notebook

April 17, 2019

```
In [23]: import numpy as np
         import pandas as pd
         from sklearn.cluster import KMeans
         from sklearn.preprocessing import StandardScaler
         from sklearn.metrics import pairwise_distances_argmin


         import matplotlib.pyplot as plt
         %matplotlib inline
```

```
In [24]: # data cleaning
         df = pd.read_csv('./food_coded.csv', na_values="nan")

         drop_cols = ['comfort_food', 'comfort_food_reasons',
         'diet_current', 'eating_changes', 'father_profession',
         'fav_cuisine', 'food_childhood','healthy_meal', 'ideal_diet',
         'meals_dinner_friend','mother_profession','type_sports','weight']

         df.drop(drop_cols, inplace=True, axis=1)
         print(df.head())
         print(df.get_dtype_counts())

         print(df.isnull().sum().sum())

         ## fill na values
         for column in df:
             median = df[column].median()
             df[column].fillna(median, inplace=True)
         ## end data cleaning
         print(df.isnull().sum().sum())
```

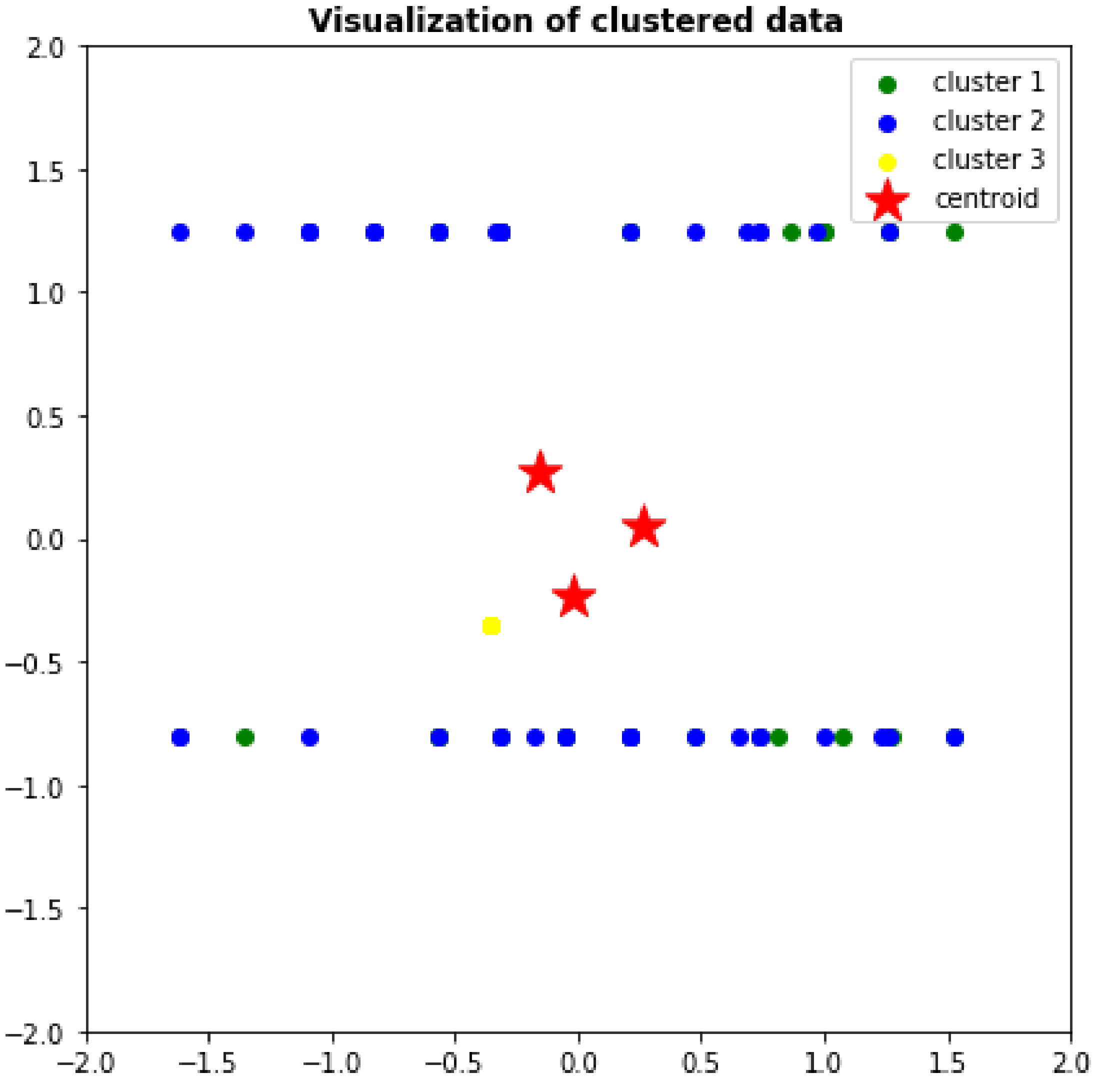
```
     GPA  Gender  breakfast  calories_chicken  calories_day  calories_scone  \
0  2.400       2          1               430           NaN           315.0
1  3.654       1          1               610           3.0           420.0
2  3.300       1          1               720           4.0           420.0
3  3.200       1          1               430           3.0           420.0
4  3.500       1          1               720           2.0           420.0
```

```
   coffee  comfort_food_reasons_coded  cook  comfort_food_reasons_coded.1  \
0       1                         9.0   2.0                             9
1       2                         1.0   3.0                             1
2       2                         1.0   1.0                             1
3       2                         2.0   2.0                             2
4       2                         1.0   1.0                             1

   ...  persian_food  self_perception_weight  soup  sports  thai_food  \
0  ...           5.0                     3.0   1.0     1.0          1
1  ...           4.0                     3.0   1.0     1.0          2
2  ...           5.0                     6.0   1.0     2.0          5
3  ...           5.0                     5.0   1.0     2.0          5
4  ...           2.0                     4.0   1.0     1.0          4

   tortilla_calories  turkey_calories  veggies_day  vitamins  waffle_calories
0             1165.0              345            5         1             1315
1              725.0              690            4         2              900
2             1165.0              500            5         1              900
3              725.0              690            3         1             1315
4              940.0              500            4         2              760

[5 rows x 48 columns]
float64    21
int64      27
dtype: int64
101
0
```

```
In [78]: X_std = StandardScaler().fit_transform(df)

         # Run local implementation of kmeans
         km = KMeans(n_clusters=3, max_iter=1000)
         km.fit(X_std)
         centroids = km.cluster_centers_
         # kmeans = KMeans(n_clusters=4, random_state=0).fit(df)
         print km.labels_
```

```
[2 2 0 0 1 2 0 1 2 2 1 0 2 0 1 1 2 2 1 1 1 2 2 1 2 1 1 1 1 2 1 0 2 2 2 2 1
 0 1 1 2 0 2 2 0 2 2 1 2 2 1 0 0 1 0 1 0 1 0 0 1 1 1 0 2 2 2 2 2 1 0 0 1 1
 2 2 1 1 2 0 2 2 2 2 0 2 2 1 0 0 1 1 1 0 0 2 2 1 0 1 2 0 1 2 2 1 2 2 2 1 2
 1 0 2 2 1 2 2 2 0 0 2 2 1 2]
```

```
In [79]: fig, ax = plt.subplots(figsize=(7, 7))
         plt.scatter(X_std[km.labels_ == 0, 0], X_std[km.labels_ == 0, 1],
                     c='green', label='cluster 1')
         plt.scatter(X_std[km.labels_ == 1, 0], X_std[km.labels_ == 1, 1],
                     c='blue', label='cluster 2')
         plt.scatter(X_std[km.labels_ == 1, 2], X_std[km.labels_ == 1, 2],
                     c='yellow', label='cluster 3')

         plt.scatter(centroids[:, 0], centroids[:, 1], marker='*', s=300,
                     c='r', label='centroid')

         plt.legend()
         plt.xlim([-2, 2])
         plt.ylim([-2, 2])
         plt.title('Visualization of clustered data', fontweight='bold')
         ax.set_aspect('equal');
         # centers = kmeans.cluster_centers_
         #plt.scatter(centers[:, 0], centers[:, 1], c='black', s=200, alpha=0.5);
```



```
In [ ]:
```