*Creado por:*

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# K-Means Clustering

In [1]:
```
from sklearn.datasets import make_blobs
import pandas as pd
```

In [2]:
```
dataset, clases = make_blobs(n_samples=200, n_features=2, centers=4, cluster_std=0.5, random_state=0)

df = pd.DataFrame(dataset, columns=["var1", "var2"])
df.head()
```

Out[2]:

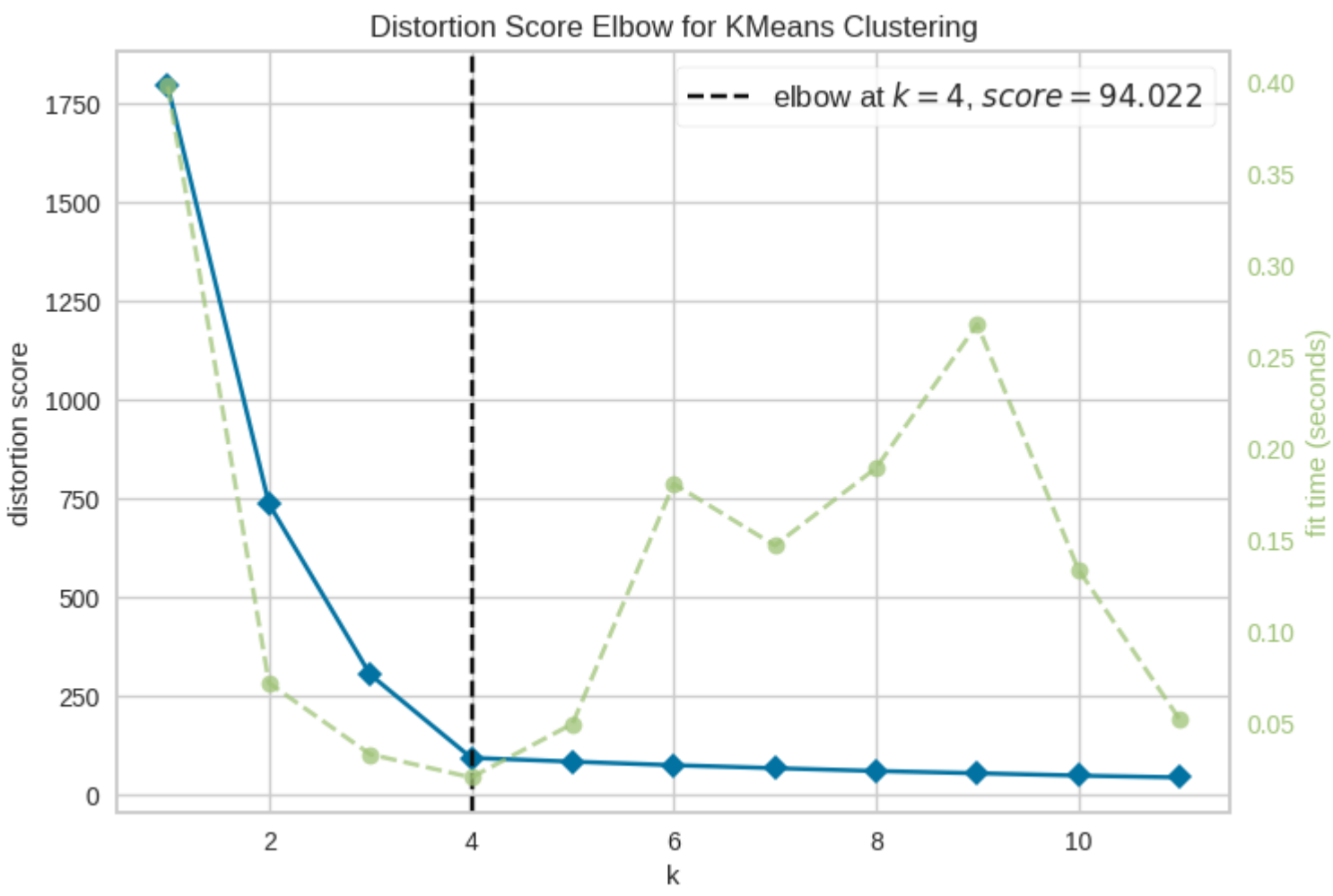
| | var1 | var2 |
|---|---|---|
| **0** | 2.204387 | 1.560857 |
| **1** | -1.133740 | 2.684673 |
| **2** | 1.064983 | 4.102897 |
| **3** | -2.376038 | 7.324207 |
| **4** | 1.682890 | 0.484444 |

In [3]:
```
# pip install yellowbrick
```

In [4]:
```
from yellowbrick.cluster import KElbowVisualizer
from sklearn.cluster import KMeans
```

In [5]:
```
model = KMeans()

visualizer = KElbowVisualizer(model, k=(1, 12)).fit(df)
visualizer.show()
```




Out[5]: <AxesSubplot: title={'center': 'Distortion Score Elbow for KMeans Clustering'}, xlabel='k', ylabel='distortion score'>

Resultado son 4 clusters/grupos/centroides

In [6]:
```
kmeans = KMeans(n_clusters=4, init="k-means++", random_state=0).fit(df)
```

In [7]:
```
# Obtenemos los valores de la predicción (kmeans.predict(df)):
kmeans.labels_
```

Out[7]:
```
array([1, 0, 3, 2, 1, 3, 0, 3, 3, 3, 3, 1, 0, 0, 1, 3, 2, 2, 2, 1, 2, 0,
       1, 0, 1, 1, 2, 1, 1, 3, 2, 3, 0, 1, 0, 3, 0, 3, 3, 2, 2, 2, 2, 3,
       1, 0, 3, 2, 2, 3, 2, 0, 0, 2, 3, 2, 0, 1, 3, 1, 2, 3, 1, 3, 2, 3,
       1, 2, 0, 0, 1, 1, 3, 3, 0, 2, 0, 0, 1, 1, 2, 3, 1, 0, 0, 3, 3, 1,
       0, 0, 2, 2, 2, 3, 3, 1, 0, 2, 3, 3, 2, 1, 1, 2, 2, 0, 3, 1, 1, 3,
       2, 0, 0, 1, 1, 3, 0, 0, 2, 3, 2, 0, 3, 1, 3, 0, 3, 0, 1, 3, 0, 1,
       0, 2, 2, 0, 2, 2, 1, 2, 1, 0, 1, 1, 0, 1, 3, 1, 0, 2, 2, 2, 3, 0,
       1, 3, 2, 0, 2, 1, 2, 1, 1, 0, 0, 2, 3, 1, 1, 0, 1, 3, 0, 2, 2, 2,
       3, 3, 0, 3, 0, 1, 3, 1, 3, 0, 0, 2, 3, 2, 1, 1, 3, 2, 0, 0, 0, 3,
       2, 1], dtype=int32)
```

In [8]:
```
kmeans.inertia_
```

Out[8]:
```
94.02242630751755
```

In [9]:
```
kmeans.n_iter_
```

Out[9]:
```
2
```

In [10]:
```
kmeans.cluster_centers_
```

Out[10]:
```
array([[-1.60782913,  2.9162828 ],
       [ 2.06911036,  0.96146833],
       [-1.33173192,  7.7400479 ],
       [ 0.91932803,  4.34824615]])
```

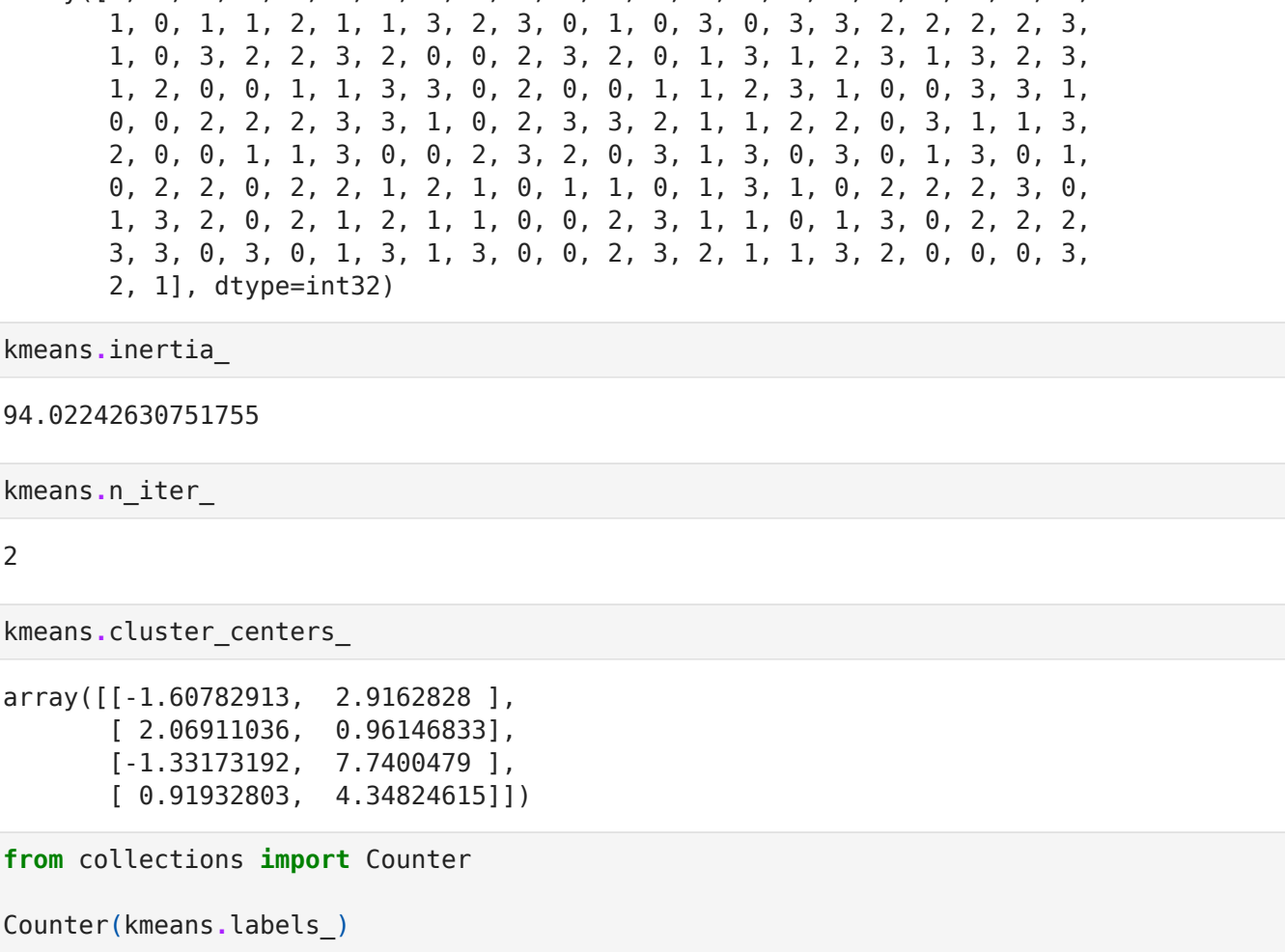
In [11]:
```
from collections import Counter

Counter(kmeans.labels_)
```

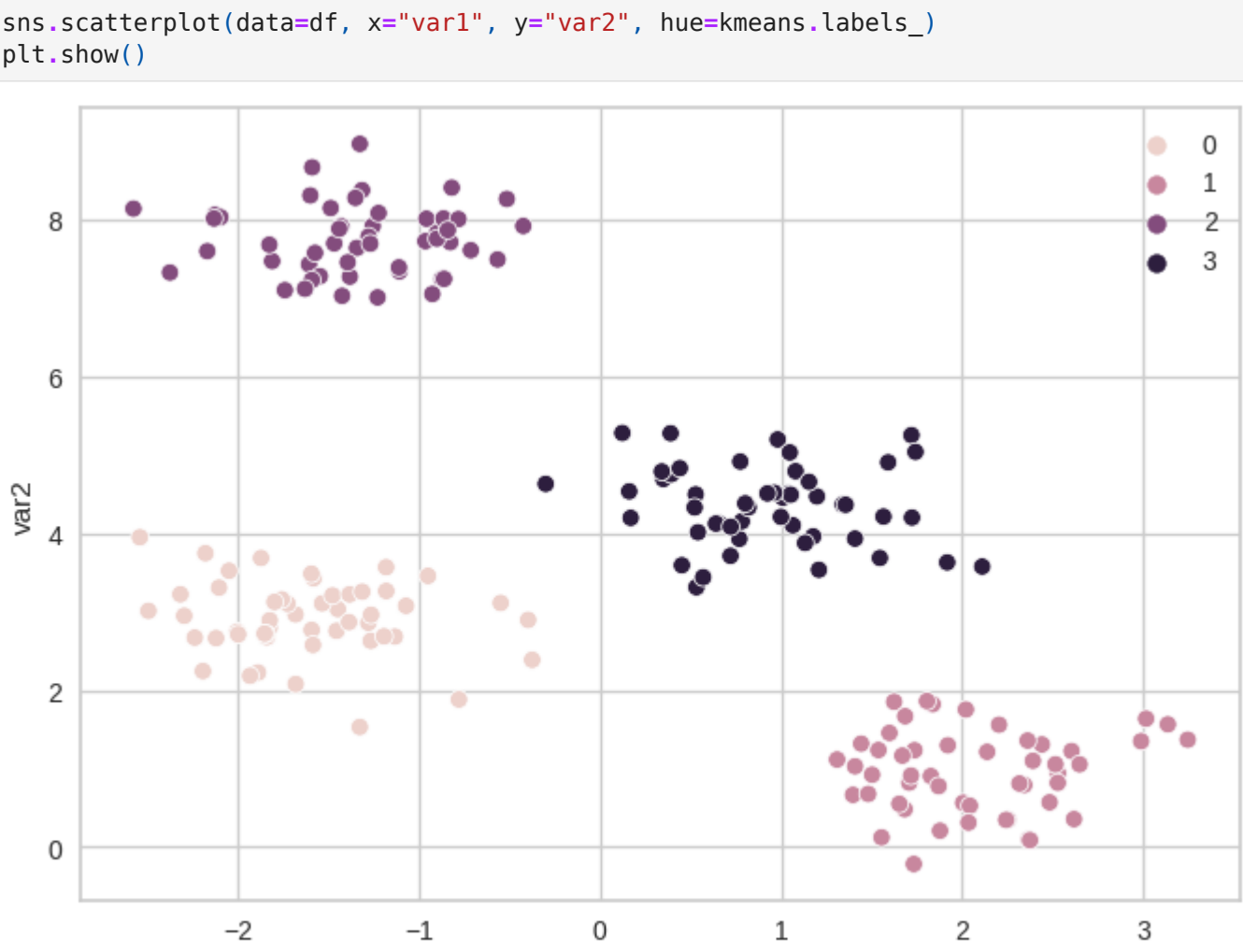
Out[11]:
```
Counter({1: 50, 0: 50, 3: 50, 2: 50})
```

In [16]:
```
import seaborn as sns
import matplotlib.pyplot as plt

sns.scatterplot(data=df, x="var1", y="var2", hue=kmeans.labels_)
plt.show()
```




In [17]:
```
sns.scatterplot(data=df, x="var1", y="var2", hue=kmeans.labels_)
plt.scatter(kmeans.cluster_centers_[:,0], kmeans.cluster_centers_[:,1],
            marker="X", c="r", s=80, label="centroids")
plt.legend()
plt.show()
```

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