Sipna College of Engineering & Technology, Amravati.
Department of Computer Science & Engineering
Session 2022-2023

Branch :- Computer Sci. & Engg. **Class :- Final Year**
Subject :-Artificial Intelligence and Machine Learning **Sem :- VIII**

Teacher Manual

PRACTICAL NO 3

AIM: To Understand and implement the concept of un-supervised learning

S/W REQUIRED: Python
DATA SET USED: iris.csv

Unsupervised Learning:-

Unsupervised learning, also known as unsupervised machine learning, uses machine learning algorithms to analyze and cluster unlabeled datasets

Unsupervised learning models are utilized for three main tasks—clustering, association, and dimensionality reduction. Below we'll define each learning method and highlight common algorithms and approaches to conduct them effectively.

Clustering is a data mining technique which groups unlabelled data based on their similarities or differences. Clustering algorithms are used to process raw, unclassified data objects into groups represented by structures or patterns in the information. Clustering algorithms can be categorized into a few types, specifically exclusive, overlapping, hierarchical, and probabilistic.

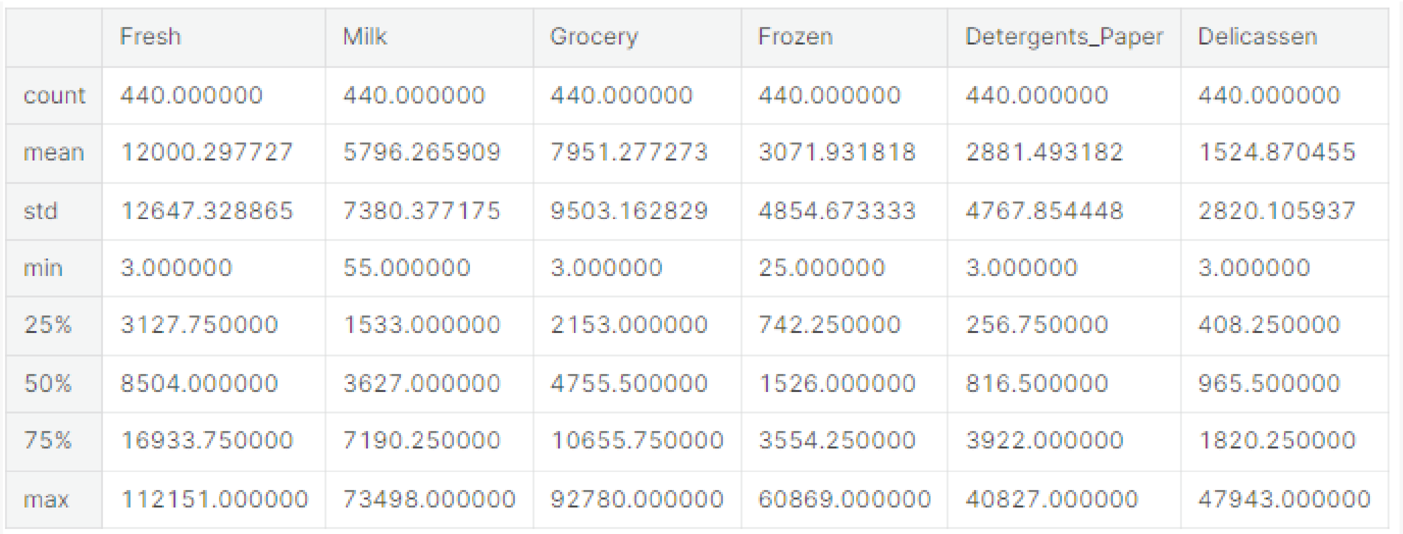
Implementation:

```
# Importing the Libraries
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

%matplotlib inline
```

```
# Importing the Dataset
try:
    data = pd.read_csv("../input/Wholesale customers data.csv")
    data.drop(labels=(['Channel','Region']),axis=1,inplace=True)
    print('Wholesale customers has {} samples with {} features each'.format(*data.shape))
except:
    print('Sorry! Dataset could not be loaded.')
```

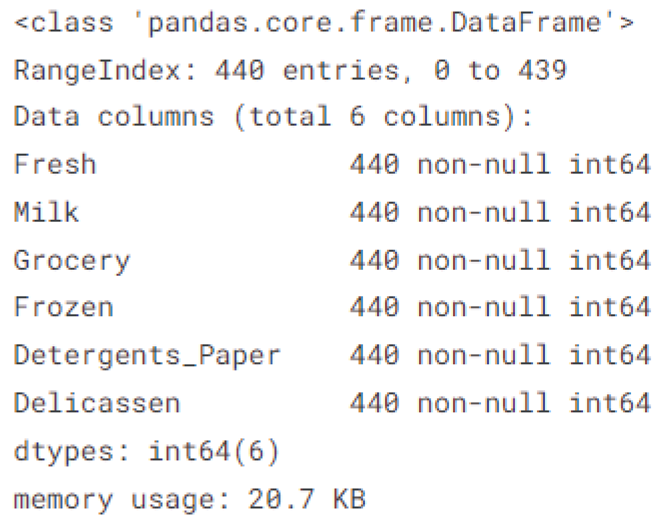
O/P:- Wholesale customers has 440 samples with 6 features each

```
data.head()

# Display a brief description of the overall dataset
data.describe()
```



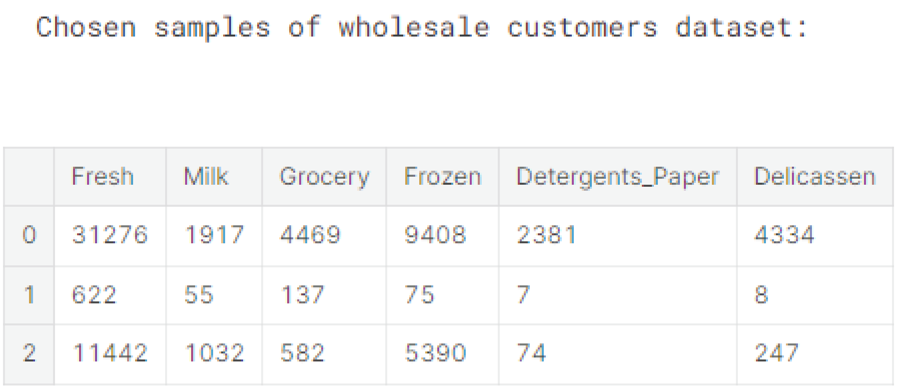
	Fresh	Milk	Grocery	Frozen	Detergents_Paper	Delicassen
count	440.000000	440.000000	440.000000	440.000000	440.000000	440.000000
mean	12000.297727	5796.265909	7951.277273	3071.931818	2881.493182	1524.870455
std	12647.328865	7380.377175	9503.162829	4854.673333	4767.854448	2820.105937
min	3.000000	55.000000	3.000000	25.000000	3.000000	3.000000
25%	3127.750000	1533.000000	2153.000000	742.250000	256.750000	408.250000
50%	8504.000000	3627.000000	4755.500000	1526.000000	816.500000	965.500000
75%	16933.750000	7190.250000	10655.750000	3554.250000	3922.000000	1820.250000
max	112151.000000	73498.000000	92780.000000	60869.000000	40827.000000	47943.000000

```
# Display complete information of the data frame
data.info()
```



```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 440 entries, 0 to 439
Data columns (total 6 columns):
Fresh               440 non-null int64
Milk                440 non-null int64
Grocery             440 non-null int64
Frozen              440 non-null int64
Detergents_Paper    440 non-null int64
Delicassen          440 non-null int64
dtypes: int64(6)
memory usage: 20.7 KB
```

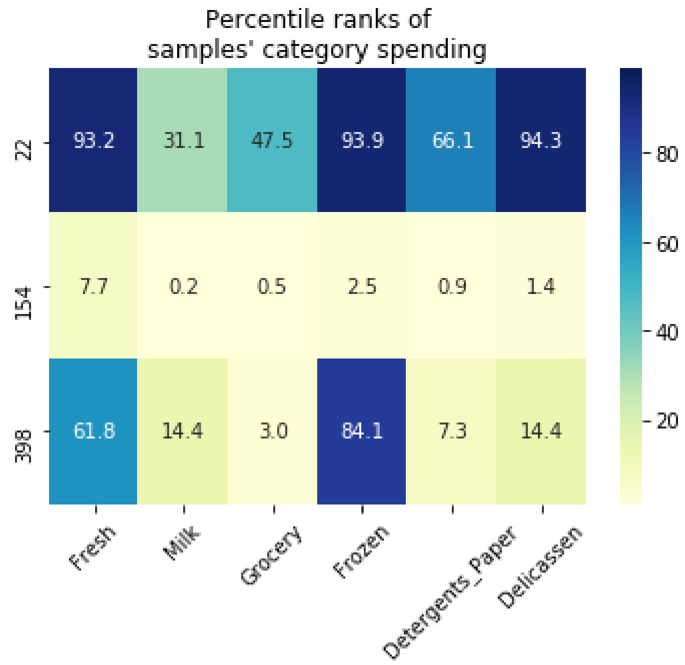
```
# Select three indices of your choice you wish to sample from the dataset
indices = [22,154,398]

# Create a DataFrame of the chosen samples
samples = pd.DataFrame(data.loc[indices], columns=data.keys()).reset_index(drop=True)
print("Chosen samples of wholesale customers dataset:")
display(samples)
```



```
Chosen samples of wholesale customers dataset:
```

	Fresh	Milk	Grocery	Frozen	Detergents_Paper	Delicassen
0	31276	1917	4469	9408	2381	4334
1	622	55	137	75	7	8
2	11442	1032	582	5390	74	247

```
# look at percentile ranks
#pcts = 100. * data.rank(axis=0, pct=True).iloc[indices].round(decimals=3)
pcts = 100. * data.rank(axis=0, pct=True).iloc[indices].round(decimals=3)
# visualize percentiles with heatmap

sns.heatmap(pcts, annot=True, vmin=1, vmax=99, fmt='.1f', cmap='YlGnBu')
plt.title('Percentile ranks of\nsamples\' category spending')
plt.xticks(rotation=45, ha='center');
```



```
# Import libraries for Decision Tree Regressor
from sklearn.tree import DecisionTreeRegressor
from sklearn.model_selection import train_test_split

# Remove column Milk
new_data = data.drop('Milk',axis=1)
```

```
# Split the data into training and testing sets(0.25) using the given feature as the target
# Set a random state.
X_train, X_test, y_train, y_test = train_test_split(new_data, data['Milk'], test_size=0.25, random_state=1)

# Create a decision tree regressor and fit it to the training set
regressor =  DecisionTreeRegressor(random_state=1)
regressor.fit(X_train, y_train)

# Report the score of the prediction using the testing set
score = regressor.score(X_test, y_test)
print(score)
```

Accuracy:- 0.515849943807

CONCLUSION: Thus we have implemented the concept of un-supervised learning.

(As you can see, we attempted to predict Milk using the other features in the dataset and the score ended up being 0.515. At this initial stage we might say that this feature is somewhat difficult to predict because the score is around the halfway point of possible scores. Remember that R^2 goes from 0 to 1. This might indicate that it could be an important feature to consider.)