Elbow Method na prática

Ciclo	Ciclo 05: Aprendizado não-supervisionado
# Aula	38
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Objetivo da Aula:

- [ ] Elbow Method na prática
- [ ] Próxima aula

Conteúdo:

▼ 1. Elbow method na prática

▼ 1.1 Código

```
# Biblioteca
import numpy                    as np
from sklearn    import datasets as ds
from sklearn    import cluster  as ct
from matplotlib import pyplot   as plt
from sklearn    import metrics  as mt

# Dados sintéticos
random_state = 0

X, y = ds.make_blobs( n_samples=100,
                      n_features=2,
                      centers=3,
                      cluster_std= 0.3,
                      random_state=random_state
                    )

# Plot dos clusters
plt.scatter( X[:,0], X[:,1] )

# Elbo Method ( Método do Cotovelo )
clusters = np.arange( 2, 11, 1 )
ss_list = []
```

```
for c in clusters:
    # define
    kmeans = ct.KMeans( n_clusters=c, init='random', n_init=10, random_state=random_state )

    # fit
    labels = kmeans.fit_predict( X )

    # performance
    ss_avg = mt.silhouette_score( X, labels )

    # add silhouette to list
    ss_list.append( ss_avg )

plt.plot( clusters, ss_list, marker='o' )
plt.xlabel( 'Number of Clusters' );
plt.ylabel( 'Avergage Silhouette Score' );

# Agruapmentos
c = ss_list.index( max( ss_list ) ) + 2

print( 'Best K: {}'.format( c ) )

# define
kmeans = ct.KMeans( n_clusters=c, init='random', n_init=10, random_state=random_state )

# fit
labels = kmeans.fit_predict( X )

# performance
ss_avg = mt.silhouette_score( X, labels )

# draw figure
plt.scatter( X[:, 0], X[:, 1], c=labels )

for i in range( len( kmeans.cluster_centers_ ) ):
    plt.scatter( kmeans.cluster_centers_[i, 0],
                 kmeans.cluster_centers_[i, 1],
                 marker='*',
                 c='orange',
                 s=160 )
```

▼ 2. Próxima aula

K-Means - Exemplo de Uso