Uppgift_T2

March 4, 2024

[2]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from sklearn.cluster import AgglomerativeClustering
import scipy.cluster.hierarchy as shc
import seaborn as sns
```

[34]:
```
saledata = pd.read_csv("Wholesale customers data.csv")
newData = saledata.iloc[:,[4,6]].values

saledata.head()
```

[34]:

	Channel	Region	Fresh	Milk	Grocery	Frozen	Detergents_Paper	Delicassen
0	2	3	12669	9656	7561	214	2674	1338
1	2	3	7057	9810	9568	1762	3293	1776
2	2	3	6353	8808	7684	2405	3516	7844
3	1	3	13265	1196	4221	6404	507	1788
4	2	3	22615	5410	7198	3915	1777	5185

[35]:
```
saledata.describe()
```

[35]:

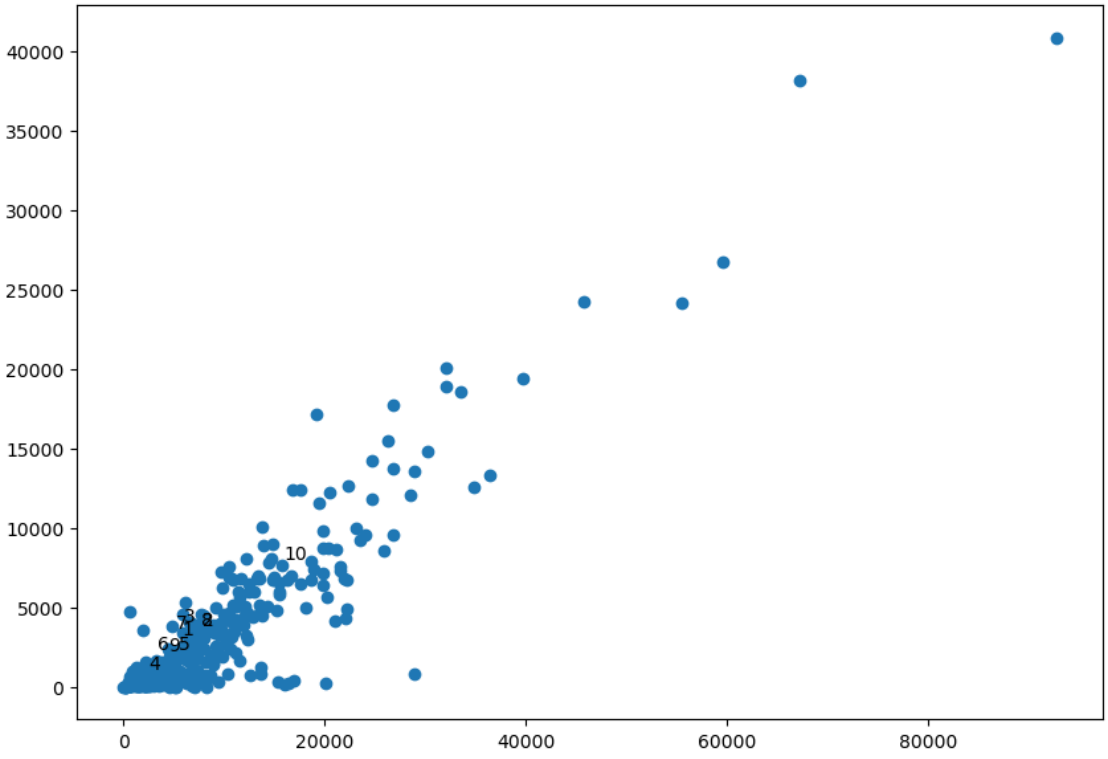
	Channel	Region	Fresh	Milk	Grocery	\
count	440.000000	440.000000	440.000000	440.000000	440.000000	
mean	1.322727	2.543182	12000.297727	5796.265909	7951.277273	
std	0.468052	0.774272	12647.328865	7380.377175	9503.162829	
min	1.000000	1.000000	3.000000	55.000000	3.000000	
25%	1.000000	2.000000	3127.750000	1533.000000	2153.000000	
50%	1.000000	3.000000	8504.000000	3627.000000	4755.500000	
75%	2.000000	3.000000	16933.750000	7190.250000	10655.750000	
max	2.000000	3.000000	112151.000000	73498.000000	92780.000000	

	Frozen	Detergents_Paper	Delicassen
count	440.000000	440.000000	440.000000
mean	3071.931818	2881.493182	1524.870455
std	4854.673333	4767.854448	2820.105937
min	25.000000	3.000000	3.000000
25%	742.250000	256.750000	408.250000
50%	1526.000000	816.500000	965.500000

```
75%      3554.250000        3922.000000    1820.250000
max     60869.000000       40827.000000   47943.000000
```

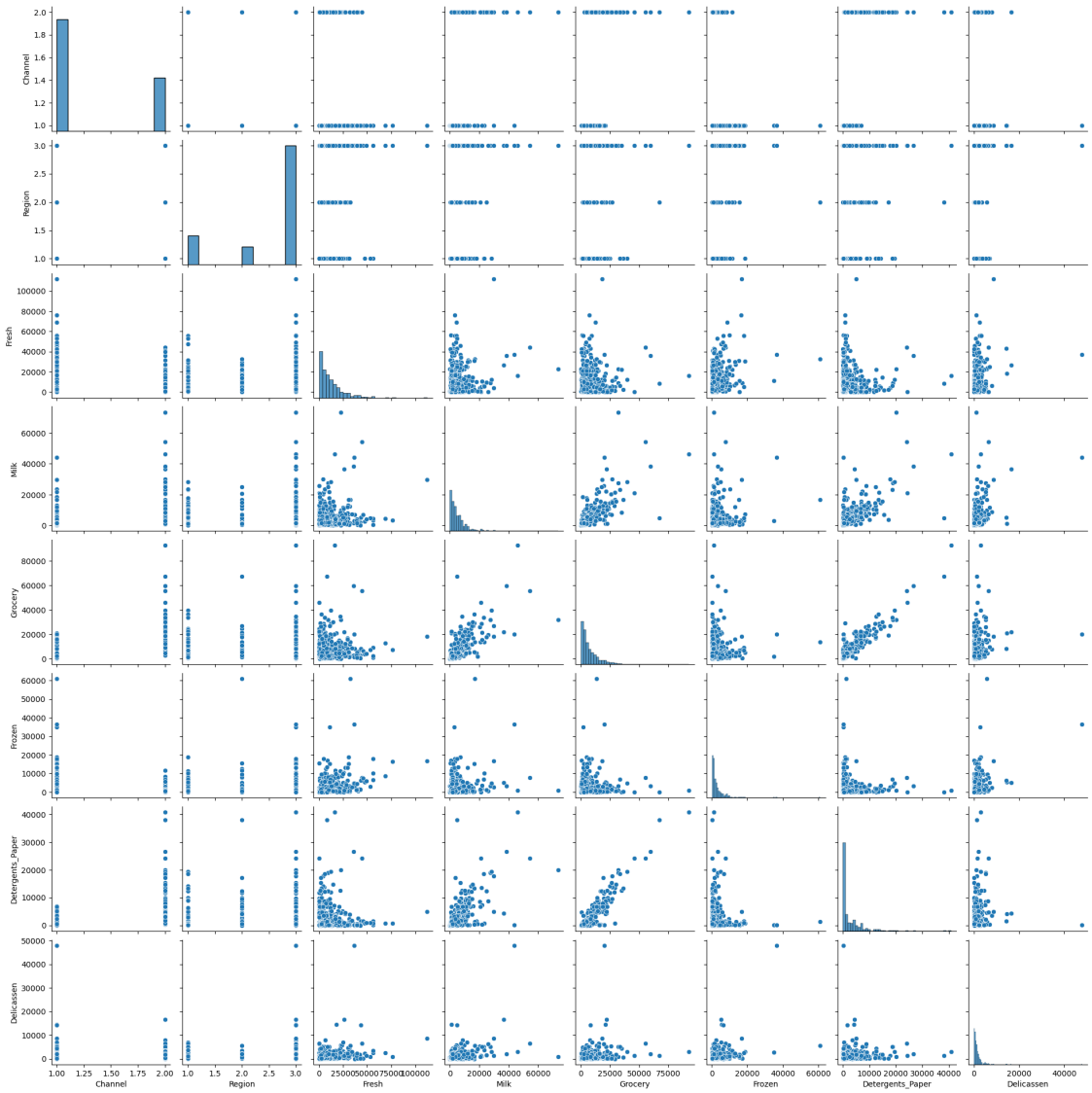
[36]:
```
#This shows our two choosen columns, we did it for a better view and for learning.
labels = range(1, 11)
plt.figure(figsize=(10, 7))
plt.scatter(newData[:,0],newData[:,1], label='True Position')

for label, x, y in zip(labels, newData[:, 0], newData[:, 1]):
    plt.annotate(
        label,
        xy=(x, y), xytext=(-3, 3),
        textcoords='offset points', ha='right', va='bottom')
plt.show()
```

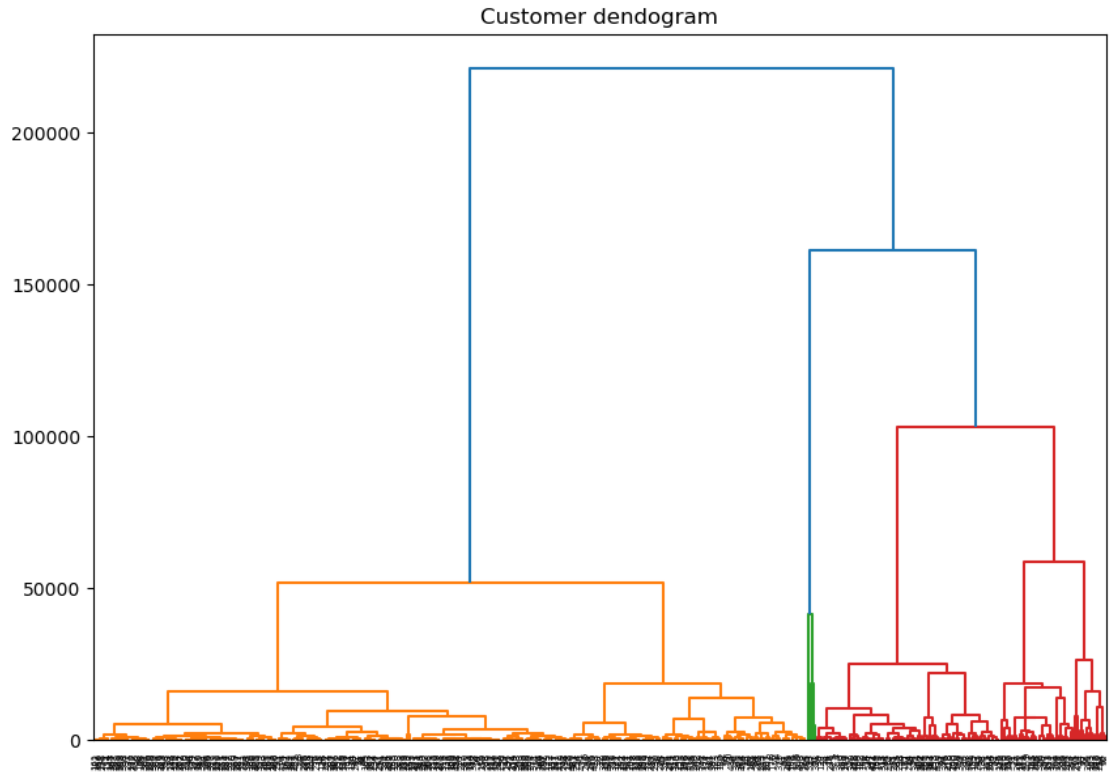


[5]:
```
#T2.1
#This exploratory analysis gives us a quick view of all the columns we have. we choose to use Detergents_Paper column and Grocery because we saw that this had a regression line and thats why it was most intressting for us.
sns.pairplot(data=saledata, vars=['Channel','Region','Fresh','Milk','Grocery','Frozen','Detergents_Paper','Delicassen'])
```

```
plt.show()
```



[11]:
```
#T2.3 Here we have a dendrogram to identify ideal number of clusters.
plt.figure(figsize=(10,7))
plt.title("Customer dendogram")
dend = shc.dendrogram(shc.linkage(newData, method='ward'))
```



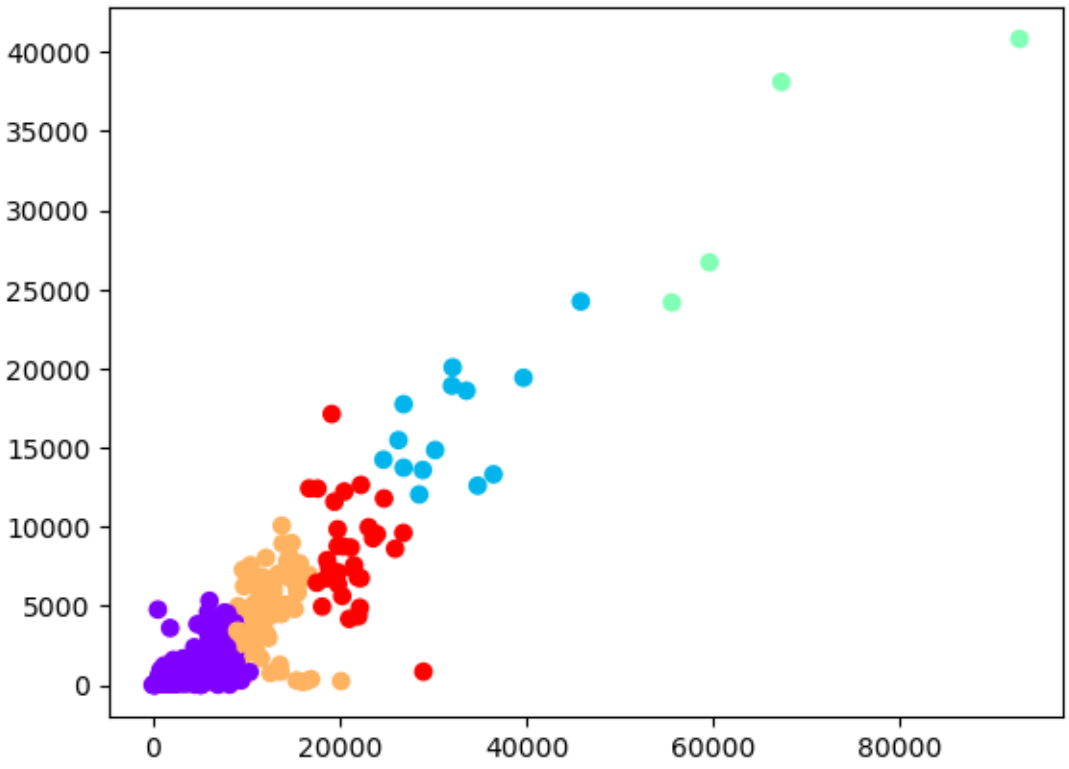
[27]:
```
#T2.4 Here with help of AgglomerativeClustering we tell this alogrithm how many␣
 ↪clusters we want plottered. n_clusters= the ammount of clusters.
cluster = AgglomerativeClustering(n_clusters=5, affinity='euclidean',␣
 ↪linkage='ward')
cluster.fit_predict(newData)
```

[27]:
```
array([0, 3, 0, 0, 0, 0, 0, 3, 0, 4, 3, 0, 3, 3, 3, 0, 3, 0, 3, 3, 0, 0,
       0, 4, 3, 0, 0, 0, 4, 0, 3, 0, 0, 0, 0, 3, 0, 3, 3, 0, 0, 0, 3, 4,
       3, 4, 4, 2, 3, 1, 0, 0, 0, 3, 0, 0, 1, 3, 0, 0, 0, 2, 0, 3, 0, 1,
       0, 3, 0, 0, 0, 4, 0, 0, 3, 0, 0, 1, 0, 0, 0, 3, 3, 0, 0, 2, 1, 0,
       0, 0, 0, 0, 1, 0, 3, 0, 0, 0, 0, 0, 3, 3, 0, 0, 0, 0, 3, 3, 0, 4,
       0, 4, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 3, 0, 0, 0, 0,
       0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 1, 0, 0, 0, 0, 0, 0, 0, 0,
       0, 4, 3, 0, 3, 3, 3, 0, 0, 1, 0, 4, 3, 0, 0, 0, 3, 4, 0, 4, 0, 3,
       0, 0, 0, 0, 0, 4, 3, 3, 0, 0, 0, 3, 3, 3, 0, 0, 0, 4, 0, 0, 0, 3,
       0, 0, 4, 1, 0, 0, 0, 4, 0, 0, 0, 4, 0, 1, 0, 0, 3, 3, 1, 0, 3, 0,
       0, 3, 0, 0, 0, 0, 3, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
       0, 0, 3, 3, 0, 0, 0, 0, 0, 1, 0, 3, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
       3, 3, 4, 0, 4, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 3, 0, 0, 0, 0, 3, 0,
       0, 0, 0, 0, 0, 0, 0, 3, 0, 0, 0, 0, 3, 0, 0, 4, 3, 3, 4, 0, 4, 0,
       0, 3, 0, 0, 4, 0, 0, 3, 0, 0, 0, 4, 0, 0, 0, 3, 0, 3, 0, 0, 0, 0,
       0, 4, 0, 2, 0, 3, 0, 0, 0, 0, 3, 3, 0, 1, 0, 0, 3, 3, 0, 4, 0, 4,
```

```
 0, 4, 0, 0, 0, 4, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0,
 0, 0, 3, 0, 0, 0, 0, 0, 0, 0, 3, 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, 3, 0, 0, 0, 3, 3,
 4, 0, 3, 3, 0, 0, 3, 0, 3, 0, 0, 0, 3, 0, 0, 0, 0, 3, 0, 1, 0, 0],
dtype=int64)
```

[28]:
```
#T2.4 Here we plot out the data on a scatter plot. We can see that if someone␣
 ↪spends more on Grocery then they are likley to spend more on Detergents_Paper
plt.scatter(newData[:,0],newData[:,1], c=cluster.labels_, cmap='rainbow')
```

[28]: <matplotlib.collections.PathCollection at 0x144a91cbdc0>



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