DIGITAL ASSIGNMENT - I

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Github Link :- Machine-Learning-Assignments/DA-1 at main · rishabh5197/Machine-Learning-Assignments (github.com)

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DA-1

Importing Libraries

In [1]:

```python
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from bs4 import BeautifulSoup as bs
import requests
from warnings import filterwarnings
filterwarnings("ignore")
```

Using Web Scraping to collect the data

In [2]:

```python
while True:
    try:
        link = 'https://www.flipkart.com/search?q=laptops&otracker=search&otracker1=search&marketplace=FLIPKART&as-show=on&as=off'
        print(link)
        page = requests.get(link)
        print(page)
        break
    except:
        pass
```

```
https://www.flipkart.com/search?q=laptops&otracker=search&otracker1=search&marketplace=FLIPKART&as-show=on&as=off (https://www.flipkart.com/sea
rch?q=laptops&otracker=search&otracker1=search&marketplace=FLIPKART&as-show=on&as=off)
<Response [200]>
```

In [3]:

```python
soup = bs(page.content,'html.parser')
```

In [4]:

```python
# items = soup.find_all('div',class_="_4rR01T")
# items=[i.get_text() for i in items]
# items = [i.split(" - (")[0] for i in items]
```

In [5]:

```python
details = soup.find_all("li",class_="rgWa7D")
details = [i.get_text() for i in details]
```

In [6]:

```python
lis,newlis=[],[]
for i in details:
    if ("Intel ")in i or ("AMD ") in i or ("M1") in i :
        if newlis:
            lis.append(newlis)
            newlis=[]
            newlis.append(i)
        else:
            newlis.append(i)
    else:
        newlis.append(i)
newlisnew=[]
for i in lis:
    newlisnew.append(" ".join(i))
```

In [7]:

```python
items = []
for i in newlisnew:
    if ' GB DDR4' in i:
         items.append(i.split(" GB DDR4")[0][:-2])
    elif ' GB DDR3' in i:
        items.append(i.split(" GB DDR3")[0][:-2] )
    elif ' GB LPDDR4X' in i:
        items.append(i.split(" GB LPDDR4X")[0][:-2] )
    else:
        items.append("")
company = [i.split()[0] for i in items]
```

In [8]:

```python
pages= soup.find_all('a',class_='ge-49M',href=True)
pages = [str(i).split(">")[0][31:] for i in pages ]
```

In [9]:
```
ratings = soup.find_all("div",class_='_3LWZlK')
ratings = [i.get_text() for i in ratings]
```

In [10]:
```
prices =  soup.find_all("div",class_="_30jeq3 _1_WHN1")
prices = [i.get_text().replace("₹","").replace(",","") for i in prices]
```

In [11]:
```
# details = soup.find_all("li",class_="rgWa7D")
# details = [i.get_text() for i in details]
```

In [12]:
```
# indepth_link = soup.find_all("a",class_ = '_1fQZEK')
```

In [13]:
```
# start= str(indepth_link[0]).index("href=")
# end = str(indepth_link[0]).index(" rel=")
# links = ['https://www.flipkart.com'+str(str(i)[start+6:end-1]) for i in indepth_link]
```

In [14]:
```
lis,newlis=[],[]
for i in details:
    if ("Intel ")in i or ("AMD ") in i or ("M1") in i :
        if newlis:
            lis.append(newlis)
            newlis=[]
            newlis.append(i)
        else:
            newlis.append(i)
    else:
        newlis.append(i)
newlisnew=[]
for i in lis:
    newlisnew.append(" ".join(i))
```

Collecting data and filtering everything

In [15]:

```python
processor_brand=[]
processor = []
ram = []
ram_type=[]
os =[]
screen_size=[]
ssd_present=[]
ssd_capacity=[]
hdd_capacity=[]
# count=0
for i in newlisnew:
    if "Intel " in i:
#           print(count)
        processor_brand.append("Intel")
        processor.append(i.split()[1]+" "+i.split()[2])
    elif 'AMD' in i:
#           print(count)
        processor_brand.append("AMD")
        processor.append(i.split()[1]+" "+i.split()[2])
    elif "M1" in i:
#           print(count)
        processor_brand.append("M1")
        processor.append(i.split()[1]+" "+i.split()[2])
    else:
        processor_brand.append("")
        processor.append("")
#       count+=1
    if ' GB DDR4 RAM' in i:
        index = i.index(' GB DDR4 RAM')
        ram.append(i[index-2:index])
        ram_type.append("DDR4")
    elif  ' GB DDR3' in i:
        index = i.index(' GB DDR3 RAM')
        ram.append(i[index-2:index])
        ram_type.append("DDR3")
    else:
        ram.append("")
    if ' Operating System' in i:
        a = i.split()
        index = a.index("Operating")
        if a[index-1]=="10":
                os.append("Windows 10")
        elif a[index-2]=='Mac':
            os.append("Mac Os")
        else:
            os.append(a[index-1])
    else:
        os.append("")
    if "inch" in i:
        a = i.split()
        if 'inches)' in a:
            index = a.index("inches)")
        else:
            index = a.index("inch)")
        screen_size.append(a[index-1].strip("(")+" inch")
    if (" GB SSD" in i) or (" TB SSD" in i):
        ssd_present.append("Yes")
        if " GB SSD" in i:
            start = i.index(" GB SSD")-3
            end=i.index(" GB SSD")
            ssd_capacity.append(i[start:end])
        elif' TB SSD' in i:
            index = i.index(" TB SSD")
            ssd_capacity.append(int(i[index-1])*1024)
    else:
        ssd_present.append("No")
        ssd_capacity.append("")
    if " HDD" in i:
        index = i.index(" HDD")
        hdd_capacity.append(i[index-4])
    else:
        hdd_capacity.append("")
```

Creating a dataframe in order to carry out further steps

In [16]:

```
data = pd.DataFrame({
'items':items[:len(processor)],                       # Name of Laptop
'company':company[:len(processor)],                   # Company of laptop  (or Laptop belongs to which company)                (Categorical)
'ratings out of 5':ratings[:len(processor)],          # What are the rating mentioned overall to the device  (continous)
'prices':prices[:len(processor)],                     # Price of the laptop                                  (continous)
'processor_brand':processor_brand,                    # what is the processor of the laptop this will be categorical as Intel or AMD (Categorical)
'processor':processor,                                # Type of processor of the laptop (Categorical)
'ram':ram ,                                           # how much ram does it have (Categorical)
'ram_type':ram_type,                                  # what is the type of ram (Categorical)
'operating_system' :os,                               # consist of which operating system by default (Categorical)
'screen_size':screen_size,                            # Screen-size of the laptop (Categorical)
'ssd_present':ssd_present,                            # is SSD present in the laptop (Categorical)
'ssd_capacity':ssd_capacity,                          # What is the capacity of the SSD (continous)
'hdd_capacity_in_TB':hdd_capacity,                    # What is the capacity of HDD (Categorical)
'Purchased': [np.random.choice(["No","Yes"]) for i in range(0,len(processor))]})   # this is generated randomly whether the customer will buy a laptop or r
data.to_csv("Dataset.csv",index=False)                                 # Storing data into csv file
```

In [17]:

```
data.shape
```

Out[17]:

```
(23, 14)
```

In [18]:

```
data =data.replace("",np.nan)
```

In [19]:

```
data.head()
```

Out[19]:

	items	company	ratings out of 5	prices	processor_brand	processor	ram	ram_type	operating_system	screen_size	ssd_present	ssd_capacity	hdd_capacity_in_TB
0	AMD Ryzen 5 Quad Core Processor (3rd Gen)	AMD	4.4	48990	AMD	Ryzen 5	8	DDR4	Windows 10	14 inch	Yes	256	1
1	Intel Core i3 Processor (10th Gen)	Intel	4	35990	Intel	Core i3	8	DDR4	Windows 10	15.6 inch	Yes	256	NaN
2	Intel Core i5 Processor (9th Gen)	Intel	4.5	52990	Intel	Core i5	8	DDR4	Windows 10	15.6 inch	Yes	512	NaN
3	Intel Core i3 Processor (10th Gen)	Intel	4.2	33490	Intel	Core i3	4	DDR4	Windows 10	15.6 inch	Yes	256	NaN
4	Intel Core i3 Processor (10th Gen)	Intel	4.2	35990	Intel	Core i3	8	DDR4	Windows 10	14 inch	Yes	256	NaN

In [20]:

```
data.isnull().sum()
```

Out[20]:

```
items                  0
company                0
ratings out of 5       0
prices                 0
processor_brand        0
processor              0
ram                    0
ram_type               0
operating_system       0
screen_size            0
ssd_present            0
ssd_capacity           4
hdd_capacity_in_TB    14
Purchased              0
dtype: int64
```

Filling null values

In [21]:

```
data = data.replace(np.nan,0)
data.head()
```

Out[21]:

	items	company	ratings out of 5	prices	processor_brand	processor	ram	ram_type	operating_system	screen_size	ssd_present	ssd_capacity	hdd_capacity_in_TB
0	AMD Ryzen 5 Quad Core Processor (3rd Gen)	AMD	4.4	48990	AMD	Ryzen 5	8	DDR4	Windows 10	14 inch	Yes	256	1
1	Intel Core i3 Processor (10th Gen)	Intel	4	35990	Intel	Core i3	8	DDR4	Windows 10	15.6 inch	Yes	256	0
2	Intel Core i5 Processor (9th Gen)	Intel	4.5	52990	Intel	Core i5	8	DDR4	Windows 10	15.6 inch	Yes	512	0
3	Intel Core i3 Processor (10th Gen)	Intel	4.2	33490	Intel	Core i3	4	DDR4	Windows 10	15.6 inch	Yes	256	0
4	Intel Core i3 Processor (10th Gen)	Intel	4.2	35990	Intel	Core i3	8	DDR4	Windows 10	14 inch	Yes	256	0

Using train test split and selecting features

In [22]:

```
from sklearn.model_selection import train_test_split
x = data.drop(["items",'Purchased'],axis=1)
y = data[["Purchased"]]
```

Transforming string to numeric

In [23]:

```
from sklearn.preprocessing import LabelEncoder
le = LabelEncoder()
x["company"] = le.fit_transform(x["company"])
x["processor_brand"] = le.fit_transform(x["processor_brand"])
x["processor"] = le.fit_transform(x["processor"])
x["ram_type"] = le.fit_transform(x["ram_type"])
x["operating_system"] = le.fit_transform(x["operating_system"])
x["screen_size"] = le.fit_transform(x["screen_size"])
x["ssd_present"] = le.fit_transform(x["ssd_present"])
y["Purchased"] = le.fit_transform(y["Purchased"])
```

In [24]:

```
xtrain,xtest,ytrain,ytest = train_test_split(x,y,shuffle=True,test_size=0.1)
```

Using Logistic Regression

In [25]:

```
from sklearn.linear_model import LogisticRegression
lr= LogisticRegression()
lr.fit(xtrain,ytrain)
predictions = lr.predict(xtest)
```

In [26]:

```
predictions
```

Out[26]:

```
array([0, 1, 1])
```

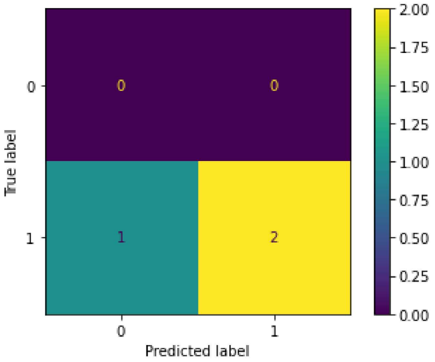
Using Confusion Matrix and accuracy score to find how much better the algorithm performs

In [27]:

```
from sklearn.metrics import accuracy_score,plot_confusion_matrix
plot_confusion_matrix(lr,xtest,ytest)
```

Out[27]:

```
<sklearn.metrics._plot.confusion_matrix.ConfusionMatrixDisplay at 0x2f92a0d4af0>
```



In [28]:

```
accuracy_score(predictions,ytest)
```

Out[28]:

```
0.6666666666666666
```