2. Implement preprocessing on dataset student.arff

Aim:

To implement Preprocessing steps in Python for student.arff data set.

Procedure:

Step 1: Create arff student file and save the file inside python folder

Step 2: Open Python idle, import all necessary modules to perform preprocessing
Step 3: Load student.arff dataset into python platform using Pandas method, like below;
data = arff.loadarff('e:/python365/student.arff')
Step 4: Understand about the dataset using, shape, info(), describe(), dtype,
Step 5: Check the % of uniqueness and null using nunique() and isnull() method.
Step 6: Perform data cleaning procedure for handling missing data by implementing fillna() method.
Step 7: Perform data cleaning procedure for handling noisy data by implementing interpolate() method
Step 8: Perform data integration procedure using Merge() method, and understand the correlation among attributes using corr() method.
Step 9: Perform Data reduction procedure for dimensionality reduction using suitable method namely Wavelet Transformation.
Step 10: Perform Data transformation to scale the data into equal range using Min-Max normalization.
Step 11: Save the preprocessed data into a csv file.

Python Code:

```
from scipy.io import arff
import pandas as pd
import pywt
import numpy as np
import matplotlib as plt
import matplotlib.pyplot as plt

data = arff.loadarff('e:/python365/student.arff')
df = pd.DataFrame(data[0])
print(df.shape)
print(df.info())
print(df.describe())
print(df.dtypes)
print(df.nunique())
df1.isnull()
df.isnull().sum()/len(df)*100
Print(df.fillna(0) )
print(df1.fillna(method='pad'))
print(df1.fillna(method='bfill'))
df2=df.replace(to_replace = np.nan, value = -99)
df1=df.interpolate(method ='linear', limit_direction ='forward')
```

```
data1 = arff.loadarff('e:/python365/student1.arff')
df1 = pd.DataFrame(data1[0])
df3=pd.DataFrame()
df3=pd.merge(df,df1) # get common data from df and df1
print(df3)
df3=pd.merge(df,df1,how='outer') #get all the data
print(df3)
print(df.corr())
x = np.linspace(0, 1, num=2048)
chirp_signal = np.sin(250 * np.pi * x**2)

fig, ax = plt.subplots(figsize=(6,1))
ax.set_title("Original Chirp Signal: ")
ax.plot(chirp_signal)
plt.show()

data = chirp_signal
waveletname = 'sym5'

fig, axarr = plt.subplots(nrows=5, ncols=2, figsize=(6,6))
for ii in range(5):
    (data, coeff_d) = pywt.dwt(data, waveletname)
    axarr[ii, 0].plot(data, 'r')
    axarr[ii, 1].plot(coeff_d, 'g')
     axarr[ii,0].set_ylabel("Level{}".format(ii+1),fontsize=14,rotati
     on=90)
    axarr[ii, 0].set_yticklabels([])
    if ii == 0:
        axarr[ii, 0].set_title("Approximation coefficients",
fontsize=14)
        axarr[ii, 1].set_title("Detail coefficients", fontsize=14)
    axarr[ii, 1].set_yticklabels([])
plt.tight_layout()
plt.show()
df['sub1'] = (df['sub1'] - df['sub1'].min()) / (df['sub1'].max() -
df['sub1'].min())
df['sub2'] = (df['sub2'] - df['sub2'].min()) / (df['sub2'].max() -
df['sub2'].min())
df['sub3'] = (df['sub3'] - df['sub3'].min()) / (df['sub3'].max() -
df['sub3'].min())

print(df['sub1'])
  df.to_csv('e:\python365\sample.csv')
```

Sample Input: student.arff

% The Student data

@relation student1

@attribute gender {male,female}
@attribute sub1 numeric
@attribute sub2 numeric
@attribute sub3 numeric
@attribute total numeric
@attribute result {pass,fail,RA}
@attribute placement {yes,no}

@data

male,56,67,78,201,pass,yes
female,67,76,65,208,pass,no
male,98,87,76,261,pass,yes
male,23,12,45,80,fail,no
male,56,76,90,222,pass,yes
female,76,65,nan,195,pass,yes
male,43,32,21,96,fail,yes
male,65,55,77,197,RA,yes
male,98,87,nan,261,pass,yes
male,54,88,77,219,pass,yes
female,90,94,93,277,pass,no
male,43,42,41,166,fail,yes
male,88,99,66,253,pass,yes

Sample Output: Sample.csv

	gender	sub1	sub2	sub3	total	result	placement
0	'male'	0.44	0.632183908	0.791666667	201	b'pass'	b'yes'
1	'female'	0.586666667	0.735632184	0.611111111	208	b'pass'	b'no'
2	b'male'	1	0.862068966	0.763888889	261	b'pass'	b'yes'
3	b'male'	0	0	0.333333333	80	b'fail'	b'no'
4	b'male'	0.44	0.735632184	0.958333333	222	b'pass'	b'yes'
5	b'female'		0.706666667	0.609195402	0.67845	195	b'pass' b'yes'
6	b'male'	0.266666667	0.229885057	0	96	b'fail'	b'yes'
7	b'male'	0.56	0.494252874	0.777777778	197	b'RA'	b'yes'
8	b'male'	1	0.862068966		261	b'pass'	b'yes'
9	b'male'	0.413333333	0.873563218	0.777777778	219	b'pass'	b'yes'
10	b'female'		0.893333333	0.942528736	1	277	b'pass' b'no'
11	b'male'	0.266666667	0.344827586	0.277777778	166	b'fail'	b'yes'

Result:

Thus the preprocessing in data mining has been successfully implemented using Python.

3. Implement association rule mining on data sets

Aim: To implement association rule mining using FP-Growth algorithm for dataset using Python and create model using Weka.

Procedure:

Step 1: Prepare the data set and save the file inside python folder

Step 2: Open Python idle, import all necessary modules to implement Apriori algorithm

Step 3: Load the dataset into python platform using Pandas method, like below;

data = pd.load_csv('e:/python365/datasetname')

Step 4: Encode the data to either 0 or 1

Step 5: Build the model using fpgrowth() method with min_sup. count

Step 6: Generate association rules using association_rules() method with metric as lift or

Confidence

Step 7: Sort the generated association rules and print the top 10 rules.

Python Code:

```
  import pandas as pd
from mlxtend.preprocessing import TransactionEncoder
from mlxtend.frequent_patterns import fpgrowth
from mlxtend.frequent_patterns import association_rules
dataset = [['Milk', 'Onion', 'Nutmeg', 'Kidney Beans', 'Eggs',
'Yogurt'],
           ['Dill', 'Onion', 'Nutmeg', 'Kidney Beans', 'Eggs',
'Yogurt'],
           ['Milk', 'Apple', 'Kidney Beans', 'Eggs'],
           ['Milk', 'Unicorn', 'Corn', 'Kidney Beans', 'Yogurt'],
           ['Corn', 'Onion', 'Onion', 'Kidney Beans', 'Ice cream',
'Eggs']]

te = TransactionEncoder()
te_ary = te.fit(dataset).transform(dataset)
df = pd.DataFrame(te_ary)
df1=fpgrowth(df, min_support=0.6, use_colnames=True)
print(dataset)
print(df1)

rules = association_rules(df1, metric ="lift", min_threshold = 1)
rules = rules.sort_values(['confidence', 'lift'], ascending =[False,
False])
print(rules.head(10))
```

Sample Input:

```
dataset = [['Milk', 'Onion', 'Nutmeg', 'Kidney Beans', 'Eggs', 'Yogurt'],
           ['Dill', 'Onion', 'Nutmeg', 'Kidney Beans', 'Eggs', 'Yogurt'],
           ['Milk', 'Apple', 'Kidney Beans', 'Eggs'],
           ['Milk', 'Unicorn', 'Corn', 'Kidney Beans', 'Yogurt'],
           ['Corn', 'Onion', 'Onion', 'Kidney Beans', 'Ice cream', 'Eggs']]
```

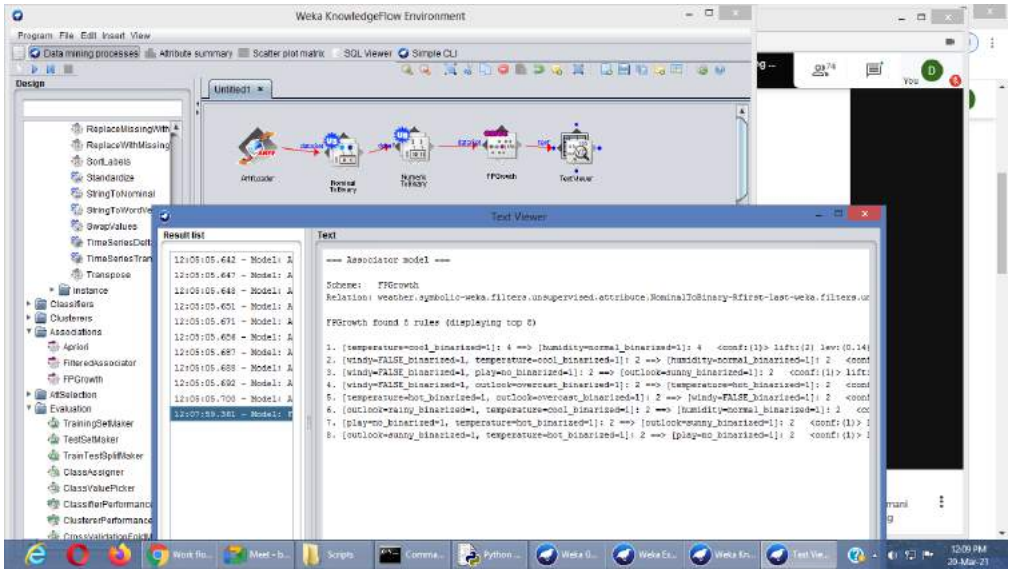
Sample Output: Sample.csv

	support	itemsets
0	1.0	(5)
1	0.8	(3)
2	0.6	(10)
3	0.6	(8)
4	0.6	(6)
5	0.8	(3, 5)
6	0.6	(10, 5)
7	0.6	(8, 3)
8	0.6	(8, 5)
9	0.6	(8, 3, 5)
10	0.6	(5, 6)

	antecedents	consequents	antecedent support	...	lift	leverage	conviction
4	(8)	(3)	0.6	...	1.25	0.12	inf
9	(8, 5)	(3)	0.6	...	1.25	0.12	inf
11	(8)	(3, 5)	0.6	...	1.25	0.12	inf
0	(3)	(5)	0.8	...	1.00	0.00	inf
2	(10)	(5)	0.6	...	1.00	0.00	inf
6	(8)	(5)	0.6	...	1.00	0.00	inf
8	(8, 3)	(5)	0.6	...	1.00	0.00	inf
15	(6)	(5)	0.6	...	1.00	0.00	inf
1	(5)	(3)	1.0	...	1.00	0.00	1.0
5	(3)	(8)	0.8	...	1.25	0.12	1.6

[10 rows x 9 columns]

Model Developed using Weka Knowledge Flow



4. Implement Association rule process on dataset test.arff using apriori algorithm

Aim: To implement Apriori algorithm for dataset using Python and create model using Weka.

Procedure:

Step 1: Prepare the data set and save the file inside python folder

Step 2: Open Python idle, import all necessary modules to implement Apriori algorithm

Step 3: Load the dataset into python platform using Pandas method, like below;

data = pd.load_csv('e:/python365/datasetname')

Step 4: Encode the data to either 0 or 1

Step 5: Build the model using aprior() method with min_sup. count

Step 6: Generate association rules using association_rules() method with metric as lift or

Confidence

Step 7: Sort the generated association rules and print the top 10 rules.

Python Code:

```
  import numpy as np
import pandas as pd
from mlxtend.frequent_patterns import apriori
from mlxtend.frequent_patterns import association_rules
data = pd.read_csv('e:/python365/retail.csv')
print(data)
print(data.columns )
```

```
data['Description'] = data['Description'].str.strip()

# Dropping the rows without any invoice number
data.dropna(axis = 0, subset =['InvoiceNo'], inplace = True)
data['InvoiceNo'] = data['InvoiceNo'].astype('str')

# Dropping all transactions which were done on credit
data = data[~data['InvoiceNo'].str.contains('C')]



basket_France = (data[data['Country'] =="France"]
          .groupby(['InvoiceNo', 'Description'])['Quantity']
          .sum().unstack().reset_index().fillna(0)
          .set_index('InvoiceNo'))

# Transactions done in the United Kingdom
basket_UK = (data[data['Country'] =="United Kingdom"]
          .groupby(['InvoiceNo', 'Description'])['Quantity']
          .sum().unstack().reset_index().fillna(0)
          .set_index('InvoiceNo'))

print(basket_UK)


def hot_encode(x):
    if(x<= 0):
        return 0
    if(x>= 1):
        return 1

# Encoding the datasets
basket_encoded = basket_France.applymap(hot_encode)
basket_France = basket_encoded

basket_encoded = basket_UK.applymap(hot_encode)
basket_UK = basket_encoded


# Building the model
frq_items = apriori(basket_UK, min_support = 0.05, use_colnames =
True)

# Collecting the inferred rules in a dataframe
rules = association_rules(frq_items, metric ="lift", min_threshold =
1)
rules = rules.sort_values(['confidence', 'lift'], ascending =[False,
False])
print(rules.head(10))
```

Sample Input: retail.csv

InvoiceNo	StockCode	Description	Quantity	InvoiceDate	UnitPrice	CustomerID	Country
536365	85123A	WHITE HANGING HEART T-LIGHT HOLDER	6	01-12-10 8:26	2.55	17850	United Kingdom
536365	71053	WHITE METAL LANTERN	6	01-12-10 8:26	3.39	17850	United Kingdom

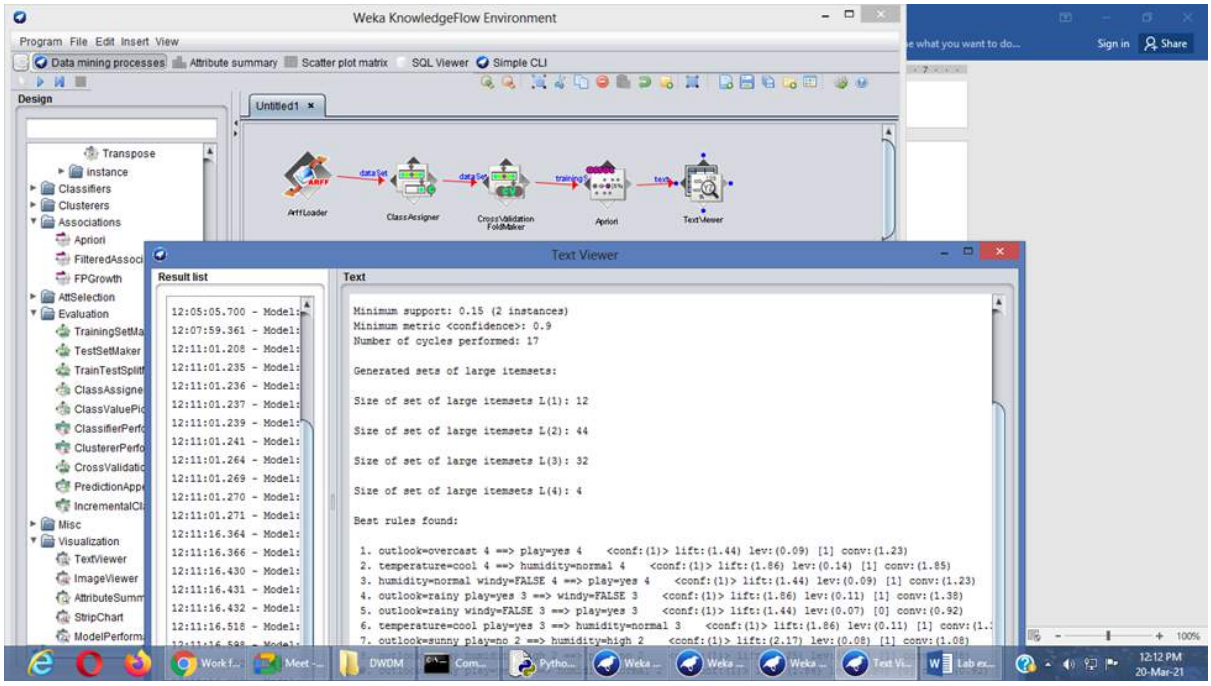
536365	84406B	CREAM CUPID HEARTS COAT HANGER	8	01-12-10 8:26	2.75	17850 United Kingdom
536365	84029G	KNITTED UNION FLAG HOT WATER BOTTLE	6	01-12-10 8:26	3.39	17850 United Kingdom
536365	84029E	RED WOOLLY HOTTIE WHITE HEART.	6	01-12-10 8:26	3.39	17850 United Kingdom
536365	22752	SET 7 BABUSHKA NESTING BOXES	2	01-12-10 8:26	7.65	17850 United Kingdom
536365	21730	GLASS STAR FROSTED T-LIGHT HOLDER	6	01-12-10 8:26	4.25	17850 United Kingdom
536366	22633	HAND WARMER UNION JACK	6	01-12-10 8:28	1.85	17850 United Kingdom
536366	22632	HAND WARMER RED POLKA DOT	6	01-12-10 8:28	1.85	17850 United Kingdom
536367	84879	ASSORTED COLOUR BIRD ORNAMENT	32	01-12-10 8:34	1.69	13047 United Kingdom
536367	22745	POPPY'S PLAYHOUSE BEDROOM	6	01-12-10 8:34	2.1	13047 United Kingdom
536367	22748	POPPY'S PLAYHOUSE KITCHEN	6	01-12-10 8:34	2.1	13047 United Kingdom
536367	22749	FELTCRAFT PRINCESS CHARLOTTE DOLL	8	01-12-10 8:34	3.75	13047 United Kingdom
536367	22310	IVORY KNITTED MUG COSY	6	01-12-10 8:34	1.65	13047 United Kingdom
536367	84969	BOX OF 6 ASSORTED COLOUR TEASPOONS	6	01-12-10 8:34	4.25	13047 United Kingdom
536367	22623	BOX OF VINTAGE JIGSAW BLOCKS	3	01-12-10 8:34	4.95	13047 United Kingdom
536367	22622	BOX OF VINTAGE ALPHABET BLOCKS	2	01-12-10 8:34	9.95	13047 United Kingdom
536367	21754	HOME BUILDING BLOCK WORD	3	01-12-10 8:34	5.95	13047 United Kingdom
536367	21755	LOVE BUILDING BLOCK WORD	3	01-12-10 8:34	5.95	13047 United Kingdom
536367	21777	RECIPE BOX WITH METAL HEART	4	01-12-10 8:34	7.95	13047 United Kingdom
536367	48187	DOORMAT NEW ENGLAND	4	01-12-10 8:34	7.95	13047 United Kingdom
536368	22960	JAM MAKING SET WITH JARS	6	01-12-10 8:34	4.25	13047 United Kingdom
536368	22913	RED COAT RACK PARIS FASHION	3	01-12-10 8:34	4.95	13047 United Kingdom
536368	22912	YELLOW COAT RACK PARIS FASHION	3	01-12-10 8:34	4.95	13047 United Kingdom
536368	22914	BLUE COAT RACK PARIS FASHION	3	01-12-10 8:34	4.95	13047 United Kingdom
536369	21756	BATH BUILDING BLOCK WORD	3	01-12-10 8:35	5.95	13047 United Kingdom
536370	22728	ALARM CLOCK BAKELIKE PINK	24	01-12-10 8:45	3.75	12583 France

536370 22727 ALARM CLOCK BAKELIKE RED 24 01-12-10 8:45 3.75 12583 France
536370 22726 ALARM CLOCK BAKELIKE GREEN 12 01-12-10 8:45 3.75 12583 France
536370 21724 PANDA AND BUNNIES STICKER SHEET 12 01-12-10 8:45 0.85 12583 France
536370 21883 STARS GIFT TAPE 24 01-12-10 8:45 0.65 12583 France

Sample Output: Sample.csv

```
Index(['InvoiceNo', 'StockCode', 'Description', 'Quantity', 'InvoiceDate',
       'UnitPrice', 'CustomerID', 'Country'],
      dtype='object')
                        antecedents  ... conviction
0  (BOX OF 6 ASSORTED COLOUR TEASPOONS)  ...        inf
1       (ASSORTED COLOUR BIRD ORNAMENT)  ...        inf
2     (BOX OF VINTAGE ALPHABET BLOCKS)  ...        inf
3       (ASSORTED COLOUR BIRD ORNAMENT)  ...        inf
4        (BOX OF VINTAGE JIGSAW BLOCKS)  ...        inf
5       (ASSORTED COLOUR BIRD ORNAMENT)  ...        inf
6                (DOORMAT NEW ENGLAND)  ...        inf
7       (ASSORTED COLOUR BIRD ORNAMENT)  ...        inf
8   (FELTCRAFT PRINCESS CHARLOTTE DOLL)  ...        inf
9       (ASSORTED COLOUR BIRD ORNAMENT)  ...        inf

[10 rows x 9 columns]
```

Model Developed using Weka Knowledge Flow



5. Implement classification rule process on dataset employee.arff using naïve Bayes algorithm

Aim: To implement Naïve Bayes Algorithm for dataset using Python and create model using Weka.

Procedure:

Step 1: Prepare the data set and save the file inside python folder

Step 2: Open Python idle, import all necessary modules to implement Apriori algorithm

Step 3: Load the dataset into python platform using Pandas method, like below;

data = pd.load_csv('e:/python365/datasetname')

Step 4: First, we assign all the points to an individual cluster

Step 5: Next, we will look at the smallest distance in the proximity matrix and merge the points with the smallest distance. We then update the proximity matrix:

Step 6: We will repeat step 2 until only a single cluster is left.

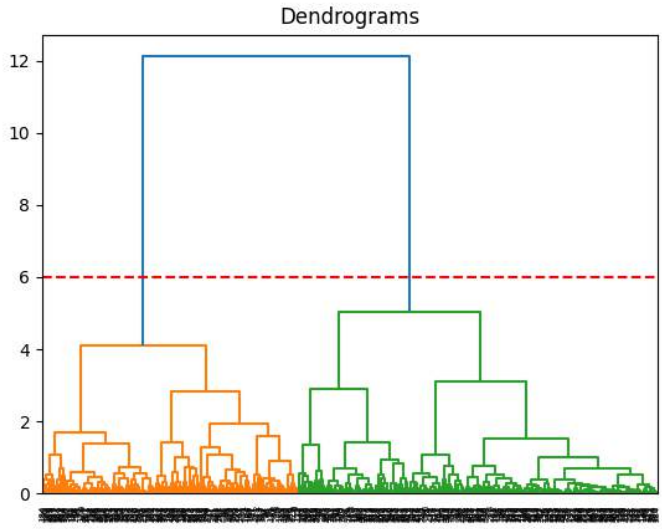
Python Code:

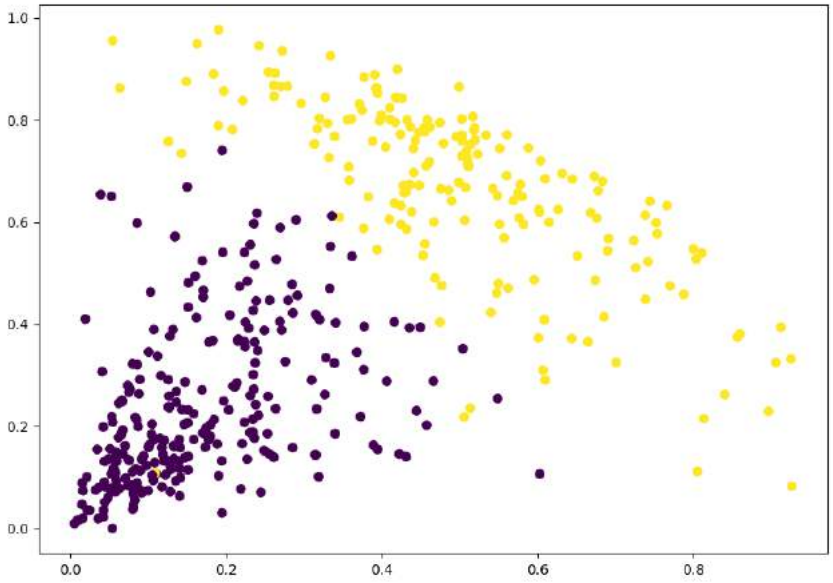
```
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt

data = pd.read_csv('Wholesale customers data.csv')
print(data.head())
```

```
from sklearn.preprocessing import normalize
data_scaled = normalize(data)
data_scaled = pd.DataFrame(data_scaled, columns=data.columns)
data_scaled.head()


import scipy.cluster.hierarchy as shc

plt.title("Dendrograms")
dend = shc.dendrogram(shc.linkage(data_scaled, method='ward'))
plt.axhline(y=6, color='r', linestyle='--')
plt.show()

from sklearn.cluster import AgglomerativeClustering
cluster = AgglomerativeClustering(n_clusters=2, affinity='euclidean',
linkage='ward')
cluster.fit_predict(data_scaled)

plt.figure(figsize=(10, 7))
plt.scatter(data_scaled['Milk'], data_scaled['Grocery'],
c=cluster.labels_)

plt.show()
```

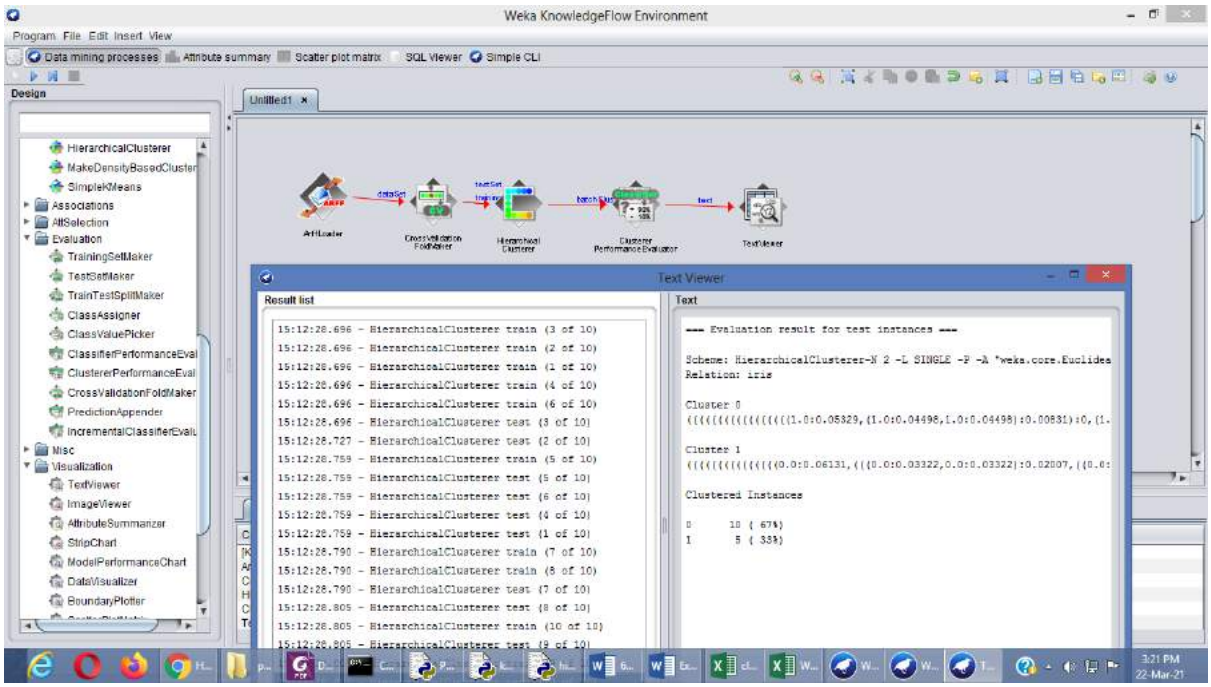
Sample Input: 'Wholesale customers data.csv'

Sample Output: Sample.csv





Weka Implementation for Clustering Model:



6. Implement clustering rule process on dataset student.arff using simple k-means

Aim: To implement K-means clustering algorithm for dataset using Python and create model using Weka.

Procedure:

Step 1: Prepare the data set and save the file inside python folder

Step 2: Open Python idle, import all necessary modules to implement Apriori algorithm

Step 3: Load the dataset into python platform using Pandas method, like below;

data = pd.load_csv('e:/python365/datasetname')

Step 4: Select k random points from the data as centroids

Step 5: Initialize no. of clusters and cluster centroid

Step 6: Assign all the points to the closest cluster centroid

Step 7: Re-compute the centroids of newly formed clusters

Step 8: Repeat steps 6 and 7.

Python Code:

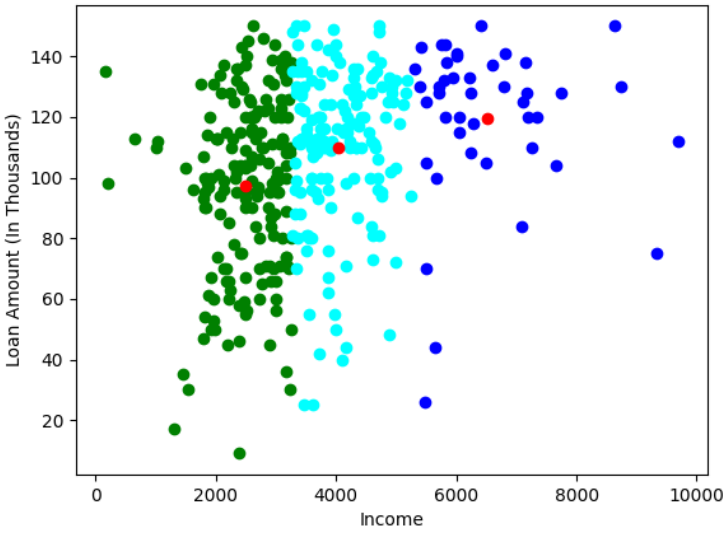
```
import pandas as pd
```

```
import numpy as np
import random as rd
import matplotlib.pyplot as plt

data = pd.read_csv('e:\python365\clustering.csv')
print(data.head())
X = data[["LoanAmount","ApplicantIncome"]]
K=3
Centroids = (X.sample(n=K))
diff = 1
j=0

while(diff!=0):
    XD=X
    i=1
    for index1,row_c in Centroids.iterrows():
        ED=[]
        for index2,row_d in XD.iterrows():
            d1=(row_c["ApplicantIncome"]-row_d["ApplicantIncome"])**2
            d2=(row_c["LoanAmount"]-row_d["LoanAmount"])**2
            d=np.sqrt(d1+d2)
            ED.append(d)
        X[i]=ED
        i=i+1

    C=[]
    for index,row in X.iterrows():
        min_dist=row[1]
        pos=1
        for i in range(K):
            if row[i+1] < min_dist:
                min_dist = row[i+1]
                pos=i+1
        C.append(pos)
    X["Cluster"]=C
    Centroids_new =
X.groupby(["Cluster"]).mean()[["LoanAmount","ApplicantIncome"]]
    if j == 0:
        diff=1
        j=j+1
    else:
        diff = (Centroids_new['LoanAmount'] -
Centroids['LoanAmount']).sum() + (Centroids_new['ApplicantIncome'] -
Centroids['ApplicantIncome']).sum()
        print(diff.sum())
    Centroids =
X.groupby(["Cluster"]).mean()[["LoanAmount","ApplicantIncome"]]

    color=['blue','green','cyan']
for k in range(K):
    data=X[X["Cluster"]==k+1]

plt.scatter(data["ApplicantIncome"],data["LoanAmount"],c=color[k])
plt.scatter(Centroids["ApplicantIncome"],Centroids["LoanAmount"],c='r
ed')
plt.xlabel('Income')
plt.ylabel('Loan Amount (In Thousands)')
#plt.show()
plt.savefig('result1.png')
```

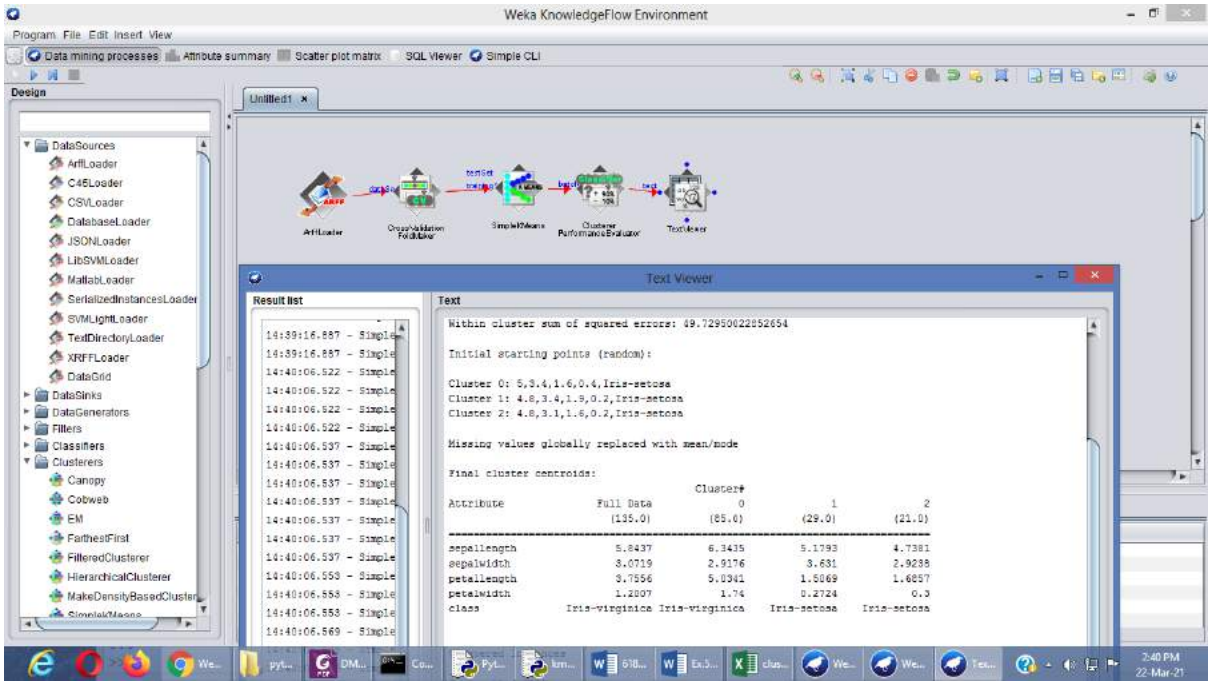
Sample Input: Clustering.csv

Sample Output: Sample.csv

621.8155926754913
465.3395667380544
444.1355622000352
191.03178731283867
207.02731030932063
277.68763984371935
244.66095351174067
229.06905235705375
218.24897861156342
107.07928213052429
52.84741626127729
98.54724443834282
90.64953219227577
18.274686272279013
9.21023994083339
18.345487493007468
46.27013250786139
0.0



Weka Implementation for Clustering Model:



7.Implement classification on data sets

Aim: To implement classification through Support Vector Machine algorithm for dataset using Python.

Procedure:

Step 1: Prepare the data set and save the file inside python folder

Step 2: Open Python idle, import all necessary modules to implement Apriori algorithm

Step 3: Load the dataset into python platform using Pandas method, like below;

data = pd.load_csv('e:/python365/datasetname')

Step 4: Split the data into training set and testing test

Step 5: Find SVC kernel

Step 6: Apply SVM model on the result of step 5.

Step 7: Print the Confusion matrix and classification metrics.

Python Code:

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


bankdata = pd.read_csv("e:/python365/bill_authentication.csv")

#divide the data into attributes and labels, execute the following code:
X = bankdata.drop('Class', axis=1)
y = bankdata['Class']

#split data into train and test data
from sklearn.model_selection import train_test_split
X_train, X_test, y_train, y_test = train_test_split(X, y, test_size = 0.20)


from sklearn.svm import SVC
svclassifier = SVC(kernel='linear')
svclassifier.fit(X_train, y_train)


y_pred = svclassifier.predict(X_test)

from sklearn.metrics import classification_report, confusion_matrix
print(confusion_matrix(y_test,y_pred))
print(classification_report(y_test,y_pred))
```

Sample Input: `bill_authentication.csv'`

Sample Output: Sample.csv

[[139 5]
[0 131]]

	precision	recall	f1-score	support
0	1.00	0.97	0.98	144
1	0.96	1.00	0.98	131
accuracy			0.98	275
macro avg	0.98	0.98	0.98	275
weighted avg	0.98	0.98	0.98	275

8. Implement clustering on data sets

Aim: To implement Clustering through Hierarchical clustering algorithm for dataset using Python and create model using Weka.

Procedure:

Step 1: Prepare the data set and save the file inside python folder

Step 2: Open Python idle, import all necessary modules to implement Apriori algorithm

Step 3: Load the dataset into python platform using Pandas method, like below;

data = pd.load_csv('e:/python365/datasetname')

Step 4: First, we assign all the points to an individual cluster

Step 5: Next, we will look at the smallest distance in the proximity matrix and merge the points

with the smallest distance. We then update the proximity matrix:

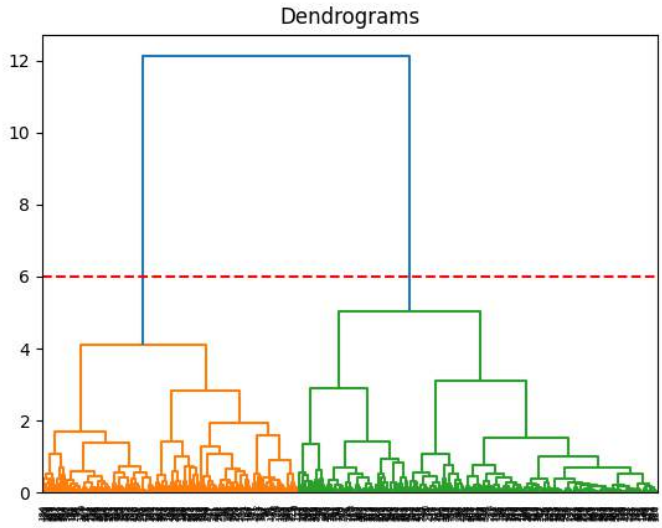
Step 6: We will repeat step 2 until only a single cluster is left.

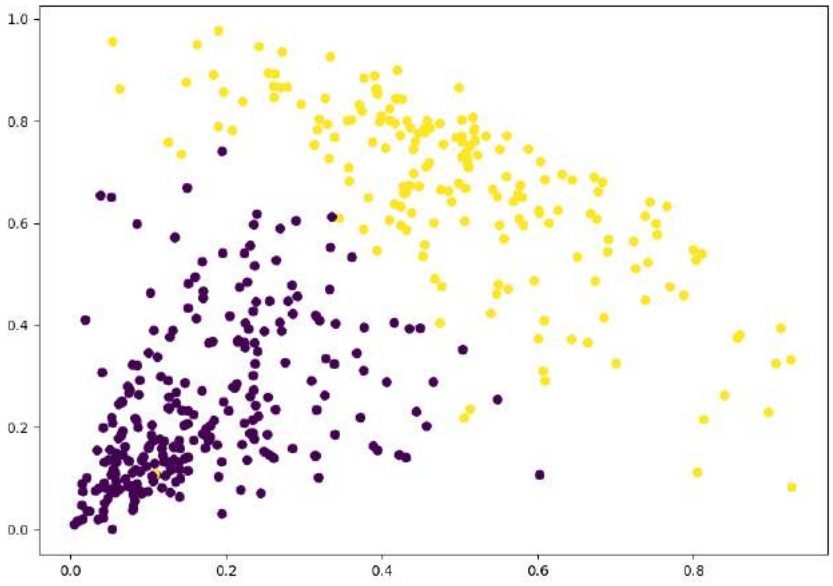
Python Code:

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

data = pd.read_csv('Wholesale customers data.csv')
print(data.head())


from sklearn.preprocessing import normalize
data_scaled = normalize(data)
data_scaled = pd.DataFrame(data_scaled, columns=data.columns)
data_scaled.head()


import scipy.cluster.hierarchy as shc

plt.title("Dendrograms")
dend = shc.dendrogram(shc.linkage(data_scaled, method='ward'))
plt.axhline(y=6, color='r', linestyle='--')
plt.show()

from sklearn.cluster import AgglomerativeClustering
cluster = AgglomerativeClustering(n_clusters=2, affinity='euclidean',
linkage='ward')
cluster.fit_predict(data_scaled)

plt.figure(figsize=(10, 7))
plt.scatter(data_scaled['Milk'], data_scaled['Grocery'],
c=cluster.labels_)

plt.show()
```

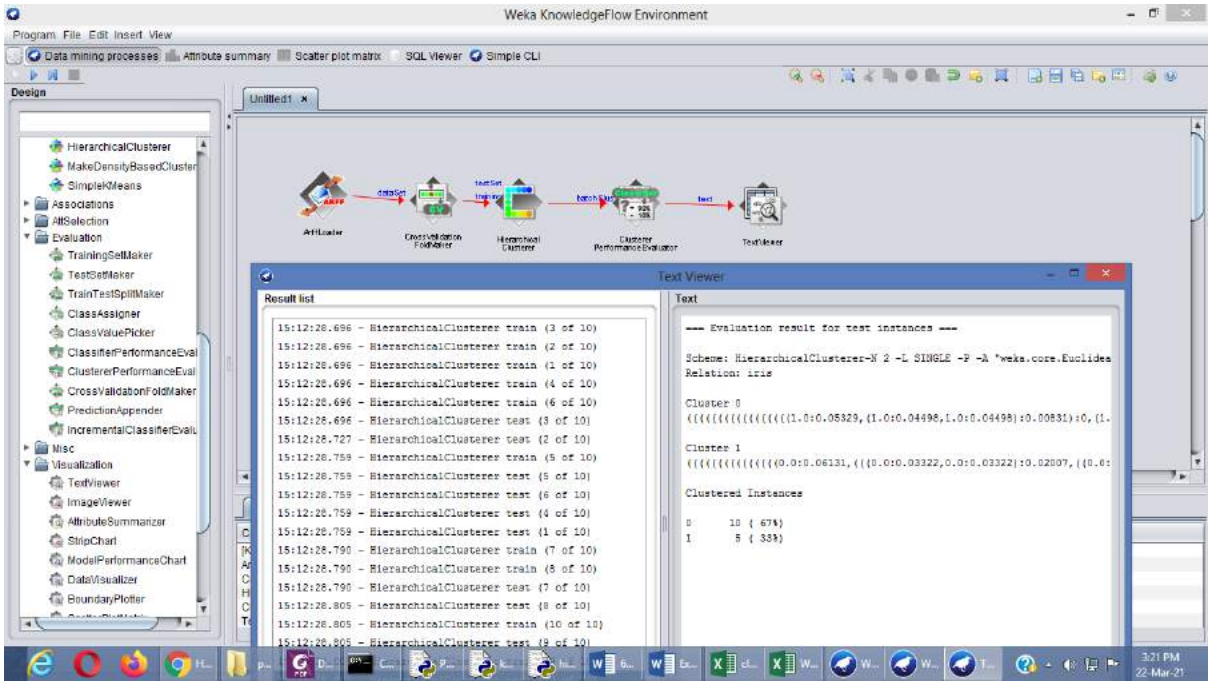
Sample Input: 'Wholesale customers data.csv'

Sample Output: Sample.csv





Weka Implementation for Clustering Model:


Weka KnowledgeFlow Environment
Program File Edit Insert View
Data mining processes
Attribute summary
Scatter plot matrix
SQL viewer
Simple CLI
Design
HierarchicalClusterer
MakeDensityBasedCluster
SimpleKMeans
Associations
AttSelection
Evaluation
TrainingSetMaker
TestSetMaker
TrainTestSplitMaker
ClassAssigner
ClassValuePicker
ClassifierPerformanceEval
ClustererPerformanceEval
CrossValidationFoldMaker
PredictionAppender
IncrementalClassifierEvalu
Misc
Visualization
TextViewer
ImageViewer
AttributeSummarizer
StripChart
ModelPerformanceChart
DataVisualizer
BoundaryPlotter
Untitled1
Text Viewer
Result list
15:12:28.696 - HierarchicalClusterer train (3 of 10)
15:12:28.696 - HierarchicalClusterer train (2 of 10)
15:12:28.696 - HierarchicalClusterer train (1 of 10)
15:12:28.696 - HierarchicalClusterer train (4 of 10)
15:12:28.696 - HierarchicalClusterer train (6 of 10)
15:12:28.696 - HierarchicalClusterer test (3 of 10)
15:12:28.727 - HierarchicalClusterer test (2 of 10)
15:12:28.759 - HierarchicalClusterer train (5 of 10)
15:12:28.759 - HierarchicalClusterer test (5 of 10)
15:12:28.759 - HierarchicalClusterer test (6 of 10)
15:12:28.759 - HierarchicalClusterer test (4 of 10)
15:12:28.759 - HierarchicalClusterer test (1 of 10)
15:12:28.790 - HierarchicalClusterer train (7 of 10)
15:12:28.790 - HierarchicalClusterer train (8 of 10)
15:12:28.790 - HierarchicalClusterer test (7 of 10)
15:12:28.805 - HierarchicalClusterer test (8 of 10)
15:12:28.805 - HierarchicalClusterer train (10 of 10)
15:12:28.805 - HierarchicalClusterer test (9 of 10)
Text
=== Evaluation result for test instances ===
Scheme: HierarchicalClusterer-N 2 -L SINGLE -P -A "weka.core.Euclidea
Relation: iris
Cluster 0
((((((((((((((((1.0:0.05329,(1.0:0.04498,1.0:0.04498):0.00831):0,(1.
Cluster 1
((((((((((((((0.0:0.06131,(((0.0:0.03322,0.0:0.03322):0.02807,((0.0:
Clustered Instances
0 10 (67%)
1 5 (33%)
3:21 PM
22-Mar-21

9. Implement Regression on data sets

Aim: To implement Regression Analysis for prediction for dataset using Python

Procedure:

Step 1: Importing all the required libraries. import numpy as np. ...
Step 2: Reading the dataset.
Step 3: Exploring the data scatter.
Step 4: Data cleaning.
Step 5: Training our model.
Step 6: Exploring our results.

Python Code:

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

dataset = pd.read_csv('e:\python365\student_scores.csv')

#Preparing Data
X = dataset.iloc[:, :-1].values
y = dataset.iloc[:, 1].values
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, random_state=0)

#Apply model
from sklearn.linear_model import LinearRegression
regressor = LinearRegression()
regressor.fit(X_train, y_train)

y_pred = regressor.predict(X_test)
df = pd.DataFrame({'Actual': y_test, 'Predicted': y_pred})
print(df)


#Prediction metrics

from sklearn import metrics
print('Mean Absolute Error:', metrics.mean_absolute_error(y_test,
y_pred))
print('Mean Squared Error:', metrics.mean_squared_error(y_test,
y_pred))
print('Root Mean Squared Error:',
np.sqrt(metrics.mean_squared_error(y_test, y_pred)))
```

Sample Input: **`student_scores.csv'`**

Sample Output: Sample.csv

Actual Predicted

0	20	16.884145
1	27	33.732261
2	69	75.357018
3	30	26.794801
4	62	60.491033

Mean Absolute Error: 4.183859899002975
Mean Squared Error: 21.598769307217406
Root Mean Squared Error: 4.647447612100367

10. Credit Risk assessment using German Credit Data

Aim: To analysis Credit Risk assessment using German Credit Data using Python

Procedure:

Step 1: Import all the required libraries. import numpy as np. ...
Step 2: Read the dataset.
Step 3: Data Preprocessing.
Step 4: Exploring the data scatter.
Step 5: Analysis the risk factor.
Step 6: Exploring our results.

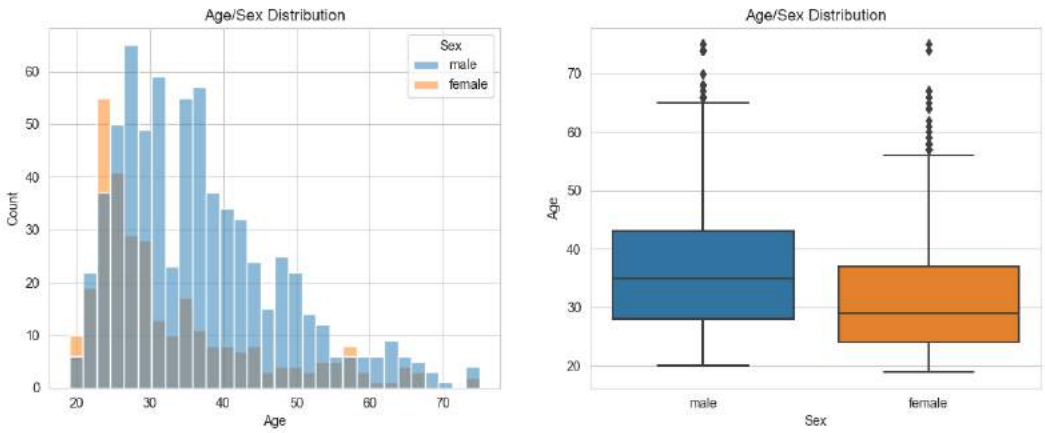
Python Code:

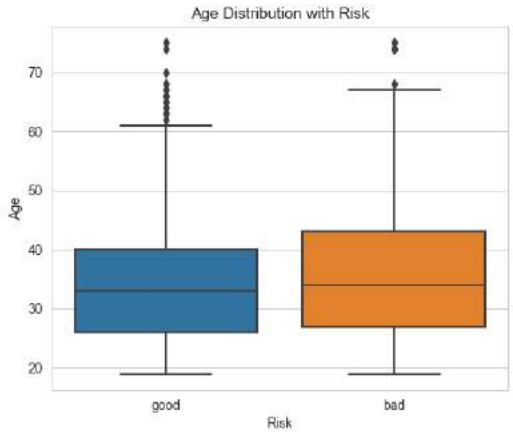
```
import numpy as np
import pandas as pd
import seaborn as sns
import matplotlib.pyplot as plt
from IPython.display import display, Markdown, Latex

sns.set_style('whitegrid')

from sklearn.preprocessing import LabelEncoder
from sklearn import model_selection
from sklearn.cluster import KMeans
from sklearn.svm import SVC
from sklearn.neighbors import KNeighborsClassifier
from sklearn.tree import DecisionTreeClassifier
from sklearn.ensemble import RandomForestClassifier
from sklearn.naive_bayes import GaussianNB


df = pd.read_csv("german_credit_data.csv", index_col=0)
print(df.head())

#preprocessing

display(Markdown("#### Explore the Values of Text Columns:"))
cols = ['Sex', 'Housing', 'Saving accounts', 'Checking account',
'Purpose', 'Risk']
for col in cols:
    line = "**" + col + ":** "
    for v in df[col].unique():
        line = line + str(v) + ", "
    display(Markdown(line))


def SC_LabelEncoder(text):
    if text == "little":
        return 1
    elif text == "moderate":
        return 2
    elif text == "quite rich":
        return 3
```

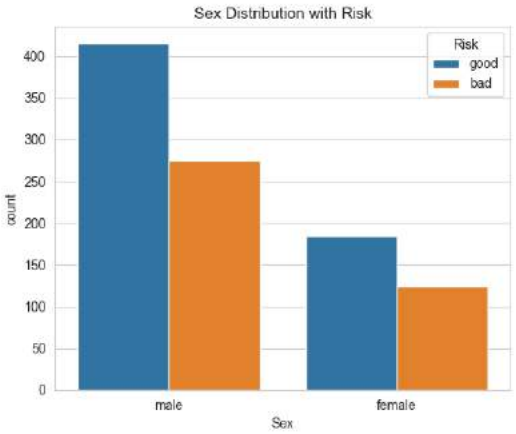
```
    elif text == "rich":
        return 4
    else:
        return 0

    df["Saving accounts"] = df["Saving
accounts"].apply(SC_LabelEncoder)
    df["Checking account"] = df["Checking
account"].apply(SC_LabelEncoder)


def H_LabelEncoder(text):
    if text == "free":
        return 0
    elif text == "rent":
        return 1
    elif text == "own":
        return 2

df["Housing"] = df["Housing"].apply(H_LabelEncoder)

#Plot data for analysis

fig, ax = plt.subplots(1,2,figsize=(15,5))
sns.histplot(df, x='Age', bins=30, hue="Sex",
ax=ax[0]).set_title("Age/Sex Distribution");
sns.boxplot(data=df, x="Sex", y="Age", ax=ax[1]).set_title("Age/Sex
Distribution");
plt.show()
fig, ax = plt.subplots(1,2,figsize=(15,5))
sns.boxplot(data=df, x='Risk', y='Age', ax=ax[0]).set_title("Age
Distribution with Risk");
sns.countplot(data=df, x="Sex", hue="Risk", ax=ax[1]).set_title("Sex
Distribution with Risk");
plt.show()
```

Sample Input: `German_credit_data.csv`'

Analysis:







- Age does not affect the risk rating much.
- Males take more count of credit from Bank.
- Males have lower percentage of bad rating than woman.

Result