clustering_by_silhouette - implementation

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Introduction

import & define essential modules + variables

In [10]:
```
from clustering_by_silhouette import silhouette_clustering

import pandas as pd
from create_3d_gif import pd_to_gif
from sklearn.decomposition import PCA

MPL_Colors=['blue', 'green','red', 'gold', 'purple', 'lime', 'tomato', 'navy', 'teal', 'maroon',
            'olive', 'orange', 'sienna', 'indigo','yellow', 'darkgreen', 'darkblue', 'chocolate',
            'black']

def pca(df,dim):
    return PCA(n_components=dim).fit(df.T).components_
```

import data

In [11]:
```
df1 = pd.read_excel('data_1.xlsx')
df2 = pd.read_excel('data_2.xlsx')
fields1 = ['a','b','c','d','e','f','g','h','i','j','k','l','m','n']
fields2 = ['f' + str(i) for i in range(1, 15)] # fields names
```

Analysis

run silhouette_clustering for hdbscan & kmeans

In [19]:
```
m_label = silhouette_clustering(df1[fields1], typ='meanshift', org=9, lim=13) # MeanShift
h_label = silhouette_clustering(df2[fields2], typ='hdbscan')                  # HDBSCAN
k_label = silhouette_clustering(df2[fields2], org=3 ,lim=10)                  # Kmeans (default)
```

```
cluster kind: meanshift,   input value = 9,   silhouette = 31.2%
cluster kind: meanshift,   input value = 10,   silhouette = 37.7%
cluster kind: meanshift,   input value = 11,   silhouette = 28.0%
cluster kind: meanshift,   input value = 12,   silhouette = 33.9%
cluster kind: meanshift,   input value = 13,   silhouette = 46.2%
cluster kind: hdbscan,   input value = 2,   silhouette = 8.3%
cluster kind: hdbscan,   input value = 3,   silhouette = -34.6%
cluster kind: hdbscan,   input value = 4,   silhouette = 18.0%
cluster kind: hdbscan,   input value = 5,   silhouette = -14.2%
cluster kind: hdbscan,   input value = 6,   silhouette = 4.5%
cluster kind: hdbscan,   input value = 7,   silhouette = 5.7%
cluster kind: hdbscan,   input value = 8,   silhouette = 4.7%
cluster kind: hdbscan,   input value = 9,   silhouette = 8.1%
cluster kind: hdbscan,   input value = 10,   silhouette = 35.4%
cluster kind: hdbscan,   input value = 11,   silhouette = 36.6%
cluster kind: hdbscan,   input value = 12,   silhouette = 35.8%
cluster kind: hdbscan,   input value = 13,   silhouette = 34.8%
cluster kind: hdbscan,   input value = 14,   silhouette = 35.0%
cluster kind: hdbscan,   input value = 15,   silhouette = 34.4%
cluster kind: hdbscan,   input value = 16,   silhouette = 35.9%
cluster kind: hdbscan,   input value = 17,   silhouette = 34.4%
cluster kind: hdbscan,   input value = 18,   silhouette = 33.8%
cluster kind: hdbscan,   input value = 19,   silhouette = 53.6%
cluster kind: hdbscan,   input value = 20,   silhouette = 53.0%
cluster kind: kmeans,   input value = 3,   silhouette = 37.2%
cluster kind: kmeans,   input value = 4,   silhouette = 44.6%
cluster kind: kmeans,   input value = 5,   silhouette = 46.3%
cluster kind: kmeans,   input value = 6,   silhouette = 46.2%
cluster kind: kmeans,   input value = 7,   silhouette = 35.9%
cluster kind: kmeans,   input value = 8,   silhouette = 35.7%
cluster kind: kmeans,   input value = 9,   silhouette = 36.3%
cluster kind: kmeans,   input value = 10,   silhouette = 35.8%
```

In [20]:
```
print(f'meanshift number of clusters: {len(set(m_label))}\nkmeans    number of clusters: {len(set(k_label))}\nhdbscan   number of clusters: {len(set(h_label))-1}')
```

```
meanshift number of clusters: 5
kmeans    number of clusters: 5
hdbscan   number of clusters: 4
```

Plot Results

Arrange Data

In [21]:
```
df1['x'], df1['y'], df1['z'] = pca(df1[fields1],3)
df2['x'], df2['y'], df2['z'] = pca(df2[fields2],3)

df1['m_color'] = [MPL_Colors[i] for i in m_label]
df2['h_color'] = [MPL_Colors[i] for i in h_label]
df2['k_color'] = [MPL_Colors[i] for i in k_label]
```

Plot Data

In [23]:
```
pd_to_gif(df1 ,['x','y','z'] ,'meanshift_plot',clrs='m_color')
pd_to_gif(df2 ,['x','y','z'] ,'hdbscan_plot',clrs='h_color')
pd_to_gif(df2 ,['x','y','z'] ,'kmeans_plot' ,clrs='k_color')
```

```
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the gif ' kmeans_plot ' created
```

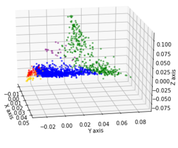

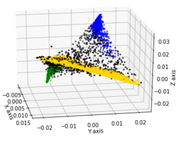

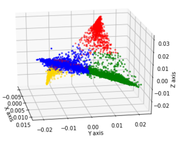

GIF version for this graphs available in here