Data Analytics Assignment - 4: Abalon Age Prediction

Team ID : PNT2022TMID45269

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Project Name :Visualizing and Predicting Heart Diseases with an Interactive Dash Board

Student Roll No: 812119104020

Dataset : https://drive.google.com/file/d/1mOWrMc8b-ODshkEfyHB1UFwO5V5s3fcW/view

Import Necesssary packages

+ Code + Text

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

sns.set_style("darkgrid")

from sklearn.model_selection import train_test_split
from sklearn.preprocessing import LabelEncoder


from sklearn.linear_model import LinearRegression

from sklearn import  metrics
```

Download and Load the dataset

```
df=pd.read_csv('/content/abalone.csv')
```

Perform descriptive statistics on the dataset

```
df.head()
```

```
df.tail()
```

	Sex	Length	Diameter	Height	Whole weight	Shucked weight	Viscera weight	Shell weight	Rings
4172	F	0.565	0.450	0.165	0.8870	0.3700	0.2390	0.2490	11
4173	M	0.590	0.440	0.135	0.9660	0.4390	0.2145	0.2605	10
4174	M	0.600	0.475	0.205	1.1760	0.5255	0.2875	0.3080	9
4175	F	0.625	0.485	0.150	1.0945	0.5310	0.2610	0.2960	10
4176	M	0.710	0.555	0.195	1.9485	0.9455	0.3765	0.4950	12

```
df.shape
```

```
(4177, 9)
```

```
df.describe()
```

	Length	Diameter	Height	Whole weight	Shucked weight	Viscera weight	
count	4177.000000	4177.000000	4177.000000	4177.000000	4177.000000	4177.000000	4177.
mean	0.523992	0.407881	0.139516	0.828742	0.359367	0.180594	0.
std	0.120093	0.099240	0.041827	0.490389	0.221963	0.109614	0.
min	0.075000	0.055000	0.000000	0.002000	0.001000	0.000500	0.
25%	0.450000	0.350000	0.115000	0.441500	0.186000	0.093500	0.
50%	0.545000	0.425000	0.140000	0.799500	0.336000	0.171000	0.
75%	0.615000	0.480000	0.165000	1.153000	0.502000	0.253000	0.

```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 4177 entries, 0 to 4176
Data columns (total 9 columns):
 #   Column          Non-Null Count  Dtype
---  ------          --------------  -----
 0   Sex             4177 non-null   object
 1   Length          4177 non-null   float64
 2   Diameter        4177 non-null   float64
 3   Height          4177 non-null   float64
 4   Whole weight    4177 non-null   float64
 5   Shucked weight  4177 non-null   float64
 6   Viscera weight  4177 non-null   float64
```

```
 7   Shell weight    4177 non-null   float64
 8   Rings           4177 non-null   int64
dtypes: float64(7), int64(1), object(1)
memory usage: 293.8+ KB
```

```
df['age']=df['Rings']+1.5
df=df.drop('Rings', axis = 1)
```

```
df.head()
```

	Sex	Length	Diameter	Height	Whole weight	Shucked weight	Viscera weight	Shell weight	age
0	M	0.455	0.365	0.095	0.5140	0.2245	0.1010	0.150	16.5
1	M	0.350	0.265	0.090	0.2255	0.0995	0.0485	0.070	8.5
2	F	0.530	0.420	0.135	0.6770	0.2565	0.1415	0.210	10.5
3	M	0.440	0.365	0.125	0.5160	0.2155	0.1140	0.155	11.5
4	I	0.330	0.255	0.080	0.2050	0.0895	0.0395	0.055	8.5

Check for Missing values and deal with them

```
df.isnull().sum()
```

```
Sex               0
Length            0
Diameter          0
Height            0
Whole weight      0
Shucked weight    0
Viscera weight    0
Shell weight      0
age               0
dtype: int64
```

```
df.columns
```

```
Index(['Sex', 'Length', 'Diameter', 'Height', 'Whole weight', 'Shucked weight',
       'Viscera weight', 'Shell weight', 'age'],
      dtype='object')
```

Perform Below Visualizations

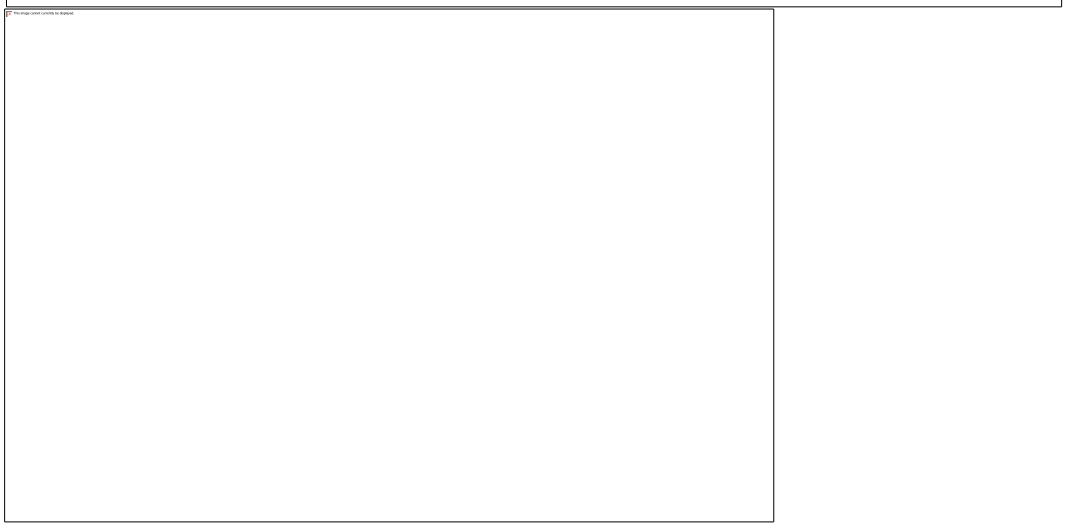
· Univariate Analysis

Bi-Variate Analysis

· Multi-Variate Analysis

```
#univariate analysis
sns.distplot(df['Length'])
```

```
/us a
```



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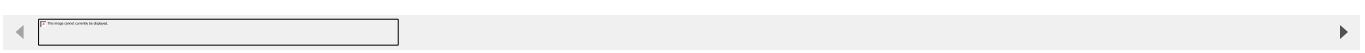

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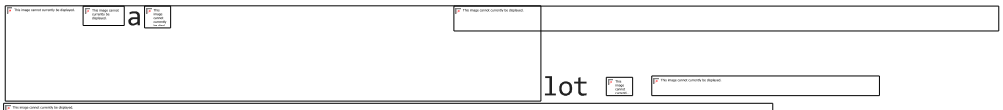
```
sns.boxp
```



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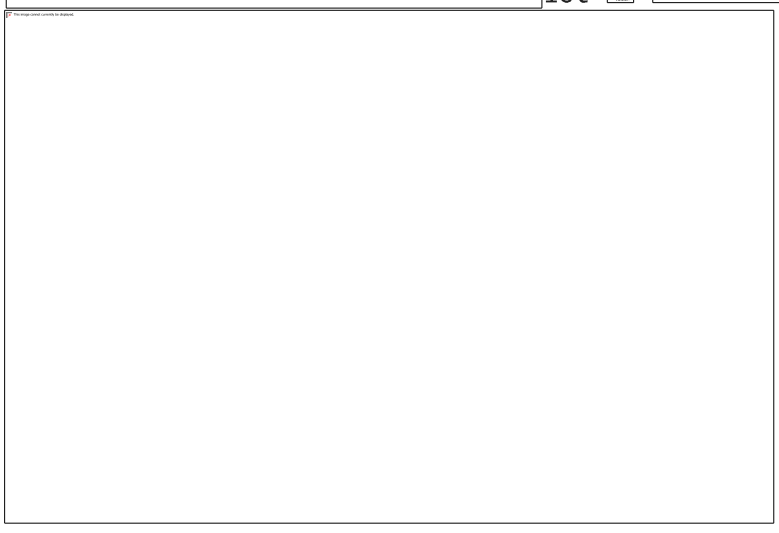

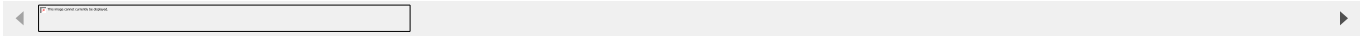

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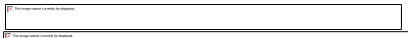
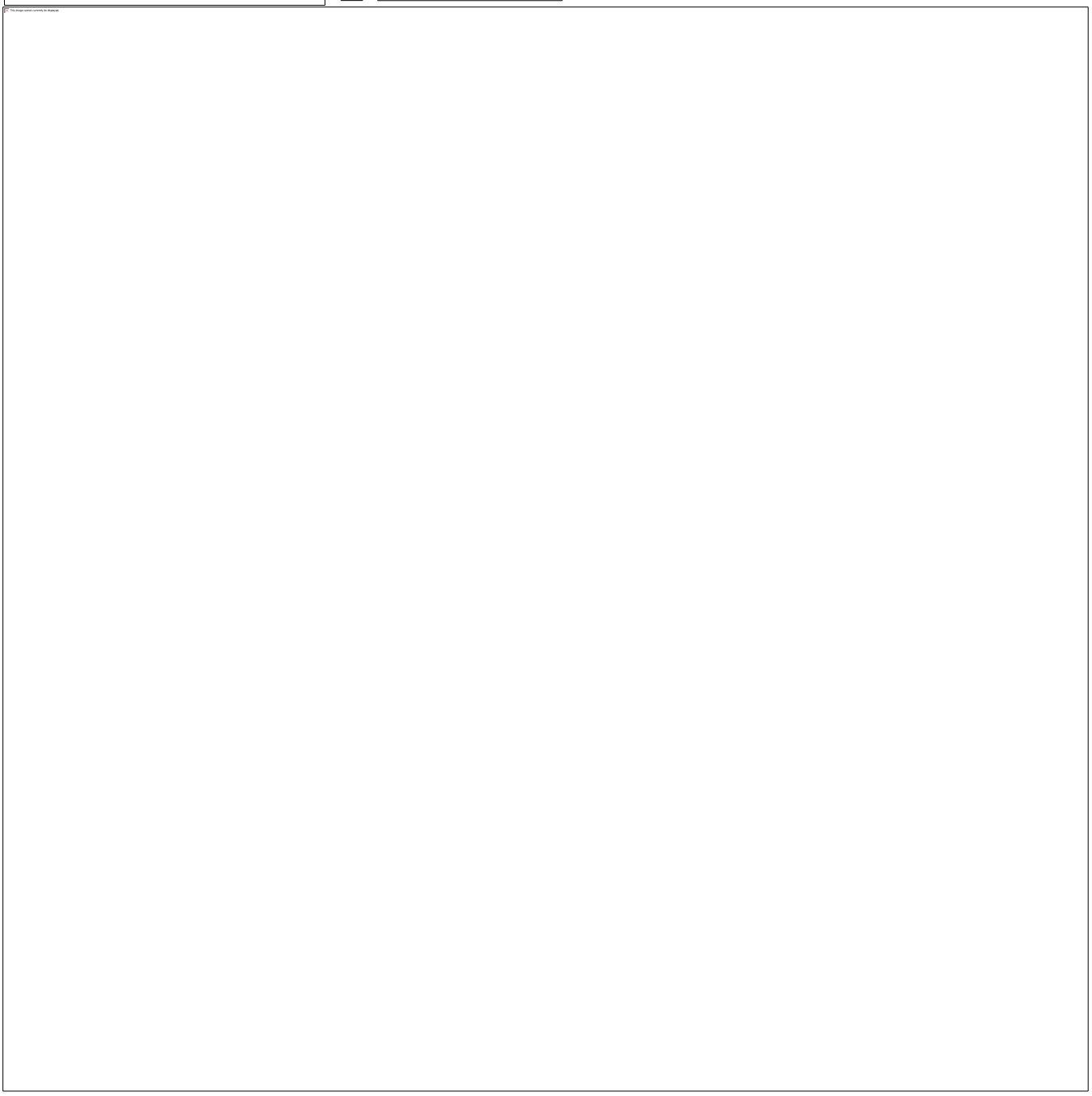
lot( )

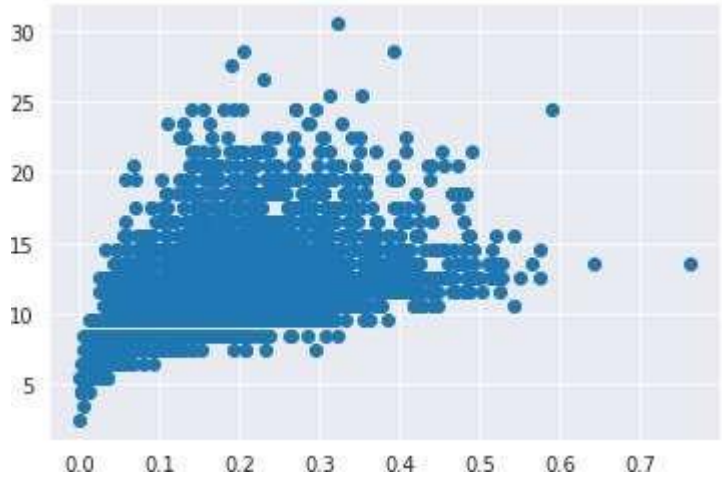




Find the outliers and replace them outliers

```
=
dummy
```

```
r = 's
p =], y = ['']
p
```




```
['sce
'] <  >  = T)
```

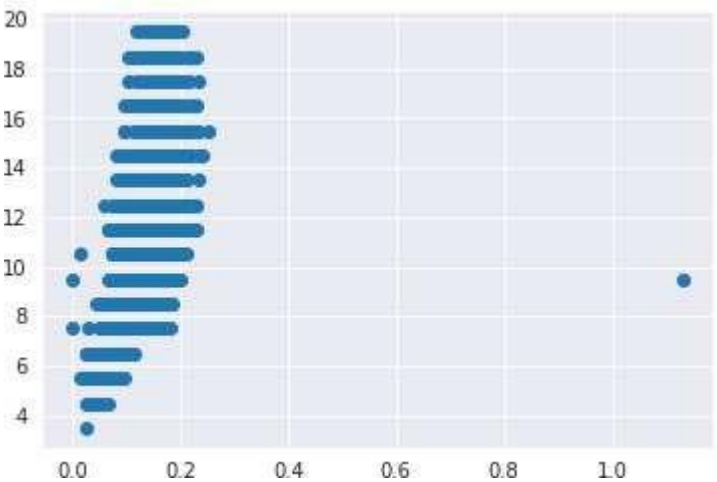
```
r = 'll
p =], y = ['']
p
```

```
'll ' ] > ( [' '] < in ce = )
'll ' ( [' '] > la = )
r = '
p ], = [' '])
p
```

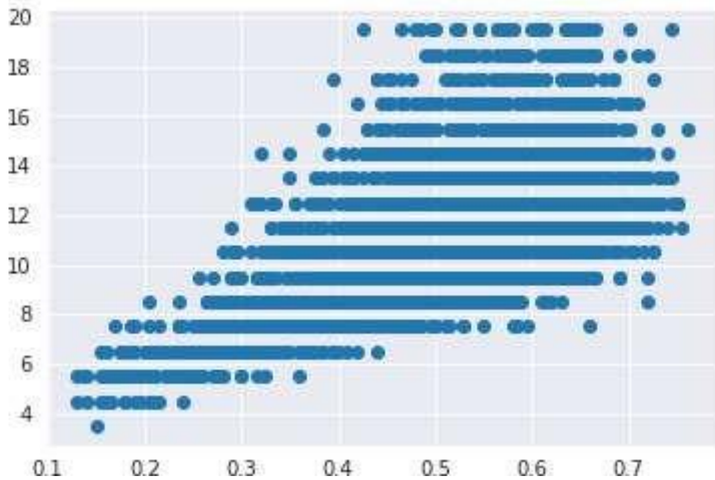
```
'uc '] >= [' '] < in ce = )
'sce ']<1) '] > lace = )
r = '
p ], y = [' '])
p
```

```
'
'
'] < in ce = )
'] > la = )
r =
p = [r], = ['']
p
```

```
r'
r'
r'
'] < in ce = T)
'] > in ce = T)
'] < in ce = )
r =
p
p
[r], = ['']
```

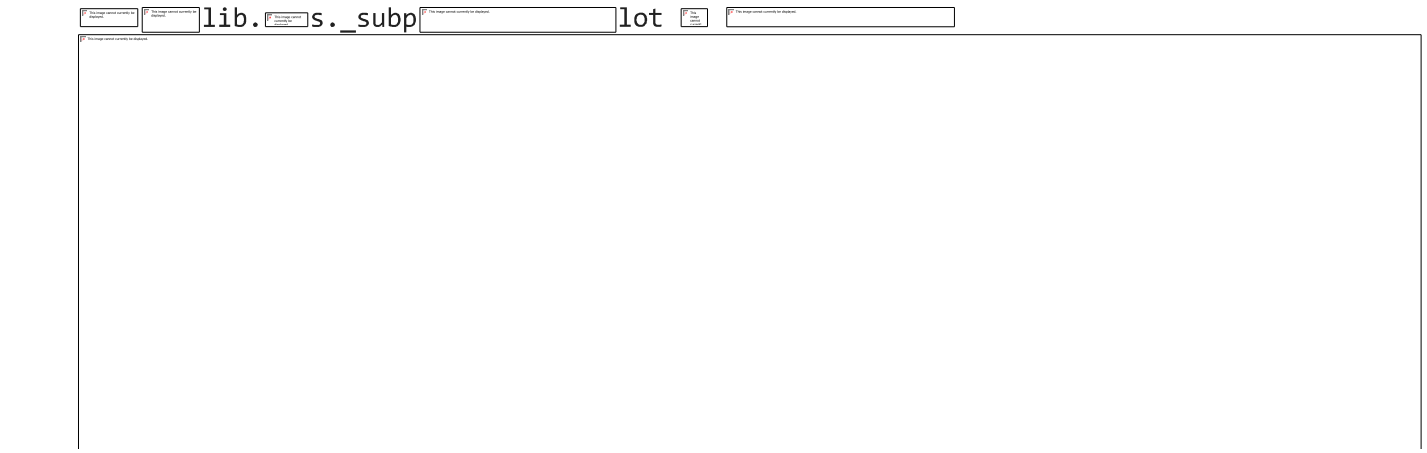


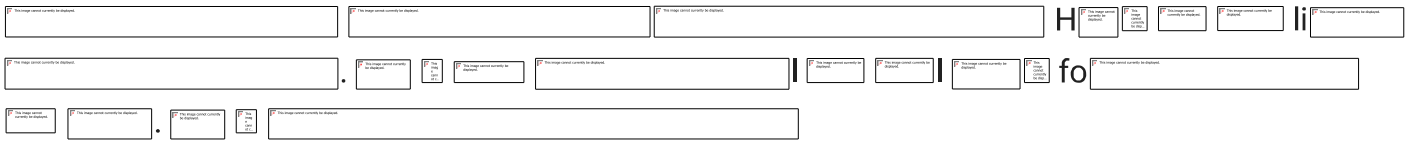

```
'] > 0.) ['] < lace = T)
']<0.) & (['] > = )
r =
p
p
[r], y = ['']
```



Check for Categorical columns and perform encoding

```
n cal = .select l = ]). s
l = .select l = ]). s

a l `np

n ca u s

I ([ ', ' r', ' ', ' ', ' uc ',
', ' l ', ' ', _F', ' ', ' '],

u s

I ([], ' ')

p =
= )
```





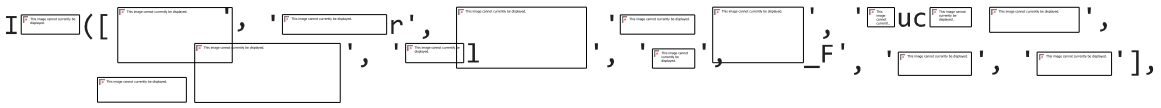
KEY INSIGHT All

but 'sex'

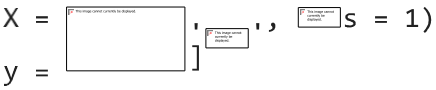
->

-> None of the features have minimum = 0 except Height (requires re-check)

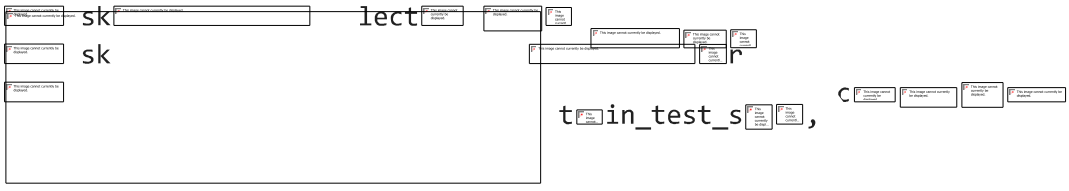
-> Each feature has difference scale range

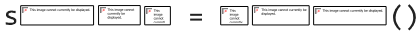


Feature Selection and Standardization



LI REGRESSION





```
X_new = se )

in, , in, = t i , i = 0.25)

ir =

LinearRegression()

i =
=

from sk n lute ua r r
s = uared
p (' n

p = uared y _p )
p (' n : ' )

n Squared Er r of s :3.569916
n Squared Er r of
```

The Lower the Mean Squared Error,better the forecast.

```
from sk r2
s = r2 ' )

p = r2 y
' )

R2 Score of
R2 Score of
```

The .

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