ASSIGNMENT 4

Assignment Date	29 oct 2022
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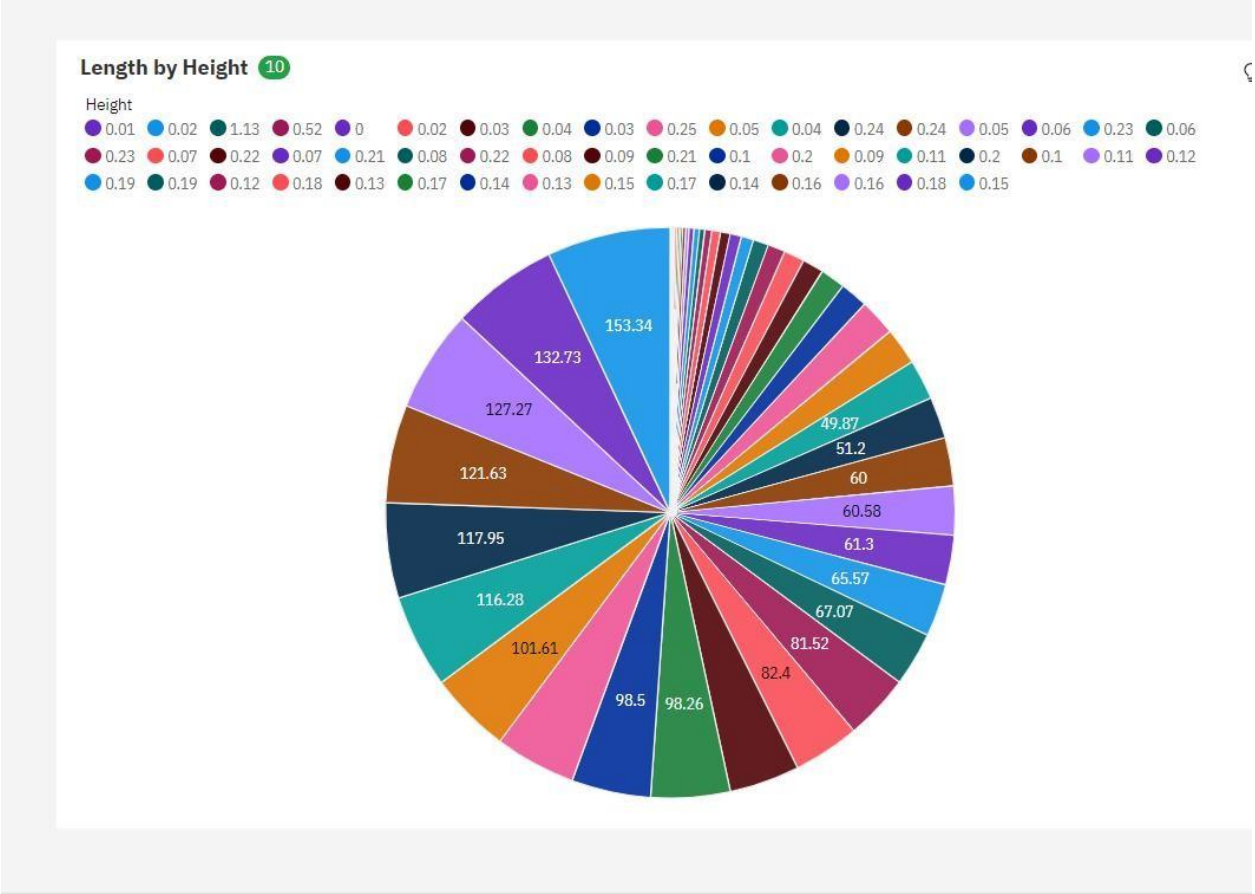
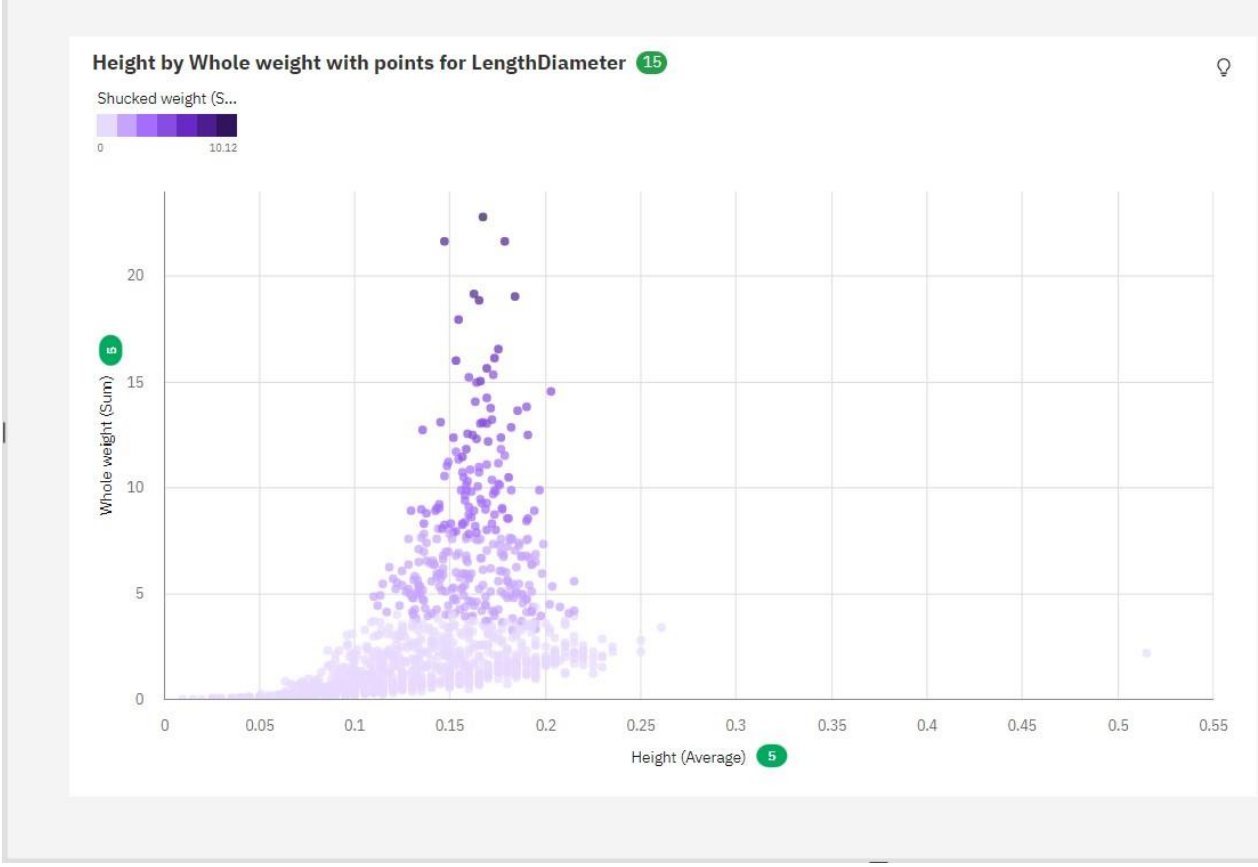
Maximum Mark	2

1. Download the dataset: Dataset
2. Load the dataset into the tool.
3. Perform Below Visualizations.
   - Univariate Analysis
   - Bi-Variate Analysis
   - Multi-Variate Analysis
4. Perform descriptive statistics on the dataset.
5. Check for Missing values and deal with them.
6. Find the outliers and replace them outliers
7. Check for Categorical columns and perform encoding. 8. Split the data into dependent and independent variables. 9. Scale the independent variables
10. Split the data into training and testing
11. Build the Model
12. Train the Model
13. Test the Model

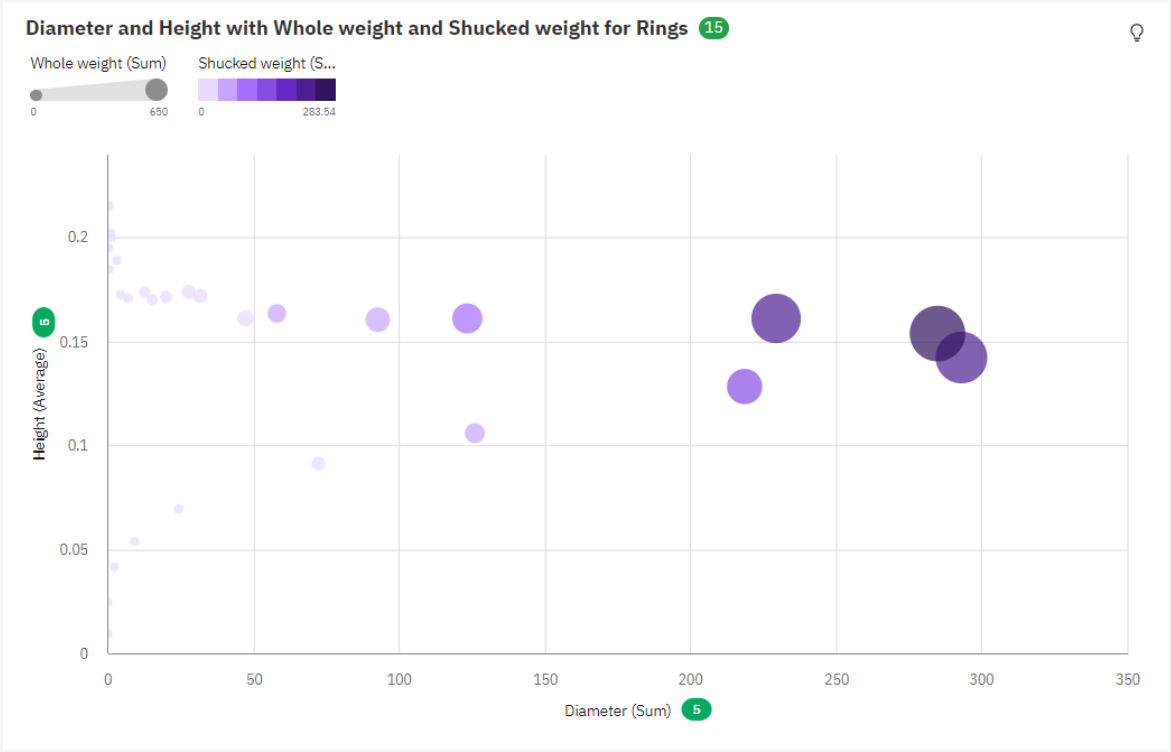
Univariate Analysis



Bi variate Analysis



Multi Variate Analysis


Diameter and Height with Whole weight and Shucked weight for Rings 15
Whole weight (Sum)
0
650
Shucked weight (S...
0
283.54
0.2
0.15
0.1
0.05
0
Height (Average) 5
0
50
100
150
200
250
300
350
Diameter (Sum) 5

```
import pandas as pd
import numpy as np
import sklearn as sk

#loading the data
data = pd.read_csv('/content/abalone.csv')

data.head()
```

```
  Sex  Length  Diameter  Height  Whole weight  Shucked weight  Viscera
weight  \
0   M   0.455     0.365   0.095        0.5140          0.2245
0.1010
1   M   0.350     0.265   0.090        0.2255          0.0995
0.0485
2   F   0.530     0.420   0.135        0.6770          0.2565
0.1415
3   M   0.440     0.365   0.125        0.5160          0.2155
0.1140
4   I   0.330     0.255   0.080        0.2050          0.0895
0.0395

   Shell weight  Rings
0         0.150     15
1         0.070      7
2         0.210      9
3         0.155     10
4         0.055      7
```

```
data.tail()
```

```
     Sex  Length  Diameter  Height  Whole weight  Shucked weight  \
4172   F   0.565     0.450   0.165        0.8870          0.3700
4173   M   0.590     0.440   0.135        0.9660          0.4390
4174   M   0.600     0.475   0.205        1.1760          0.5255
4175   F   0.625     0.485   0.150        1.0945          0.5310
4176   M   0.710     0.555   0.195        1.9485          0.9455

      Viscera weight  Shell weight  Rings
4172          0.2390        0.2490     11
4173          0.2145        0.2605     10
4174          0.2875        0.3080      9
4175          0.2610        0.2960     10
4176          0.3765        0.4950     12
```

```
data.shape
```

```
(4177, 9)
```

data preprocessing

```
#missing values
data.isnull().sum()
```

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

```
# remove unwanted columns
data = data.drop(columns = ['Sex'],axis = 1)
```

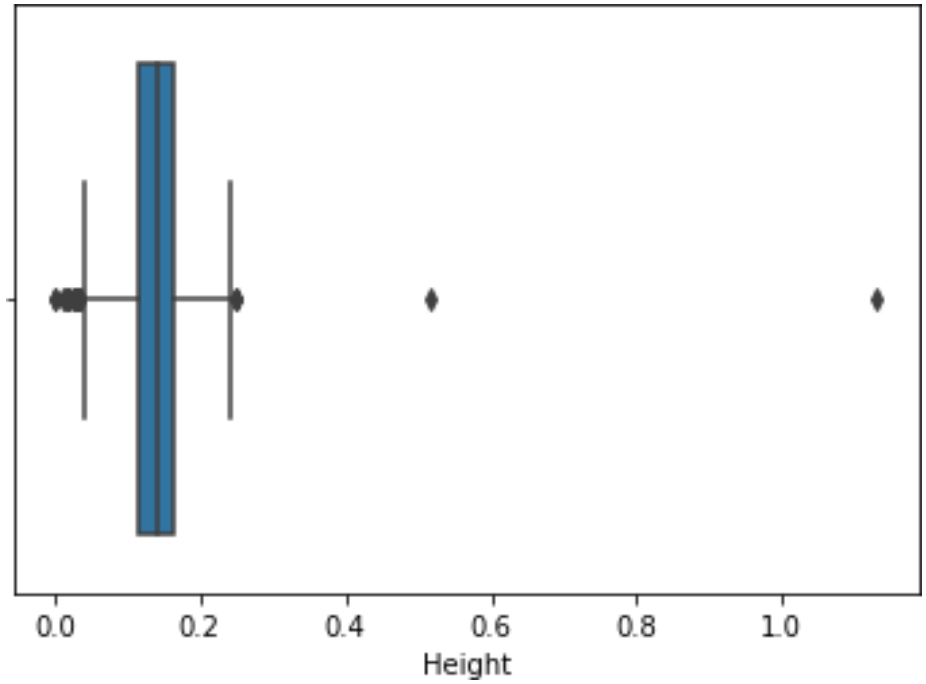
```
data.head()
```

```
   Length  Diameter  Height  Whole weight  Shucked weight  Viscera
weight  \
0  0.455      0.365   0.095        0.5140          0.2245
0.1010
1   0.350     0.265   0.090        0.2255          0.0995
0.0485
2   0.530     0.420   0.135        0.6770          0.2565
0.1415
3   0.440     0.365   0.125        0.5160          0.2155
0.1140
4   0.330     0.255   0.080        0.2050          0.0895
0.0395

   Shell weight  Rings
0         0.150     15
1         0.070      7
2         0.210      9
3         0.155     10
4         0.055      7
```

```
# deal with outlier
import seaborn as sns
sns.boxplot(data.Height)
```

```
/usr/local/lib/python3.7/dist-packages/seaborn/_decorators.py:43:
FutureWarning: Pass the following variable as a keyword arg: x. From
version 0.12, the only valid positional argument will be `data`, and
passing other arguments without an explicit keyword will result in an
```

```
error or misinterpretation.
  FutureWarning

<matplotlib.axes._subplots.AxesSubplot at 0x7f7f76a2a810>
```




```
# Encoding
pd.get_dummies(data['Height'])
```

```
      0.000  0.010  0.015  0.020  0.025  0.030  0.035  0.040  0.045
0.050  \
0          0      0      0      0      0      0      0      0      0
0
1          0      0      0      0      0      0      0      0      0
0
2          0      0      0      0      0      0      0      0      0
0
3          0      0      0      0      0      0      0      0      0
0
4          0      0      0      0      0      0      0      0      0
0
...      ...    ...    ...    ...    ...    ...    ...    ...    ...
...
4172       0      0      0      0      0      0      0      0      0
0
4173       0      0      0      0      0      0      0      0      0
0
4174       0      0      0      0      0      0      0      0      0
```

```
0
4175      0       0       0       0       0       0       0       0       0
0
4176      0       0       0       0       0       0       0       0       0
0

       ...  0.210  0.215  0.220  0.225  0.230  0.235  0.240  0.250
0.515  \
0      ...      0      0      0      0      0      0      0      0
0
1      ...      0      0      0      0      0      0      0      0
0
2      ...      0      0      0      0      0      0      0      0
0
3      ...      0      0      0      0      0      0      0      0
0
4      ...      0      0      0      0      0      0      0      0
0
...    ...    ...    ...    ...    ...    ...    ...    ...    ...    .
..
4172   ...      0      0      0      0      0      0      0      0
0
4173   ...      0      0      0      0      0      0      0      0
0
4174   ...      0      0      0      0      0      0      0      0
0
4175   ...      0      0      0      0      0      0      0      0
0
4176   ...      0      0      0      0      0      0      0      0
0

      1.130
0         0
1         0
2         0
3         0
4         0
...     ...
4172      0
4173      0
4174      0
4175      0
4176      0

[4177 rows x 51 columns]
```

```
# scaling
from sklearn.preprocessing import MinMaxScaler

scale = MinMaxScaler(feature_range=(0,1))
```

```
y = data['Rings']
x = data.drop(columns=['Rings'],axis = 1)

names = x.columns
names

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

x = scale.fit_transform(x)
x

array([[0.51351351, 0.5210084 , 0.0840708 , ..., 0.15030262, 0.1323239
,
        0.14798206],
       [0.37162162, 0.35294118, 0.07964602, ..., 0.06624075,
0.06319947,
        0.06826109],
       [0.61486486, 0.61344538, 0.11946903, ..., 0.17182246,
0.18564845,
        0.2077728 ],
       ...,
       [0.70945946, 0.70588235, 0.18141593, ..., 0.3527236 ,
0.37788018,
        0.30543099],
       [0.74324324, 0.72268908, 0.13274336, ..., 0.35642233,
0.34298881,
        0.29347285],
       [0.85810811, 0.84033613, 0.17256637, ..., 0.63517149,
0.49506254,
        0.49177877]])

#train and test

from sklearn.model_selection import train_test_split

x_train,x_test,y_train,y_test = train_test_split(x,y,test_size = 0.2)

from sklearn.linear_model import LogisticRegression

model = LogisticRegression()

model.fit(x_train,y_train)

/usr/local/lib/python3.7/dist-packages/sklearn/linear_model/
_logistic.py:818: ConvergenceWarning: lbfgs failed to converge
(status=1):
STOP: TOTAL NO. of ITERATIONS REACHED LIMIT.

Increase the number of iterations (max_iter) or scale the data as
```

```
shown in:
    https://scikit-learn.org/stable/modules/preprocessing.html
Please also refer to the documentation for alternative solver options:

https://scikit-learn.org/stable/modules/linear_model.html#logistic-
regression
  extra_warning_msg=_LOGISTIC_SOLVER_CONVERGENCE_MSG,

LogisticRegression()

# test with train data
pred = model.predict(x_train)

pred

array([ 6,  8, 10, ...,  9,  8,  8])

from sklearn import metrics

metrics.accuracy_score(pred,y_train)

0.26967973660580663

pred = model.predict(x_test)

metrics.accuracy_score(pred,y_test)

0.25239234449760767
```