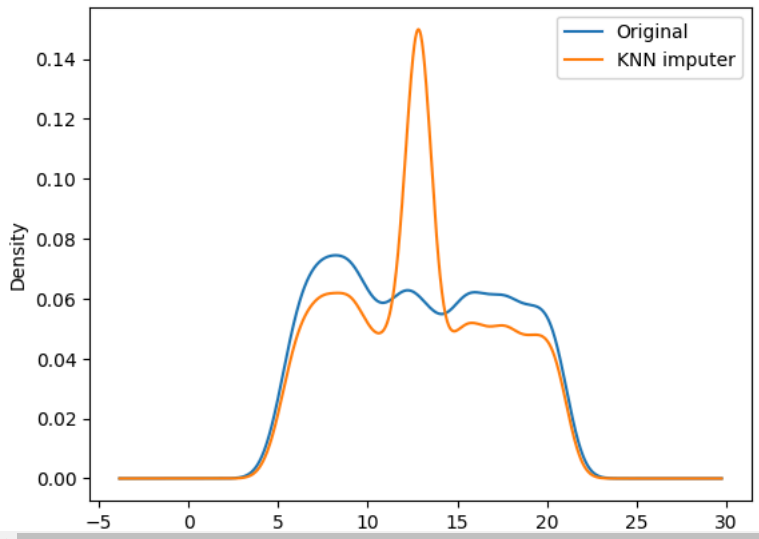



```
Start coding or generate with AI.
```

Multivariate Imputaion

```
from sklearn.impute import KNNImputer


knn = KNNImputer(n_neighbors=10,weights="distance")


data['knn_imputer']= knn.fit_transform(data[['Item_Weight']]).ravel()


data['Item_Weight'].plot(kind = "kde",label="Original")

data['knn_imputer'].plot(kind = "kde",label = "KNN imputer")
```

```
plt.legend()
plt.show()
```




```
data = data.drop(['Item_Weight','Item_Weight_mean','Item_Weight_median','knn_imputer'],axis=1)
```

```
data.head(1)
```

	Item_Identifier	Item_Fat_Content	Item_Visibility	Item_Type	Item_MRP	Outlet_Identifier	Outlet_Establishment_Year	Outlet_Size	O
0	FDA15	Low Fat	0.016047	Dairy	249.8092	OUT049	1999	Medium	

```
data.isnull().sum()
```

```
Item_Identifier               0
Item_Fat_Content              0
Item_Visibility               0
Item_Type                     0
Item_MRP                      0
Outlet_Identifier             0
Outlet_Establishment_Year     0
Outlet_Size                2410
Outlet_Location_Type          0
Outlet_Type                   0
Item_Outlet_Sales             0
Item_Weight_interploate       0
dtype: int64
```

Outlet_Size

```
data['Outlet_Size'].value_counts()
```

```
Outlet_Size
Medium    2793
Small     2388
High       932
Name: count, dtype: int64
```

```
data['Outlet_Type'].value_counts()
```

```
Outlet_Type
Supermarket Type1    5577
Grocery Store        1083
Supermarket Type3     935
Supermarket Type2     928
Name: count, dtype: int64
```

```
mode_outlet = data.pivot_table(values='Outlet_Size',columns='Outlet_Type',aggfunc=(lambda x:x.mode()[0]))
```

```
mode_outlet
```

Outlet_Type	Grocery Store	Supermarket Type1	Supermarket Type2	Supermarket Type3
Outlet_Size	Small	Small	Medium	Medium

```
missing_values = data['Outlet_Size'].isnull()
```

```
missing_values
```

```
0       False
1       False
2       False
3        True
4       False
        ...
8518    False
8519     True
8520    False
8521    False
8522    False
Name: Outlet_Size, Length: 8523, dtype: bool
```

```
data.loc[missing_values,'Outlet_Size'] = data.loc[missing_values,'Outlet_Type'].apply(lambda x :mode_outlet[x])
```

```
data.isnull().sum()
```

```
Item_Identifier              0
Item_Fat_Content             0
Item_Visibility              0
Item_Type                    0
Item_MRP                     0
Outlet_Identifier            0
Outlet_Establishment_Year    0
Outlet_Size                  0
Outlet_Location_Type         0
Outlet_Type                  0
Item_Outlet_Sales            0
Item_Weight_interploate      0
dtype: int64
```

Item_Fat_Content

```
data.columns
```

```
Index(['Item_Identifier', 'Item_Fat_Content', 'Item_Visibility', 'Item_Type',
       'Item_MRP', 'Outlet_Identifier', 'Outlet_Establishment_Year',
       'Outlet_Size', 'Outlet_Location_Type', 'Outlet_Type',
       'Item_Outlet_Sales', 'Item_Weight_interploate'],
      dtype='object')
```

```
data['Item_Fat_Content'].value_counts()
```

```
Item_Fat_Content
Low Fat    5089
Regular    2889
LF          316
reg         117
low fat     112
Name: count, dtype: int64
```

```
data.replace({'Item_Fat_Content':{'Low Fat':'LF','low fat':'LF','reg':'Regular'}},inplace=True)
```

```
data['Item_Fat_Content'].value_counts()
```

```
Item_Fat_Content
LF         5517
Regular    3006
Name: count, dtype: int64
```

Item_Visibility

```
data.columns
```

```
Index(['Item_Identifier', 'Item_Fat_Content', 'Item_Visibility', 'Item_Type',
       'Item_MRP', 'Outlet_Identifier', 'Outlet_Establishment_Year',
       'Outlet_Size', 'Outlet_Location_Type', 'Outlet_Type',
       'Item_Outlet_Sales', 'Item_Weight_interploate'],
      dtype='object')
```

```
data['Item_Visibility'].value_counts()
```

```
Item_Visibility
0.000000    526
0.076975      3
0.107274      2
0.074613      2
0.045166      2
           ...
0.056783      1
0.046982      1
0.035186      1
0.145221      1
0.016827      1
Name: count, Length: 7880, dtype: int64
```

```
data['Item_Visibility_interpolate']=data['Item_Visibility'].replace(0,np.nan).interpolate(method='linear')
```

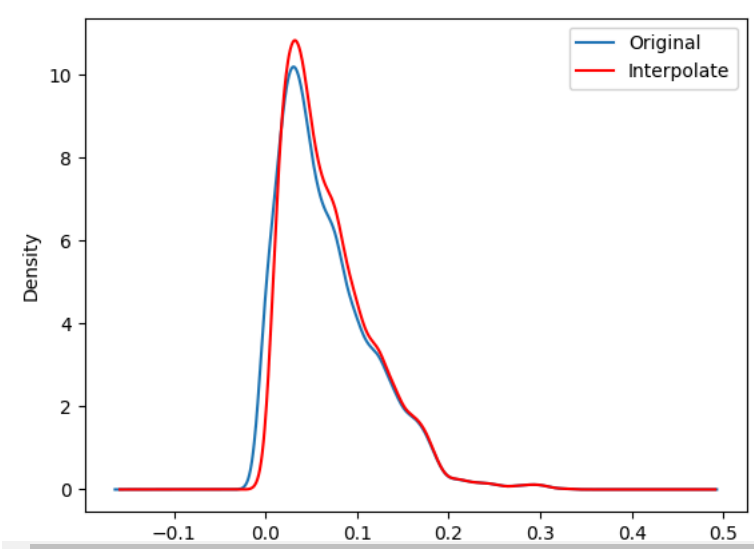
```
data.head(1)
```

	Item_Identifier	Item_Fat_Content	Item_Visibility	Item_Type	Item_MRP	Outlet_Identifier	Outlet_Establishment_Year	Outlet_Size	O
0	FDA15	LF	0.016047	Dairy	249.8092	OUT049	1999	Medium	

```
data['Item_Visibility_interpolate'].value_counts()
```

```
Item_Visibility_interpolate
0.076975    3
0.096592    2
0.093308    2
0.076792    2
0.107274    2
           ..
0.070712    1
0.036133    1
0.124111    1
0.094146    1
0.138190    1
Name: count, Length: 8405, dtype: int64
```

```
data['Item_Visibility'].plot(kind="kde",label="Original")

data['Item_Visibility_interpolate'].plot(kind="kde",color='red',label="Interpolate")

plt.legend()
plt.show()
```




```
data = data.drop('Item_Visibility',axis=1)
```

```
data.head(1)
```

	Item_Identifier	Item_Fat_Content	Item_Type	Item_MRP	Outlet_Identifier	Outlet_Establishment_Year	Outlet_Size	Outlet_Location_Ty
0	FDA15	LF	Dairy	249.8092	OUT049	1999	Medium	Tie

Item_Type

```
data.columns
```

```
Index(['Item_Identifier', 'Item_Fat_Content', 'Item_Type', 'Item_MRP',
       'Outlet_Identifier', 'Outlet_Establishment_Year', 'Outlet_Size',
       'Outlet_Location_Type', 'Outlet_Type', 'Item_Outlet_Sales',
       'Item_Weight_interploate', 'Item_Visibility_interpolate'],
      dtype='object')
```

```
data['Item_Type'].value_counts()
```

```
Item_Type
Fruits and Vegetables    1232
Snack Foods              1200
Household                 910
Frozen Foods              856
Dairy                     682
Canned                    649
Baking Goods              648
Health and Hygiene        520
Soft Drinks               445
Meat                      425
Breads                    251
Hard Drinks               214
Others                    169
Starchy Foods             148
Breakfast                 110
Seafood                    64
Name: count, dtype: int64
```

Item_Identifier

```
data.columns
```

```
Index(['Item_Identifier', 'Item_Fat_Content', 'Item_Type', 'Item_MRP',
       'Outlet_Identifier', 'Outlet_Establishment_Year', 'Outlet_Size',
       'Outlet_Location_Type', 'Outlet_Type', 'Item_Outlet_Sales',
       'Item_Weight_interploate', 'Item_Visibility_interpolate'],
      dtype='object')
```

```
data['Item_Identifier'].value_counts().sample(5)
```

```
Item_Identifier
FDM16    2
DRD12    7
FDV34    5
NCF42    9
NCY41    7
Name: count, dtype: int64
```

```
data['Item_Identifier'] =data['Item_Identifier'].apply(lambda x : x[:2])
```

```
data['Item_Identifier'].value_counts()
```

```
Item_Identifier
FD    6125
NC    1599
DR     799
Name: count, dtype: int64
```

Outlet_Establishment_Year

```
data.columns
```

```
Index(['Item_Identifier', 'Item_Fat_Content', 'Item_Type', 'Item_MRP',
       'Outlet_Identifier', 'Outlet_Establishment_Year', 'Outlet_Size',
       'Outlet_Location_Type', 'Outlet_Type', 'Item_Outlet_Sales',
       'Item_Weight_interploate', 'Item_Visibility_interpolate'],
      dtype='object')
```

```
data['Outlet_Establishment_Year']
```

```
0       1999
1       2009
2       1999
3       1998
4       1987
        ...
8518    1987
8519    2002
8520    2004
8521    2009
8522    1997
Name: Outlet_Establishment_Year, Length: 8523, dtype: int64
```

```
import datetime as dt
```

```
current_year = dt.datetime.today().year
```

```
current_year
```

```
2024
```

```
data['Outlet_age']= current_year - data['Outlet_Establishment_Year']
```

```
data.head(1)
```

	Item_Identifier	Item_Fat_Content	Item_Type	Item_MRP	Outlet_Identifier	Outlet_Establishment_Year	Outlet_Size	Outlet_Location_Ty
0	FD	LF	Dairy	249.8092	OUT049	1999	Medium	Tie

```
data = data.drop('Outlet_Establishment_Year',axis=1)
```

```
data.head()
```

	Item_Identifier	Item_Fat_Content	Item_Type	Item_MRP	Outlet_Identifier	Outlet_Size	Outlet_Location_Type	Outlet_Type	Item_Outle
0	FD	LF	Dairy	249.8092	OUT049	Medium	Tier 1	Supermarket Type1	37
1	DR	Regular	Soft Drinks	48.2692	OUT018	Medium	Tier 3	Supermarket Type2	4
2	FD	LF	Meat	141.6180	OUT049	Medium	Tier 1	Supermarket Type1	20
3	FD	Regular	Fruits and Vegetables	182.0950	OUT010	Small	Tier 3	Grocery Store	7
4	NC	LF	Household	53.8614	OUT013	High	Tier 3	Supermarket Type1	9

Handling Categorical Columns

```
from sklearn.preprocessing import OrdinalEncoder

data_encoded = data.copy()

cat_cols = data.select_dtypes(include=['object']).columns

for col in cat_cols:
    oe = OrdinalEncoder()
    data_encoded[col]=oe.fit_transform(data_encoded[[col]])
    print(oe.categories_)
```

```
[array(['DR', 'FD', 'NC'], dtype=object)]
[array(['LF', 'Regular'], dtype=object)]
[array(['Baking Goods', 'Breads', 'Breakfast', 'Canned', 'Dairy',
       'Frozen Foods', 'Fruits and Vegetables', 'Hard Drinks',
       'Health and Hygiene', 'Household', 'Meat', 'Others', 'Seafood',
       'Snack Foods', 'Soft Drinks', 'Starchy Foods'], dtype=object)]
[array(['OUT010', 'OUT013', 'OUT017', 'OUT018', 'OUT019', 'OUT027',
       'OUT035', 'OUT045', 'OUT046', 'OUT049'], dtype=object)]
[array(['High', 'Medium', 'Small'], dtype=object)]
[array(['Tier 1', 'Tier 2', 'Tier 3'], dtype=object)]
[array(['Grocery Store', 'Supermarket Type1', 'Supermarket Type2',
       'Supermarket Type3'], dtype=object)]
```

```
data_encoded.head(3)
```

	Item_Identifier	Item_Fat_Content	Item_Type	Item_MRP	Outlet_Identifier	Outlet_Size	Outlet_Location_Type	Outlet_Type	Item_Outle
0	1.0	0.0	4.0	249.8092	9.0	1.0	0.0	1.0	37
1	0.0	1.0	14.0	48.2692	3.0	1.0	2.0	2.0	4
2	1.0	0.0	10.0	141.6180	9.0	1.0	0.0	1.0	20

```
X = data_encoded.drop('Item_Outlet_Sales',axis=1)
y = data_encoded['Item_Outlet_Sales']
```

```
y
```

```
0       3735.1380
1        443.4228
2       2097.2700
3        732.3800
4        994.7052
           ...
8518    2778.3834
8519     549.2850
8520    1193.1136
8521    1845.5976
8522     765.6700
Name: Item_Outlet_Sales, Length: 8523, dtype: float64
```

Random Forest Regressor

```
from sklearn.ensemble import RandomForestRegressor

from sklearn.model_selection import cross_val_score

rf = RandomForestRegressor(n_estimators=100,random_state=42)
scores = cross_val_score(rf,X,y,cv=5,scoring='r2')
print(scores.mean())
```

```
0.5549992903957147
```

XGBRFRegressor

```
from xgboost import XGBRFRegressor

xg = XGBRFRegressor(n_estimators=100,random_state=42)
scores = cross_val_score(xg,X,y,cv=5,scoring='r2')
print(scores.mean())
```

```
0.5956602202104594
```

XGBRFRegressor Feature importances

```
xg = XGBRFRegressor(n_estimators=100,random_state=42)

xg1 = xg.fit(X,y)
pd.DataFrame({
    'feature':X.columns,
    'XGBRF_importance':xg1.feature_importances_

}).sort_values(by='XGBRF_importance',ascending=False)
```

	feature	XGBRF_importance
7	Outlet_Type	0.423386
10	Outlet_age	0.169442
3	Item_MRP	0.160600
5	Outlet_Size	0.101296
4	Outlet_Identifier	0.099362
6	Outlet_Location_Type	0.036353
9	Item_Visibility_interpolate	0.003181
8	Item_Weight_interploate	0.002475
2	Item_Type	0.002263
0	Item_Identifier	0.000967
1	Item_Fat_Content	0.000676

```
['Item_Visibility_interpolate','Item_Weight_interploate',
'Item_Type','Outlet_Location_Type','Item_Identifier','Item_Fat_Content']
```

```
['Item_Visibility_interpolate',
 'Item_Weight_interploate',
 'Item_Type',
 'Outlet_Location_Type',
 'Item_Identifier',
 'Item_Fat_Content']
```

```
data['Item_Type'].value_counts()
```

```
Item_Type
Fruits and Vegetables    1232
Snack Foods              1200
Household                 910
Frozen Foods              856
Dairy                     682
Canned                    649
Baking Goods              648
```

```
Health and Hygiene        520
Soft Drinks               445
Meat                      425
Breads                    251
Hard Drinks               214
Others                    169
Starchy Foods             148
Breakfast                 110
Seafood                    64
Name: count, dtype: int64
```

```
from xgboost import XGBRFRegressor

xg = XGBRFRegressor(n_estimators=100,random_state=42)
scores = cross_val_score(xg1,X.drop(['Item_Visibility_interpolate','Item_Weight_interploate', 'Item_Type',
'Outlet_Location_Type','Item_Identifier','Item_Fat_Content'],axis=1),y,cv=5,scoring='r2')
print(scores.mean())
```

```
0.596332173045327
```

```
final_data = X.drop(columns=['Item_Visibility_interpolate','Item_Weight_interploate','Outlet_Location_Type', 'Item_Type','Item_Identifier','
```

```
final_data
```

	Item_MRP	Outlet_Identifier	Outlet_Size	Outlet_Type	Outlet_age
0	249.8092	9.0	1.0	1.0	25
1	48.2692	3.0	1.0	2.0	15
2	141.6180	9.0	1.0	1.0	25
3	182.0950	0.0	2.0	0.0	26
4	53.8614	1.0	0.0	1.0	37
...	...	...	...	...	...
8518	214.5218	1.0	0.0	1.0	37
8519	108.1570	7.0	2.0	1.0	22
8520	85.1224	6.0	2.0	1.0	20
8521	103.1332	3.0	1.0	2.0	15
8522	75.4670	8.0	2.0	1.0	27

8523 rows × 5 columns

```
Start coding or generate with AI.
```

Best Model

```
from xgboost import XGBRFRegressor

xg_final = XGBRFRegressor()

xg_final.fit(final_data,y)
```

```
XGBRFRegressor(base_score=None, booster=None, callbacks=None,
               colsample_bylevel=None, colsample_bytree=None, device=None,
               early_stopping_rounds=None, enable_categorical=False,
               eval_metric=None, feature_types=None, gamma=None,
               grow_policy=None, importance_type=None,
               interaction_constraints=None, max_bin=None,
               max_cat_threshold=None, max_cat_to_onehot=None,
               max_delta_step=None, max_depth=None, max_leaves=None,
               min_child_weight=None, missing=nan, monotone_constraints=None,
               multi_strategy=None, n_estimators=None, n_jobs=None,
               num_parallel_tree=None, objective='reg:squarederror',
```

```
from sklearn.model_selection import train_test_split
from sklearn.metrics import mean_absolute_error


X_train,X_test,y_train,y_test = train_test_split(final_data,y,
                                                 test_size=0.20,
                                                 random_state=42)


xg_final.fit(X_train,y_train)
```

```
XGBRFRegressor

XGBRFRegressor(base_score=None, booster=None, callbacks=None,
               colsample_bylevel=None, colsample_bytree=None, device=None,
               early_stopping_rounds=None, enable_categorical=False,
               eval_metric=None, feature_types=None, gamma=None,
               grow_policy=None, importance_type=None,
               interaction_constraints=None, max_bin=None,
               max_cat_threshold=None, max_cat_to_onehot=None,
               max_delta_step=None, max_depth=None, max_leaves=None,
               min_child_weight=None, missing=nan, monotone_constraints=None,
               multi_strategy=None, n_estimators=None, n_jobs=None,
               num_parallel_tree=None, objective='reg:squarederror',
```

```
y_pred = xg_final.predict(X_test)


mean_absolute_error(y_test,y_pred)
```

```
np.float64(713.5792228647217)
```

Prediction on Unseen Data

```
pred = xg_final.predict(np.array([[141.6180,9.0,1.0,1.0,24]]))[0]
print(pred)
```

```
2058.0156
```

```
print(f"Sales Value is between {pred-713.57} and {pred+713.57}")
```

```
Sales Value is between 1344.445556640625 and 2771.585693359375
```

Save Model Using Joblib

```
import joblib


joblib.dump(xg_final,'bigmart_model')
```

```
['bigmart_model']
```

```
model = joblib.load('bigmart_model')


pred = model.predict(np.array([[141.6180,9.0,1.0,1.0,24]]))[0]
print(pred)
```

```
2058.0156
```

```
print(f"Sales Value is between {pred-713.57} and {pred+713.57}")
```

```
Sales Value is between 1344.445556640625 and 2771.585693359375
```

```
import pickle


filename = 'trained_model.sav'
pickle.dump(xg_final, open(filename, 'wb'))
```

```
#loading the saved model
loaded_model = pickle.load(open('trained_model.sav', 'rb'))


pred = loaded_model.predict(np.array([[141.6180,9.0,1.0,1.0,24]]))[0]
print(pred)
print(f"Sales Value is between {pred-713.57} and {pred+713.57}")
```

```
2058.0156
Sales Value is between 1344.445556640625 and 2771.585693359375
```

```
Start coding or generate with AI.
```

GUI

```
import numpy as np
import datetime as dt
from tkinter import *
import joblib
current_year = dt.datetime.today().year
def show_entry_fields():
    p1=float(e1.get())
    #p4=float(e4.get())

    text = clicked.get()
    if text == "OUT010":
        p2=0
        print(p2)
    elif text=="OUT013":
        p2=1
        print(p2)
    elif text=="OUT017":
        p2=2
        print(p2)
    elif text=="OUT018":
        p2=3
        print(p2)
    elif text=="OUT019":
        p2=4
        print(p2)
    elif text=="OUT027":
        p2=5
        print(p2)
    elif text=="OUT035":
        p2=6
        print(p2)
    elif text=="OUT045":
        p2=7
        print(p2)
    elif text=="OUT046":
        p2=8
        print(p2)
    elif text=="OUT049":
        p2=9
        print(p2)
    text0 = clicked0.get()
    if text0 == "High":
        p3=0
        print(p3)
    elif text0=="Medium":
        p3=1
        print(p3)
    elif text0=="Small":
        p3=2
        print(p3)

    text1 = clicked1.get()
    if text1 == "Supermarket Type1":
        p4=1
        print(p4)
    elif text1=="Supermarket Type2":
        p4=2
        print(p4)
    elif text1=="Supermarket Type3":
        p4=3
```

```
            print(p4)
        elif text1=="Grocery Store":
            p4=0
            print(p4)

        p5=current_year - int(e5.get())
        print(p5)

        model = joblib.load('bigmart_model')
        result=model.predict(np.array([[p1,p2,p3,p4,p5]]))
        Label(master, text="Sales Amount is in between").grid(row=8)
        Label(master, text=float(result) -714.42 ).grid(row=10)
        Label(master, text="and").grid(row=11)
        Label(master, text=float(result) + 714.42) .grid(row=12)
        print("Sales amount", result)

    master = Tk()
    master.title("Big Mart Sales Prediction using Machine Learning")


    label = Label(master, text = " Big Mart Sales Prediction using ML"
                              , bg = "black", fg = "white"). \
                                   grid(row=0,columnspan=2)

    # Item_MRP  Outlet_Identifier   Outlet_Size Outlet_Type Outlet_age
    Label(master, text="Item_MRP").grid(row=1)
    Label(master, text="Outlet_Identifier").grid(row=2)
    Label(master, text="Outlet_Size").grid(row=3)
    Label(master, text="Outlet_Type").grid(row=4)
    Label(master, text="Outlet_Establishment_Year").grid(row=5)


    clicked = StringVar()
    options = ['OUT010', 'OUT013', 'OUT017', 'OUT018', 'OUT019', 'OUT027',
           'OUT035', 'OUT045', 'OUT046', 'OUT049']

    clicked0 = StringVar()

    options0 = ['High', 'Medium', 'Small']

    clicked1 = StringVar()
    options1 = ['Grocery Store', 'Supermarket Type1', 'Supermarket Type2',
           'Supermarket Type3']

    e1 = Entry(master)

    e2 = OptionMenu(master , clicked , *options )
    e2.configure(width=15)


    e3 = OptionMenu(master , clicked0 , *options0 )
    e3.configure(width=15)


    e4 = OptionMenu(master , clicked1 , *options1 )
    e4.configure(width=15)

    e5 = Entry(master)


    e1.grid(row=1, column=1)
    e2.grid(row=2, column=1)
    e3.grid(row=3, column=1)
    e4.grid(row=4, column=1)
    e5.grid(row=5, column=1)
```