Pre-processing

October 15, 2021

0.0.1 Outlier treatment

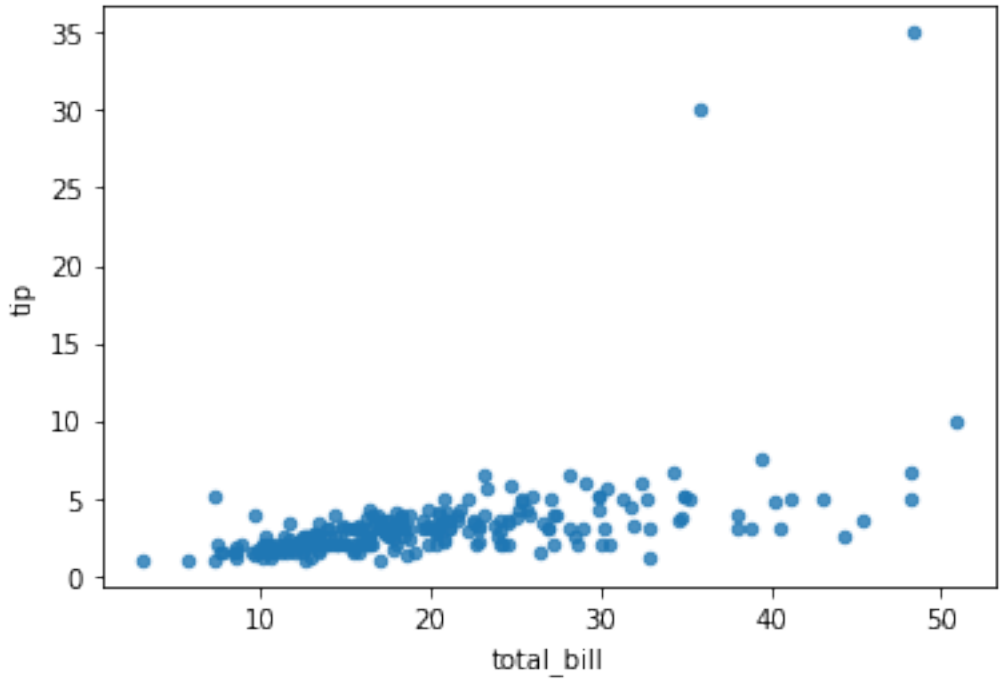
[1]:
```
# Load random set of values
import pandas as pd
import numpy as np
data = pd.read_csv("E:\\MY LECTURES\\DATA SCIENCE\\3.Programs\\dataset\\Meal␣
 ↪and Tips-with outlier.csv")
data.head()
```

[1]:

	total_bill	tip	sex	smoker	day	time	size
0	16.99	1.01	Female	No	Sun	Dinner	2
1	10.34	1.66	Male	No	Sun	Dinner	3
2	21.01	3.50	Male	No	Sun	Dinner	3
3	23.68	3.31	Male	No	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4

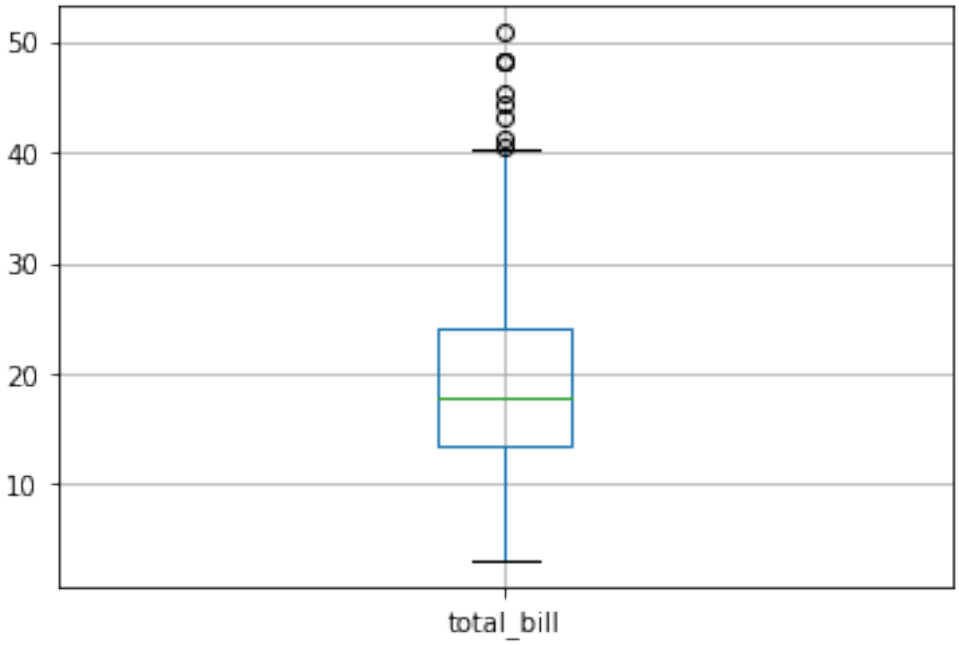
[2]:
```
# Identifying outliers using scatter plot
data.plot.scatter('total_bill','tip',alpha=0.8)
```

[2]:
```
<AxesSubplot:xlabel='total_bill', ylabel='tip'>
```



[3]:
```
# Identifying outliers using box-whisker plot
data.boxplot('total_bill')
```

[3]: <AxesSubplot:>



[4]:
```
# Treating outlier using quantile
p25=data["tip"].quantile(0.25)
p75=data["tip"].quantile(0.75)
iqr = p75-p25
lowerValue = p25 - iqr
upperValue = p75 + iqr
```

[5]:
```
# Replacing it with nan
data.loc[data.tip < lowerValue, 'tip'] = np.nan
data.loc[data.tip > upperValue, 'tip'] = np.nan
data.head()
```

[5]:

	total_bill	tip	sex	smoker	day	time	size
0	16.99	1.01	Female	No	Sun	Dinner	2
1	10.34	1.66	Male	No	Sun	Dinner	3
2	21.01	3.50	Male	No	Sun	Dinner	3
3	23.68	3.31	Male	No	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4

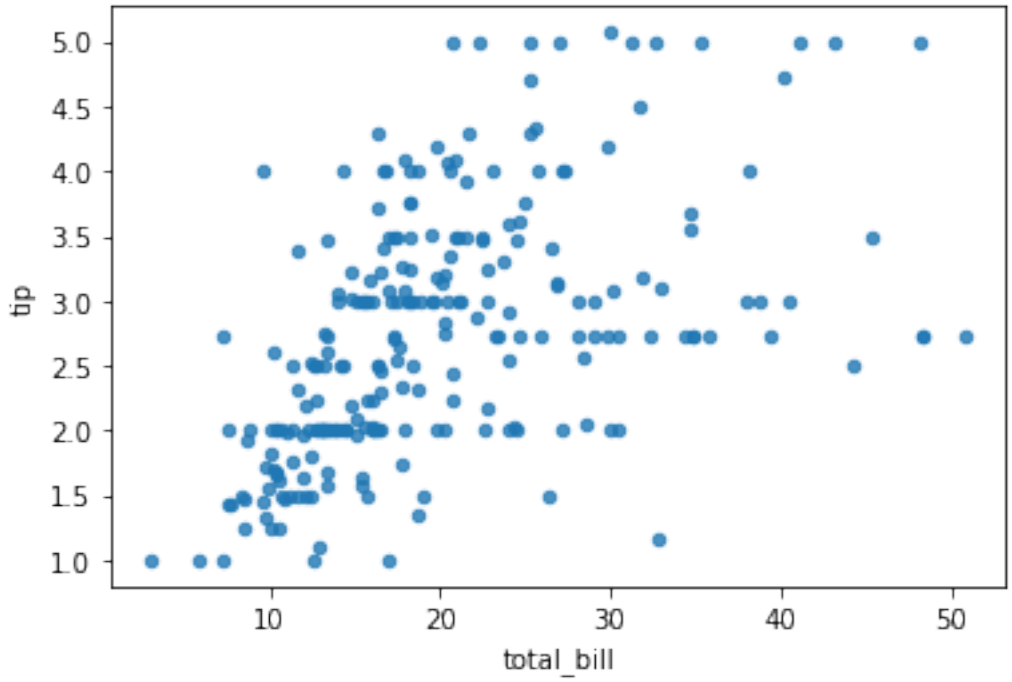
[6]:
```
# Replacing NA with mean using impute
from sklearn.impute import SimpleImputer
imputer = SimpleImputer(missing_values=np.nan, strategy='mean')
imputer = imputer.fit(data.iloc[:,1:2])
data.iloc[:, 1:2] =  imputer.transform(data.iloc[:, 1:2])
data.head()
```

[6]:

	total_bill	tip	sex	smoker	day	time	size
0	16.99	1.01	Female	No	Sun	Dinner	2
1	10.34	1.66	Male	No	Sun	Dinner	3
2	21.01	3.50	Male	No	Sun	Dinner	3
3	23.68	3.31	Male	No	Sun	Dinner	2
4	24.59	3.61	Female	No	Sun	Dinner	4

[7]:
```
# Identifying outliers using scatter plot
data.plot.scatter('total_bill','tip',alpha=0.8)
```

[7]:
```
<AxesSubplot:xlabel='total_bill', ylabel='tip'>
```



0.0.2 Missing value treatment

[8]:
```
import pandas as pd
import numpy as np
data1 = pd.DataFrame(data=[[1,2,3],[3,4,4],[3,5,np.nan],[6,7,8],[3,np.nan,1]],␣
↪columns=['A', 'B', 'C'])
data1
```

[8]:

	A	B	C
0	1	2.0	3.0
1	3	4.0	4.0
2	3	5.0	NaN
3	6	7.0	8.0
4	3	NaN	1.0

[9]:
```
imputer = imputer.fit(data1.iloc[:,2:3])
data1.iloc[:, 2:3] =  imputer.transform(data1.iloc[:, 2:3])
data1
```

[9]:

	A	B	C
0	1	2.0	3.0
1	3	4.0	4.0
2	3	5.0	4.0

```
3  6  7.0  8.0
4  3  NaN  1.0
```

[10]:
```
imputer = imputer.fit(data1.iloc[:,1:2])
data1.iloc[:, 1:2] =  imputer.transform(data1.iloc[:, 1:2])
data1
```

[10]:
```
   A    B    C
0  1  2.0  3.0
1  3  4.0  4.0
2  3  5.0  4.0
3  6  7.0  8.0
4  3  4.5  1.0
```

0.1 Normalized data

0.1.1 Min-max scaling

[11]:
```
from sklearn.preprocessing import MinMaxScaler
data = [[-1, 2], [-0.5, 6], [0, 10], [1, 18]]
data
```

[11]:
```
[[-1, 2], [-0.5, 6], [0, 10], [1, 18]]
```

[12]:
```
scaler = MinMaxScaler()
scaler.fit(data)
print(scaler.transform(data))
```

```
[[0.   0.  ]
 [0.25 0.25]
 [0.5  0.5 ]
 [1.   1.  ]]
```

0.1.2 z-score normalization

[13]:
```
import pandas as pd
data = [1,2,3,4,5]
df = pd.DataFrame(data)
normalized_df= df.transform(lambda x: (x - x.mean()) / x.std())
normalized_df
```

[13]:
```
          0
0 -1.264911
1 -0.632456
2  0.000000
```

```
3  0.632456
4  1.264911
```

0.2 Discretization

0.2.1 Equal-width

[14]:
```
import pandas as pd
import random
points = random.sample(range(1, 1000), 50)
bin = pd.cut(points, bins=8).value_counts()
bin
```

[14]:
```
(9.014, 133.25]    8
(133.25, 256.5]    3
(256.5, 379.75]    8
(379.75, 503.0]    5
(503.0, 626.25]    7
(626.25, 749.5]    5
(749.5, 872.75]    7
(872.75, 996.0]    7
dtype: int64
```

0.2.2 Equal-frequency

[15]:
```
import pandas as pd
import random
points = random.sample(range(1, 10000), 500)
bins = pd.qcut(points, 5).value_counts()
bins
```

[15]:
```
(5.999, 2411.2]     100
(2411.2, 4499.4]    100
(4499.4, 6260.0]    100
(6260.0, 8023.6]    100
(8023.6, 9976.0]    100
dtype: int64
```

[ ]:
```

```