

```
In [1]: from google.colab import files  
files.upload()
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Pilih File Tidak ada file yang dipilih Upload widget is only available when the cell has been executed in the current browser session. Please rerun this cell to enable.
Saving Wholesale customers data.csv to Wholesale customers data.csv

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830,948,1218\r\n1,3,17565,3686,4657,1059,1803,668\r\n1,3,16980,2884,12232,874,321
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3,10290,1981,2232,1038,168,2125\r\n1,3,2787,1698,2510,65,477,52\r\n1,3,
```

```
In [2]: import pandas as pd
import numpy as np
from sklearn.preprocessing import StandardScaler
from sklearn.cluster import KMeans
import matplotlib.pyplot as plt
import seaborn as sns
```

```
In [4]: df = pd.read_csv("Wholesale customers data.csv")
```

```
In [5]: print("Shape Dataset:", df.shape)
display(df.head())
```

Shape Dataset: (440, 8)

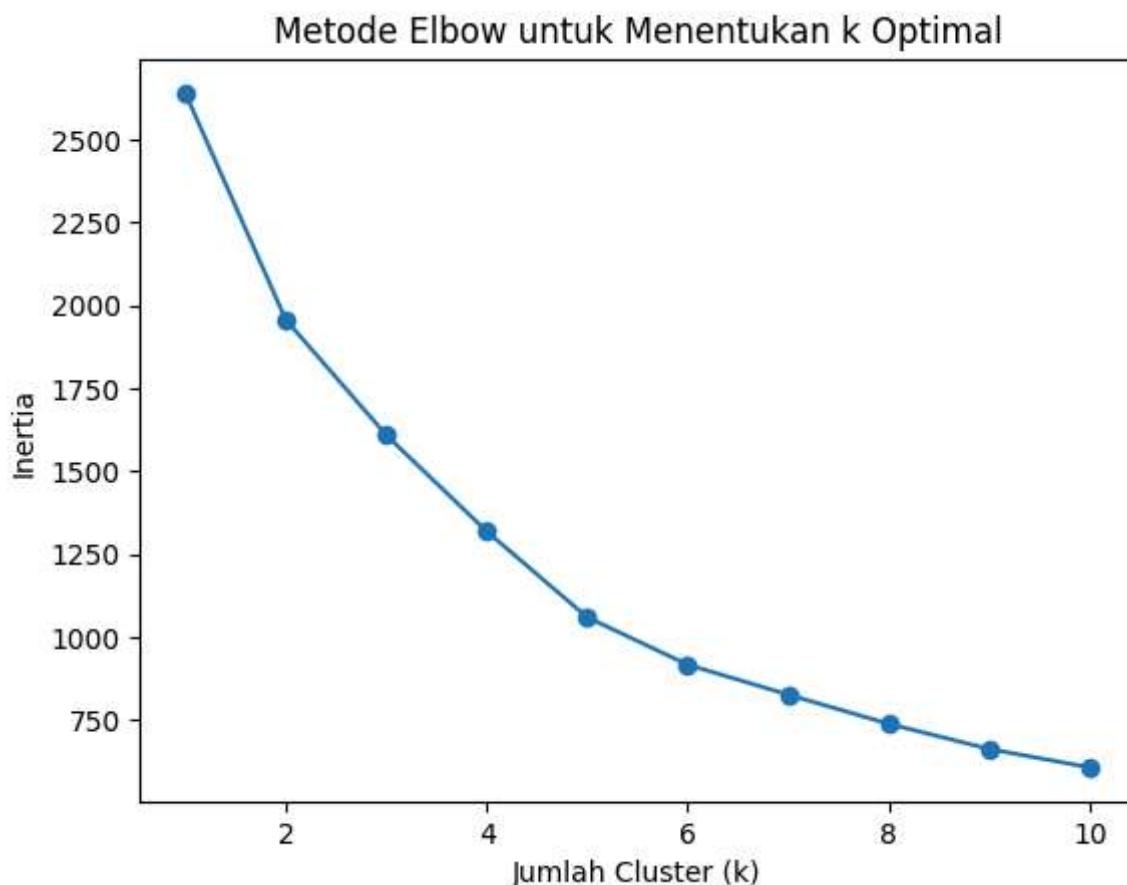
	Channel	Region	Fresh	Milk	Grocery	Frozen	Detergents_Paper	Delicassen
0	2	3	12669	9656	7561	214	2674	1338
1	2	3	7057	9810	9568	1762	3293	1776
2	2	3	6353	8808	7684	2405	3516	7844
3	1	3	13265	1196	4221	6404	507	1788
4	2	3	22615	5410	7198	3915	1777	5185

```
In [7]: if 'Channel' in df.columns:
    df = df.drop(['Channel', 'Region'], axis=1)
```

```
scaler = StandardScaler()
X_scaled = scaler.fit_transform(df)
```

```
In [8]: inertia = []
K_range = range(1, 11)
for k in K_range:
    km = KMeans(n_clusters=k, random_state=42, n_init=10)
    km.fit(X_scaled)
    inertia.append(km.inertia_)

plt.plot(K_range, inertia, marker='o')
plt.xlabel('Jumlah Cluster (k)')
plt.ylabel('Inertia')
plt.title('Metode Elbow untuk Menentukan k Optimal')
plt.show()
```



```
In [9]: k_optimal = 3
model = KMeans(n_clusters=k_optimal, random_state=42, n_init=10)
df['Cluster'] = model.fit_predict(X_scaled)
```

```
In [10]: print("\nRata-rata pengeluaran tiap cluster:\n")
print(df.groupby('Cluster').mean())
```

Rata-rata pengeluaran tiap cluster:

Cluster	Fresh	Milk	Grocery	Frozen	\
0	10440.933333	19386.422222	28656.088889	2190.244444	
1	12062.913486	4115.099237	5534.966921	2940.676845	
2	34782.000000	30367.000000	16898.000000	48701.500000	
Cluster	Detergents_Paper	Delicassen			
0	13327.800000	2374.200000			
1	1696.170483	1299.114504			
2	755.500000	26776.000000			

```
In [11]: plt.figure(figsize=(8,6))
sns.scatterplot(x=df['Grocery'], y=df['Milk'], hue=df['Cluster'], palette='viridis')
plt.title("Visualisasi Cluster Pelanggan")
plt.xlabel("Grocery")
plt.ylabel("Milk")
plt.show()
```

