

healthy fast foods analysis and Classification

```
In [1]: import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
import seaborn as sns
from sklearn.cluster import KMeans
from sklearn.model_selection import train_test_split
import matplotlib.pyplot as plt
```

Data collection

```
In [2]: #loading the dataset in pandas
data = pd.read_csv('fastfood.csv')
```

```
In [3]: #check first five rows of the dataset
data.head()
```

Out [3]:

	restaurant	item	calories	cal_fat	total_fat	sat_fat	trans_fat	cholesterol	sodium
0	Mcdonalds	Artisan Grilled Chicken Sandwich	380	60	7	2.0	0.0	95	111
1	Mcdonalds	Single Bacon Smokehouse Burger	840	410	45	17.0	1.5	130	158
2	Mcdonalds	Double Bacon Smokehouse Burger	1130	600	67	27.0	3.0	220	192
3	Mcdonalds	Grilled Bacon Smokehouse Chicken Sandwich	750	280	31	10.0	0.5	155	194
4	Mcdonalds	Crispy Bacon Smokehouse Chicken Sandwich	920	410	45	12.0	0.5	120	198

```
In [4]: #check last five rows of the dataset
data.tail()
```

Out[4]:

	restaurant	item	calories	cal_fat	total_fat	sat_fat	trans_fat	cholesterol	sodi
510	Taco Bell	Spicy Triple Double Crunchwrap	780	340	38	10.0	0.5	50	11
511	Taco Bell	Express Taco Salad w/ Chips	580	260	29	9.0	1.0	60	11
512	Taco Bell	Fiesta Taco Salad-Beef	780	380	42	10.0	1.0	60	11
513	Taco Bell	Fiesta Taco Salad-Chicken	720	320	35	7.0	0.0	70	11
514	Taco Bell	Fiesta Taco Salad-Steak	720	320	36	8.0	1.0	55	11

```
In [5]: #check shape of the dataset
data.shape
```

Out[5]: (515, 17)

```
In [6]: #check columns
data.columns
```

Out[6]: Index(['restaurant', 'item', 'calories', 'cal_fat', 'total_fat', 'sat_fat', 'trans_fat', 'cholesterol', 'sodium', 'total_carb', 'fiber', 'sugar', 'protein', 'vit_a', 'vit_c', 'calcium', 'salad'], dtype='object')

In [7]: *#check basic infomation*
data.info()

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 515 entries, 0 to 514
Data columns (total 17 columns):
#   Column          Non-Null Count  Dtype
---  -
0   restaurant      515 non-null    object
1   item             515 non-null    object
2   calories         515 non-null    int64
3   cal_fat          515 non-null    int64
4   total_fat        515 non-null    int64
5   sat_fat          515 non-null    float64
6   trans_fat        515 non-null    float64
7   cholesterol      515 non-null    int64
8   sodium           515 non-null    int64
9   total_carb       515 non-null    int64
10  fiber            503 non-null    float64
11  sugar            515 non-null    int64
12  protein          514 non-null    float64
13  vit_a            301 non-null    float64
14  vit_c            305 non-null    float64
15  calcium          305 non-null    float64
16  salad            515 non-null    object
dtypes: float64(7), int64(7), object(3)
memory usage: 68.5+ KB
```

In [8]: *#check mathamtic realtionship*
data.describe()

Out [8]:

	calories	cal_fat	total_fat	sat_fat	trans_fat	cholesterol	sod
count	515.000000	515.000000	515.000000	515.000000	515.000000	515.000000	515.000
mean	530.912621	238.813592	26.590291	8.153398	0.465049	72.456311	1246.737
std	282.436147	166.407510	18.411876	6.418811	0.839644	63.160406	689.954
min	20.000000	0.000000	0.000000	0.000000	0.000000	0.000000	15.000
25%	330.000000	120.000000	14.000000	4.000000	0.000000	35.000000	800.000
50%	490.000000	210.000000	23.000000	7.000000	0.000000	60.000000	1110.000
75%	690.000000	310.000000	35.000000	11.000000	1.000000	95.000000	1550.000
max	2430.000000	1270.000000	141.000000	47.000000	8.000000	805.000000	6080.000

In [9]: `#check corr realtion of the dataset`
`data.corr()`

/var/folders/qn/zzvcdwg51dzdyg67zv6vp9lw0000gn/T/ipykernel_1054/3539882025.py:2: FutureWarning: The default value of numeric_only in DataFrame.corr is deprecated. In a future version, it will default to False. Select only valid columns or specify the value of numeric_only to silence this warning.

`data.corr()`

Out [9]:

	calories	cal_fat	total_fat	sat_fat	trans_fat	cholesterol	sodium	total_carb
calories	1.000000	0.901661	0.900494	0.739664	0.530354	0.762460	0.817855	0.712701
cal_fat	0.901661	1.000000	0.995311	0.852150	0.648422	0.803997	0.670458	0.032643
total_fat	0.900494	0.995311	1.000000	0.846716	0.648821	0.801352	0.669182	0.036386
sat_fat	0.739664	0.852150	0.846716	1.000000	0.812126	0.764030	0.487456	-0.041220
trans_fat	0.530354	0.648422	0.648821	0.812126	1.000000	0.680858	0.261466	-0.121890
cholesterol	0.762460	0.803997	0.801352	0.764030	0.680858	1.000000	0.596164	-0.061503
sodium	0.817855	0.670458	0.669182	0.487456	0.261466	0.596164	1.000000	0.301023
total_carb	0.712701	0.419373	0.422543	0.276534	0.100284	0.238728	0.671976	1.000000
fiber	0.287031	0.032643	0.036386	-0.041220	-0.121890	-0.061503	0.301023	-0.057142
sugar	0.437711	0.255485	0.259370	0.234218	0.112651	0.298259	0.422993	-0.134031
protein	0.831957	0.720379	0.719518	0.603645	0.478960	0.880960	0.766942	0.062994
vit_a	-0.153963	-0.121748	-0.122280	-0.054292	-0.086352	-0.057142	-0.134031	0.162438
vit_c	0.007387	-0.115456	-0.112868	-0.088834	-0.141754	-0.015610	0.062994	0.284882
calcium	0.351207	0.166801	0.168817	0.304948	0.114094	0.162438	0.284882	

```
In [10]: #check missing value of the dataset  
data.isnull().sum()
```

```
Out[10]: restaurant      0  
item                    0  
calories                0  
cal_fat                 0  
total_fat               0  
sat_fat                 0  
trans_fat               0  
cholesterol             0  
sodium                  0  
total_carb              0  
fiber                   12  
sugar                   0  
protein                 1  
vit_a                   214  
vit_c                   210  
calcium                 210  
salad                   0  
dtype: int64
```

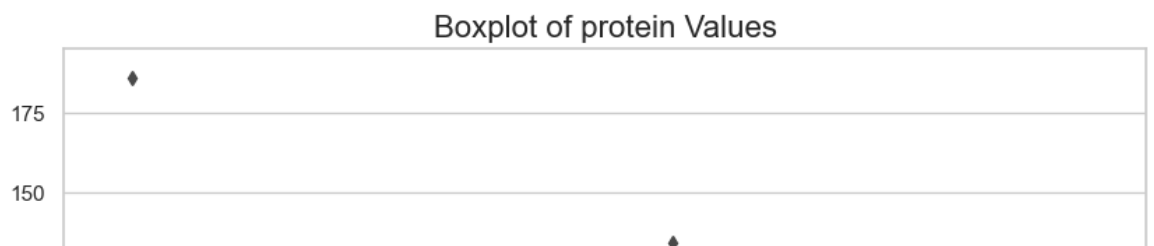
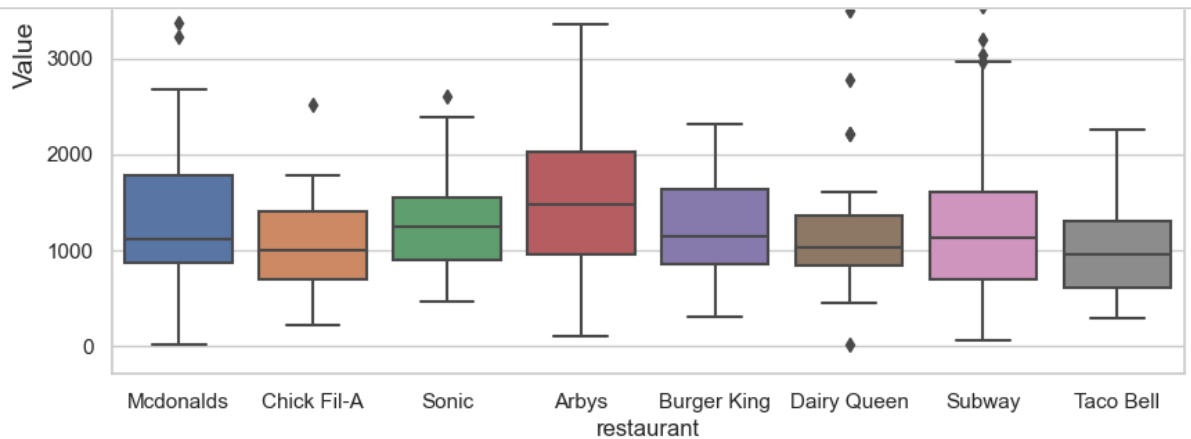
EDA of the Data

```
In [11]: restaurants = data['restaurant'].unique()  
nutritions = ['calories', 'sat_fat', 'trans_fat', 'sodium', 'protei
```

```
In [12]: sns.set(style="whitegrid")

for nutrition in nutritions:
    fig, ax = plt.subplots(figsize=(10, 6))
    sns.boxplot(x='restaurant', y=nutrition, data=data, ax=ax)
    ax.set_ylabel('Value', fontsize=14)
    ax.set_title(f"Boxplot of {nutrition} Values", fontsize=16)

plt.show()
```



```
In [13]: nutritions_per_restaurant = data.groupby('restaurant').mean().round(2)
         nutritions_per_restaurant
```

```
/var/folders/qn/zzvcdwg51dzdyg67zv6vp9lw0000gn/T/ipykernel_1054/3568129121.py:1: FutureWarning: The default value of numeric_only in DataFrameGroupBy.mean is deprecated. In a future version, numeric_only will default to False. Either specify numeric_only or select only columns which should be valid for the function.
```

```
         nutritions_per_restaurant = data.groupby('restaurant').mean().round(2).sort_values(by='calories').reset_index()
```

Out [13]:

	restaurant	calories	cal_fat	total_fat	sat_fat	trans_fat	cholesterol	sodium	total_carb
0	Chick Fil-A	384.44	145.37	16.15	4.11	0.04	79.07	1151.48	28.63
1	Taco Bell	443.65	188.00	20.90	6.59	0.26	39.04	1013.91	46.63
2	Subway	503.02	165.10	18.48	6.20	0.22	61.30	1272.97	54.72
3	Dairy Queen	520.24	260.48	28.86	10.44	0.68	71.55	1181.79	38.69
4	Arbys	532.73	237.84	26.98	7.97	0.42	70.45	1515.27	44.87
5	Burger King	608.57	333.76	36.81	11.15	0.86	100.86	1223.57	39.31
6	Sonic	631.70	338.30	37.64	11.42	0.93	86.98	1350.75	47.21
7	Mcdonalds	640.35	285.61	31.81	8.29	0.46	109.74	1437.89	48.79

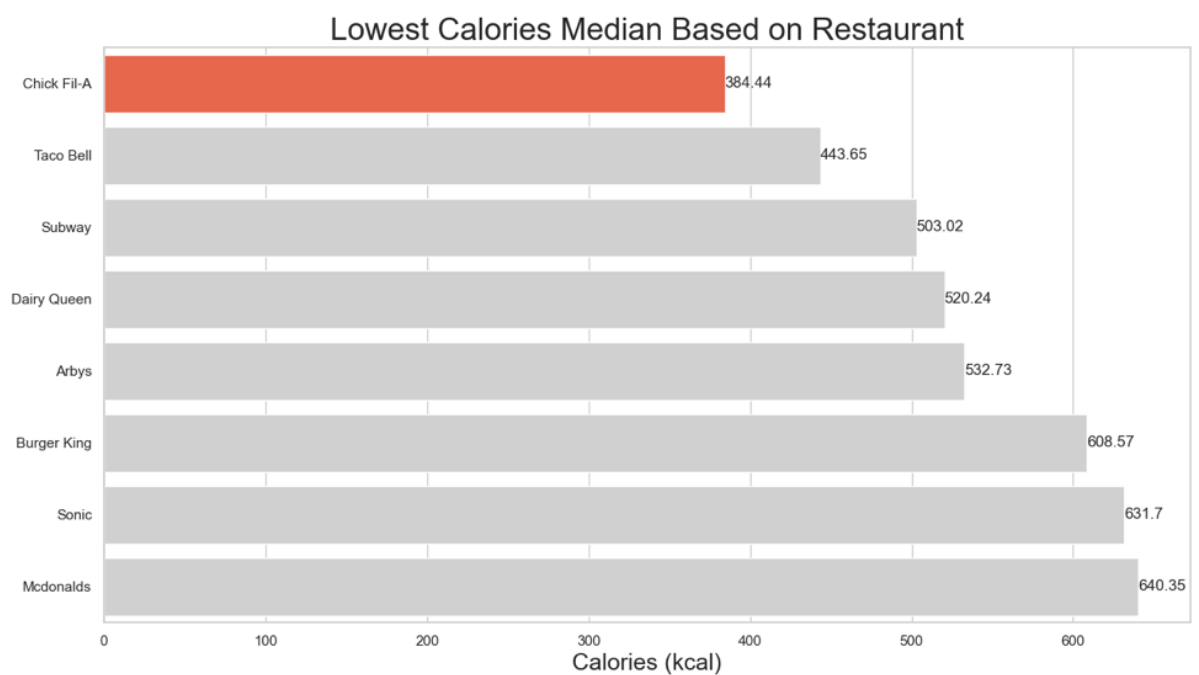
```
In [14]: fig, ax = plt.subplots(figsize=(15, 8))

custom_palette = ['#FF5733'] + ['#D0D0D0']*(len(nutritions_per_rest

sns.barplot(x = 'calories', y='restaurant', data=nutritions_per_res
            , palette=custom_palette)
plt.title('Lowest Calories Median Based on Restaurant', fontsize=24)
plt.xlabel('Calories (kcal)', fontsize=18)
plt.ylabel('')

for i in ax.containers:
    plt.bar_label(i, label_type='edge')

plt.show()
```



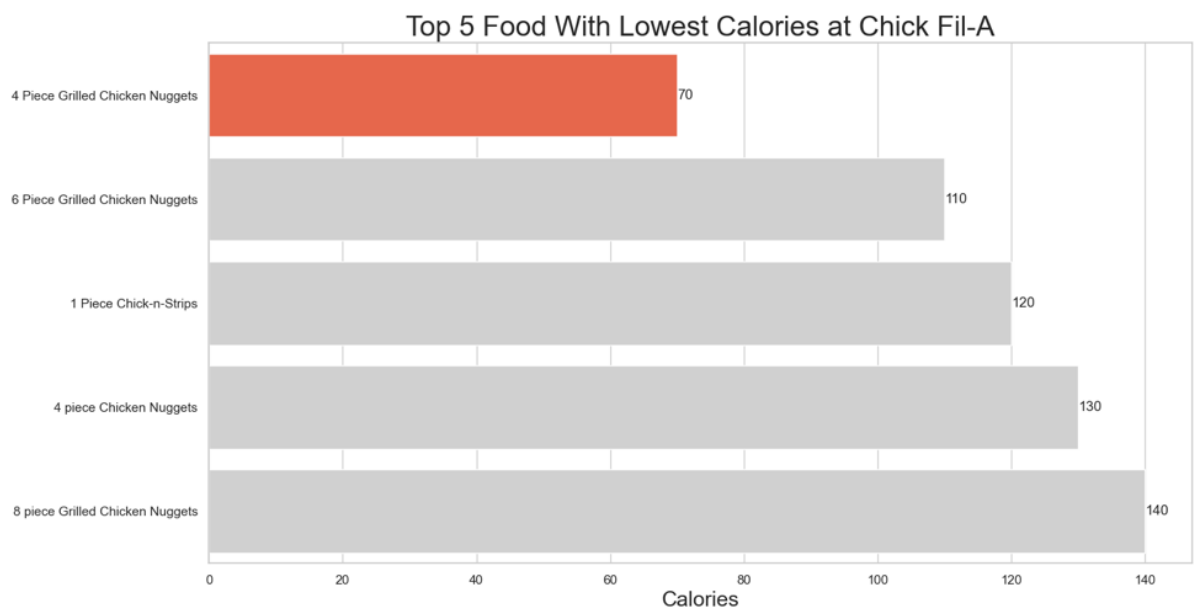

```
In [15]: top_5_lowest_chick = data[data['restaurant'] == 'Chick Fil-A'].sort

custom_palette = ['#FF5733'] + ['#D0D0D0']*(len(top_5_lowest_chick[

fig, ax = plt.subplots(figsize=(15, 8))
sns.barplot(x='calories', y='item', palette=custom_palette,
            data=top_5_lowest_chick, dodge=False, ax=ax)

for i in ax.containers:
    ax.bar_label(i, label_type='edge')

plt.title('Top 5 Food With Lowest Calories at Chick Fil-A', fontsize=
plt.xlabel('Calories', fontsize=18)
plt.ylabel('')
plt.show()
```



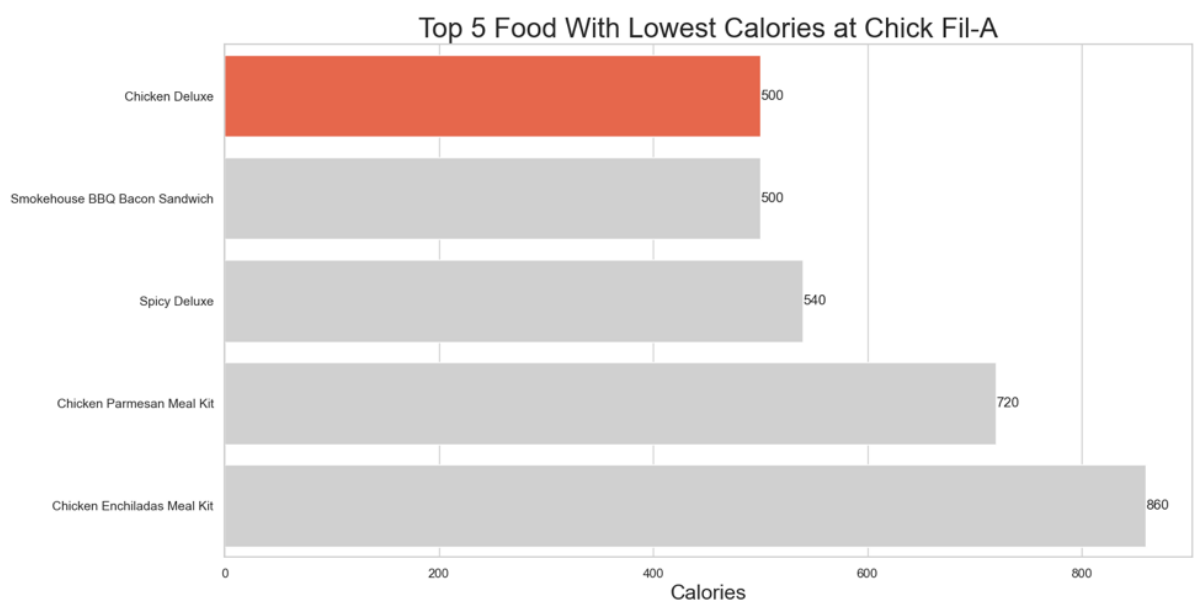
```
In [16]: top_5_chick = data[(data['restaurant'] == 'Chick Fil-A') & (data['calories'] < 1000)]

custom_palette = ['#FF5733'] + ['#D0D0D0']*(len(top_5_chick['item'].unique())-1)

fig, ax = plt.subplots(figsize=(15, 8))
sns.barplot(x='calories', y='item', palette=custom_palette,
            data=top_5_chick, dodge=False, ax=ax)

for i in ax.containers:
    ax.bar_label(i, label_type='edge')

plt.title('Top 5 Food With Lowest Calories at Chick Fil-A', fontsize=14)
plt.xlabel('Calories', fontsize=18)
plt.ylabel('')
plt.show()
```



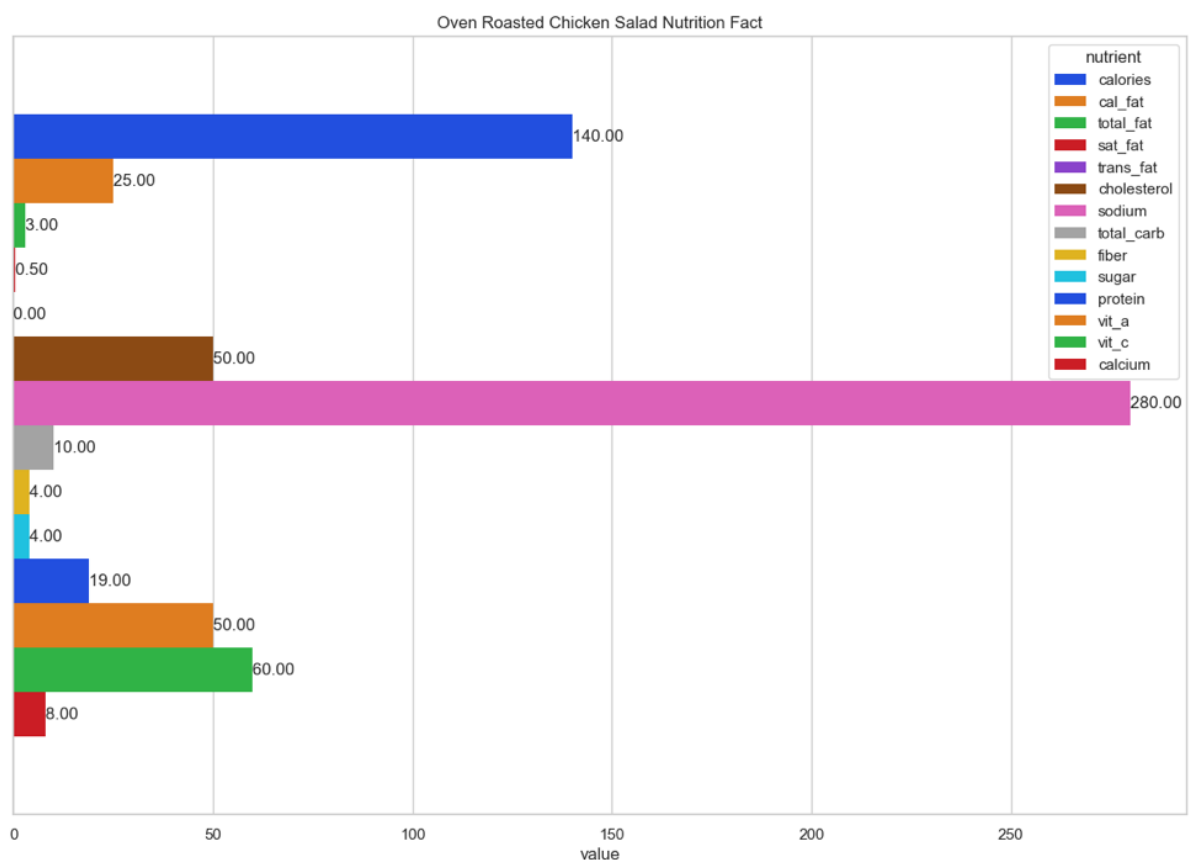
```
In [17]: #Protein to calories ratio
data['protein_to_cal_ratio'] = data['protein'] / data['calories']
data['sodium_to_cal_ratio'] = data['sodium'] / data['calories']
top_10_cal_ratio = data.sort_values(by=['sodium_to_cal_ratio', 'protein_to_cal_ratio'])
top_10_cal_ratio = top_10_cal_ratio[top_10_cal_ratio['protein_to_cal_ratio'] > 0]
top_10_cal_ratio.drop('salad', inplace=True, axis=1)
```

```
In [18]: top_1_protein_cal_ratio = pd.melt(
    top_10_cal_ratio.head(1).drop(['restaurant', 'protein_to_cal_ra
    id_vars=['item'], var_name='nutrient', value_name='value')
    top_1_protein_cal_ratio['value'] = top_1_protein_cal_ratio['value']

fig, ax = plt.subplots(figsize=(15, 10))
sns.barplot(x='value', y='item', hue='nutrient', data=top_1_protein_cal_ratio)
plt.title(f"{top_1_protein_cal_ratio['item'][0]} Nutrition Fact")
ax.get_yaxis().set_ticks([])
ax.set_ylabel('')

for container in ax.containers:
    ax.bar_label(container, labels=[f"{val:.2f}" for val in container.values])

plt.show()
```



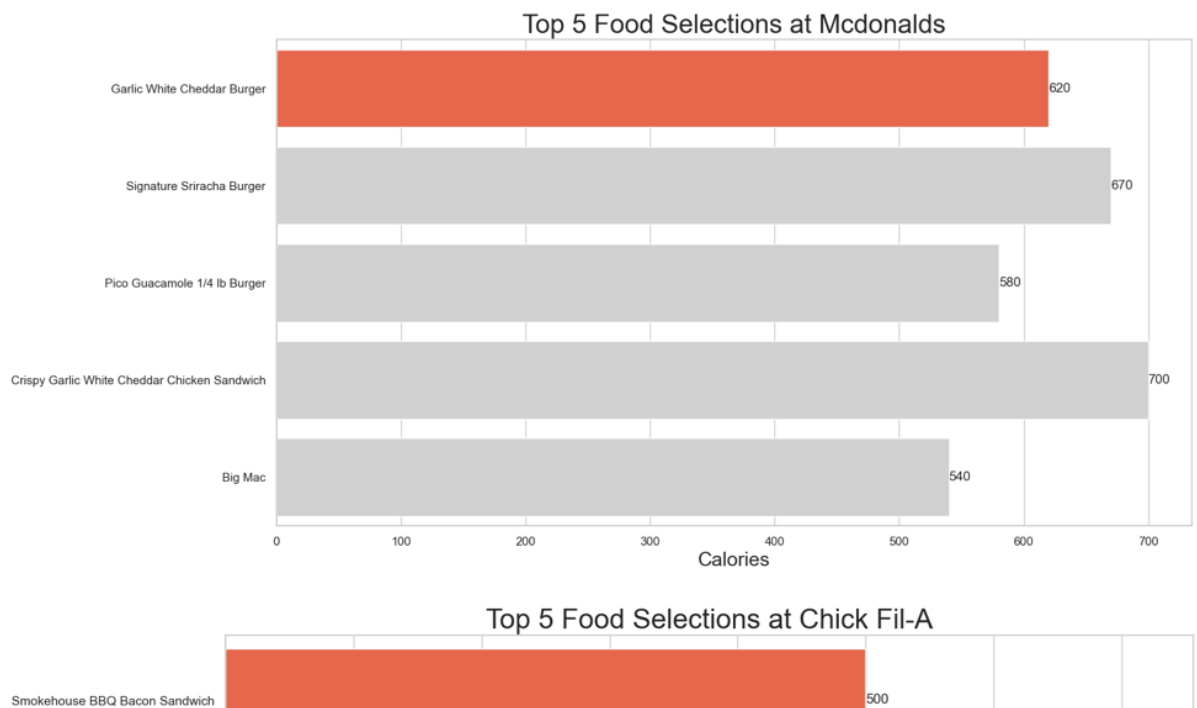
```
In [19]: for restaurant in restaurants:
top_5 = data[(data['restaurant'] == restaurant) & (data['calori
top_5 = top_5.sort_values(by=['sodium_to_cal_ratio', 'protein_t

custom_palette = ['#FF5733'] + ['#D0D0D0']*(len(top_5['item'].u

fig, ax = plt.subplots(figsize=(15, 8))
sns.barplot(x='calories', y='item', palette=custom_palette,
            data=top_5, dodge=False, ax=ax)

for i in ax.containers:
    ax.bar_label(i, label_type='edge')

plt.title(f"Top 5 Food Selections at {restaurant}", fontsize=24)
plt.xlabel('Calories', fontsize=18)
plt.ylabel('')
plt.show()
```



```
In [20]: null_vals = dict(data.isnull().sum())
null_vals
```

```
Out[20]: {'restaurant': 0,
          'item': 0,
          'calories': 0,
          'cal_fat': 0,
          'total_fat': 0,
          'sat_fat': 0,
          'trans_fat': 0,
          'cholesterol': 0,
          'sodium': 0,
          'total_carb': 0,
          'fiber': 12,
          'sugar': 0,
          'protein': 1,
          'vit_a': 214,
          'vit_c': 210,
          'calcium': 210,
          'salad': 0,
          'protein_to_cal_ratio': 1,
          'sodium_to_cal_ratio': 0}
```

```
In [21]: # % null values
for key, val in null_vals.items():
    print(f"null values for {key} =====> {(int(val)/data.shape[0])}")

null values for restaurant =====> 0.0
null values for item =====> 0.0
null values for calories =====> 0.0
null values for cal_fat =====> 0.0
null values for total_fat =====> 0.0
null values for sat_fat =====> 0.0
null values for trans_fat =====> 0.0
null values for cholesterol =====> 0.0
null values for sodium =====> 0.0
null values for total_carb =====> 0.0
null values for fiber =====> 2.3300970873786406
null values for sugar =====> 0.0
null values for protein =====> 0.1941747572815534
null values for vit_a =====> 41.55339805825243
null values for vit_c =====> 40.77669902912621
null values for calcium =====> 40.77669902912621
null values for salad =====> 0.0
null values for protein_to_cal_ratio =====> 0.1941747572815534
null values for sodium_to_cal_ratio =====> 0.0
```

```
In [22]: # replace vitamin a ,c and calcium with mean value, for this collec
null_cols = ['fiber','protein','vit_a','vit_c','calcium']
null_cols_avg = {}
for col in null_cols:
    null_cols_avg[col] = data[col].describe().mean()
null_cols_avg
```

```
Out[22]: {'fiber': 67.14682965168379,
'protein': 102.8843714070368,
'vit_a': 70.6551841488183,
'vit_c': 99.97034180718309,
'calcium': 87.92181644364442}
```

```
In [23]: data.fillna(value=null_cols_avg,inplace=True)
data.isnull().sum()
```

```
Out[23]: restaurant      0
item                    0
calories                0
cal_fat                 0
total_fat               0
sat_fat                 0
trans_fat               0
cholesterol             0
sodium                  0
total_carb              0
fiber                   0
sugar                   0
protein                 0
vit_a                   0
vit_c                   0
calcium                 0
salad                   0
protein_to_cal_ratio    1
sodium_to_cal_ratio     0
dtype: int64
```

```
In [24]: # Oh cleared it, now ready to go
# here we will consider only total fat, the reason is I have not go
# about trans_fat,sat_fat and cal_fat, I appologise for this, lets
data.drop(['salad','cal_fat','sat_fat','trans_fat'],axis=1,inplace=
```

1) Collecting labels unsuperwised learning

Steps followed:

- Collecting libraries
- Dropping unrequired columns
- Finding best cluster
- Visualizing elbow method
- Training model with best cluster
- Getting labels

```
In [25]: df_seg = data.drop(['restaurant', 'item'], axis='columns')
df_seg.sample(3)
```

Out [25]:

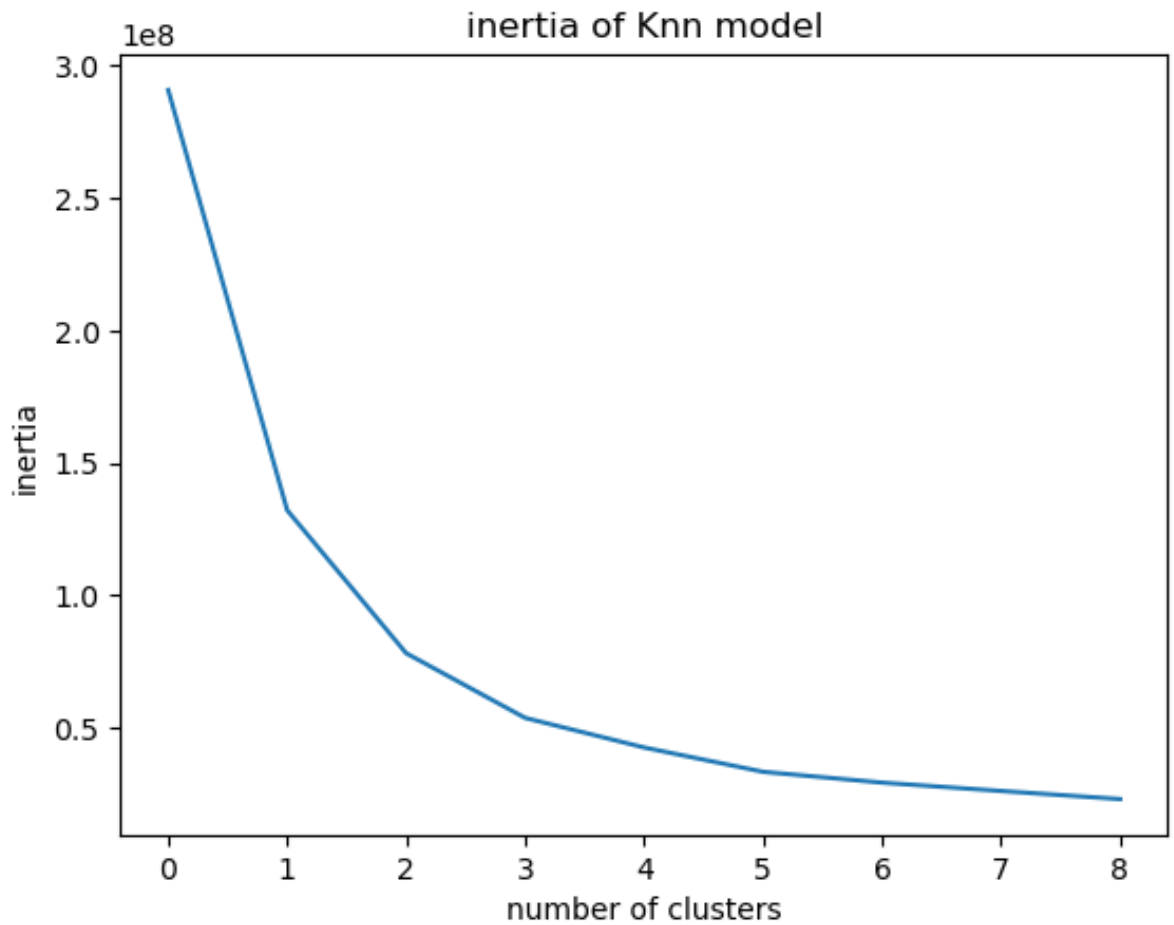
	calories	total_fat	cholesterol	sodium	total_carb	fiber	sugar	protein	vit_a	vit_c
87	410	24	55	730	32	1.0	4	20.0	7.0	1.0
458	420	28	65	1070	23	4.0	2	19.0	6.0	4.0
366	390	7	10	800	56	8.0	8	23.0	15.0	20.0

Finding best cluster size for segmentation

```
In [ ]: inertias = []
for i in range(1,10):
    model = KMeans(n_clusters=i, init="k-means++", random_state=42)
    model.fit(df_seg)
    inertias.append(model.inertia_)
print(inertias)
```

Elbow method

```
In [13]: plt.plot(inertias)
plt.title("inertia of Knn model")
plt.xlabel("number of clusters")
plt.ylabel("inertia")
plt.show()
```



As per elbow method 3 types of clusters are best for our model, that means we can classify foods into 3 types.

```
In [14]: model = KMeans(n_clusters=3, init='k-means++', random_state=42)
model.fit(df_seg)
```

```
Out[14]: KMeans(n_clusters=3, random_state=42)
```



```
In [15]: cluster_centers = model.cluster_centers_  
cluster_centers
```

```
Out[15]: array([[1134.16666667,  57.25      , 172.08333333, 3282.91666667  
,  
          87.29166667,   9.2561179 ,  15.        ,  67.  
,  
          25.5804627 ,  43.41048788,  47.73371176],  
 [ 362.79863481,  17.54266212,  47.11604096,  806.55290102  
,  
          32.54266212,   3.570467  ,   5.25938567,  19.07167235  
,  
          43.55714278,  52.93645632,  46.15857203],  
 [ 706.56565657,  36.26262626,  97.87878788, 1651.31313131  
,  
          60.03535354,   8.17408231,   9.28787879,  36.5802241  
,  
          37.47492661,  53.50271904,  57.44197356]])
```

```
In [16]: labels = model.labels_  
labels[:10]
```

```
Out[16]: array([1, 2, 2, 2, 2, 1, 1, 1, 1, 2], dtype=int32)
```

```
In [17]: df['labels'] = labels  
df.sample(3)
```

```
Out[17]:
```

	restaurant	item	calories	total_fat	cholesterol	sodium	total_carb	fiber	sugar
252	Burger King	Jalapeno Chicken Fries	300	18	40	950	19	1.0	1
420	Taco Bell	Steak Quesarito	630	31	65	1410	64	3.0	4
297	Dairy Queen	Crispy Chicken Wrap	350	21	35	820	30	2.0	1

Done first part 😊

2) Segmenting data into healthy food and unhealthy food

```
In [19]: label_0 = df[df['labels']==0]
label_1 = df[df['labels']==1]
label_2 = df[df['labels']==2]
print("label 0", len(label_0))
print("label 1", len(label_1))
print("label 2", len(label_2))
```

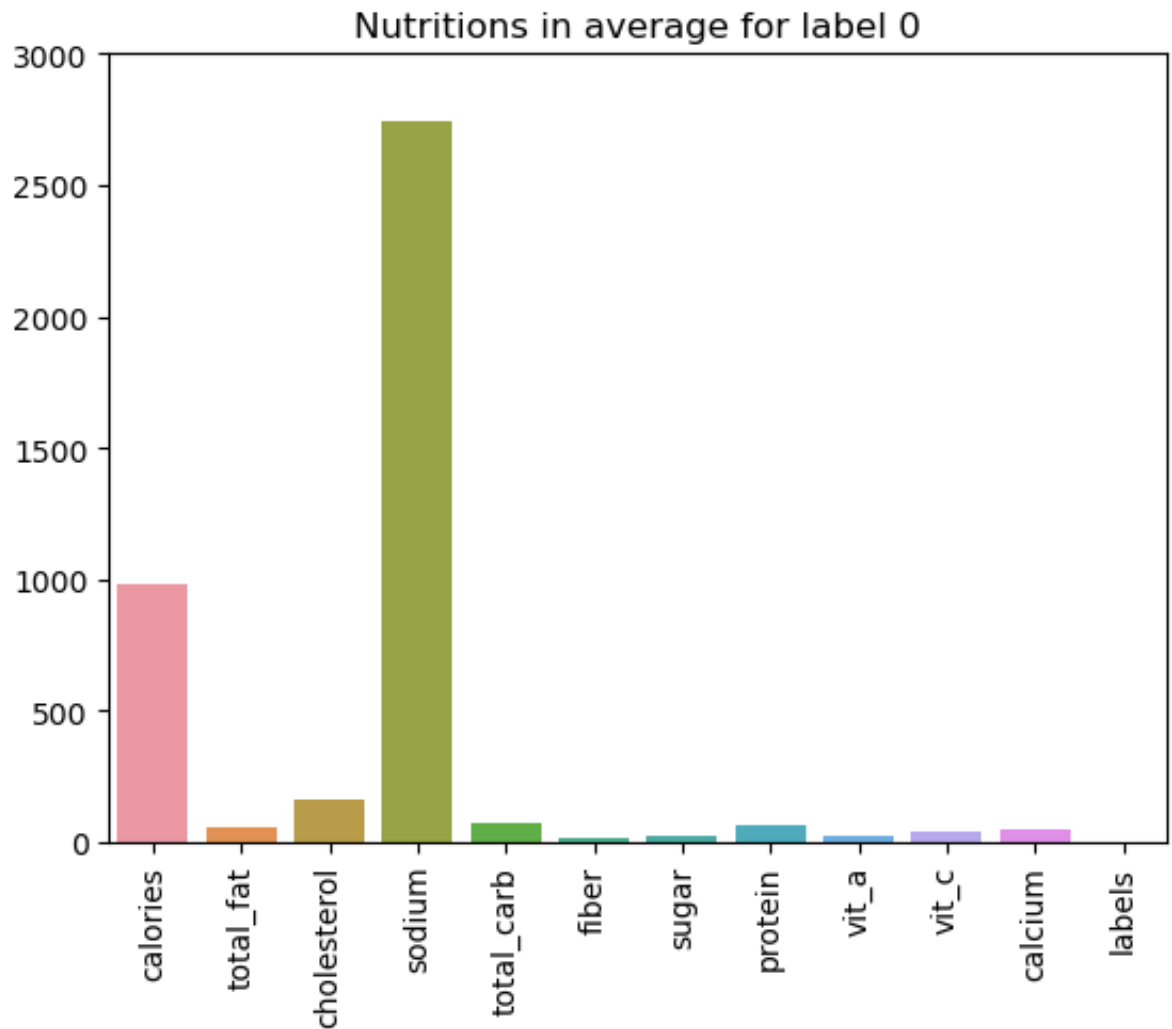
```
label 0 24
label 1 293
label 2 198
```

Collecting average of Nutrition

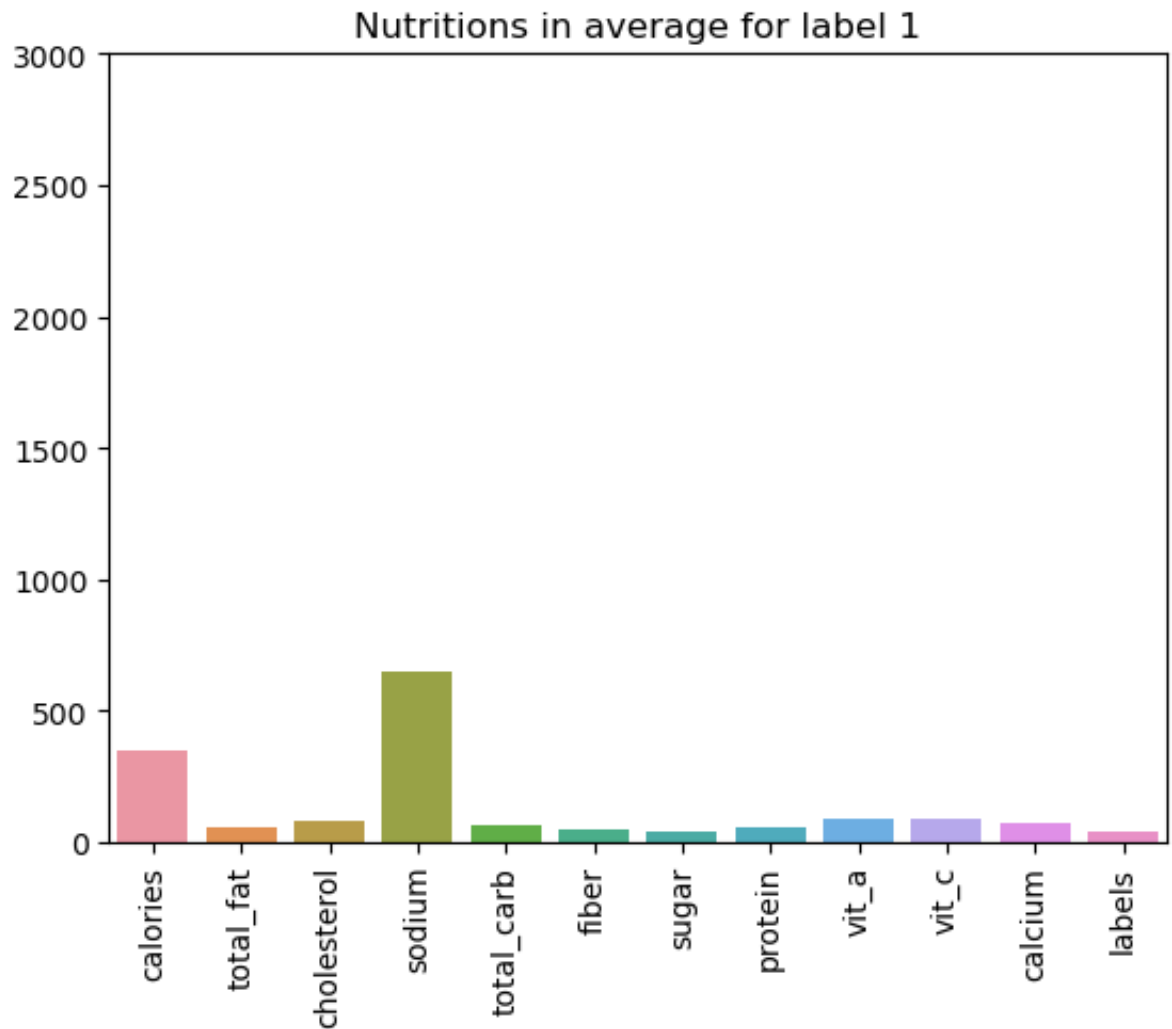
```
In [20]: nutritions = list(label_0.describe().columns)
label_0_nutri_avg = label_0.describe().mean().values
label_1_nutri_avg = label_1.describe().mean().values
label_2_nutri_avg = label_2.describe().mean().values
print("label_0_nutri_avg", label_0_nutri_avg)
print("label_1_nutri_avg", label_1_nutri_avg)
print("label_2_nutri_avg", label_2_nutri_avg)
```

```
label_0_nutri_avg [ 983.68437654  54.17094372 159.72297763 2747.
68371272  74.06228987
16.85584648  22.03154889  64.67569437  26.03244575  41.5551
4837
45.10334094  3.          ]
label_1_nutri_avg [348.17926188  53.34113266  81.06354433 651.4759
0738  66.8572915
47.13631206  44.21520818  54.22214806  85.46994363  93.22141349
75.50071478  37.375      ]
label_2_nutri_avg [ 597.76546522  60.88604693 179.10830333 1338.
3392055  72.52380115
37.79632294  34.45431951  62.62686176  54.51430051 106.1125
0799
94.82042994  26.25      ]
```

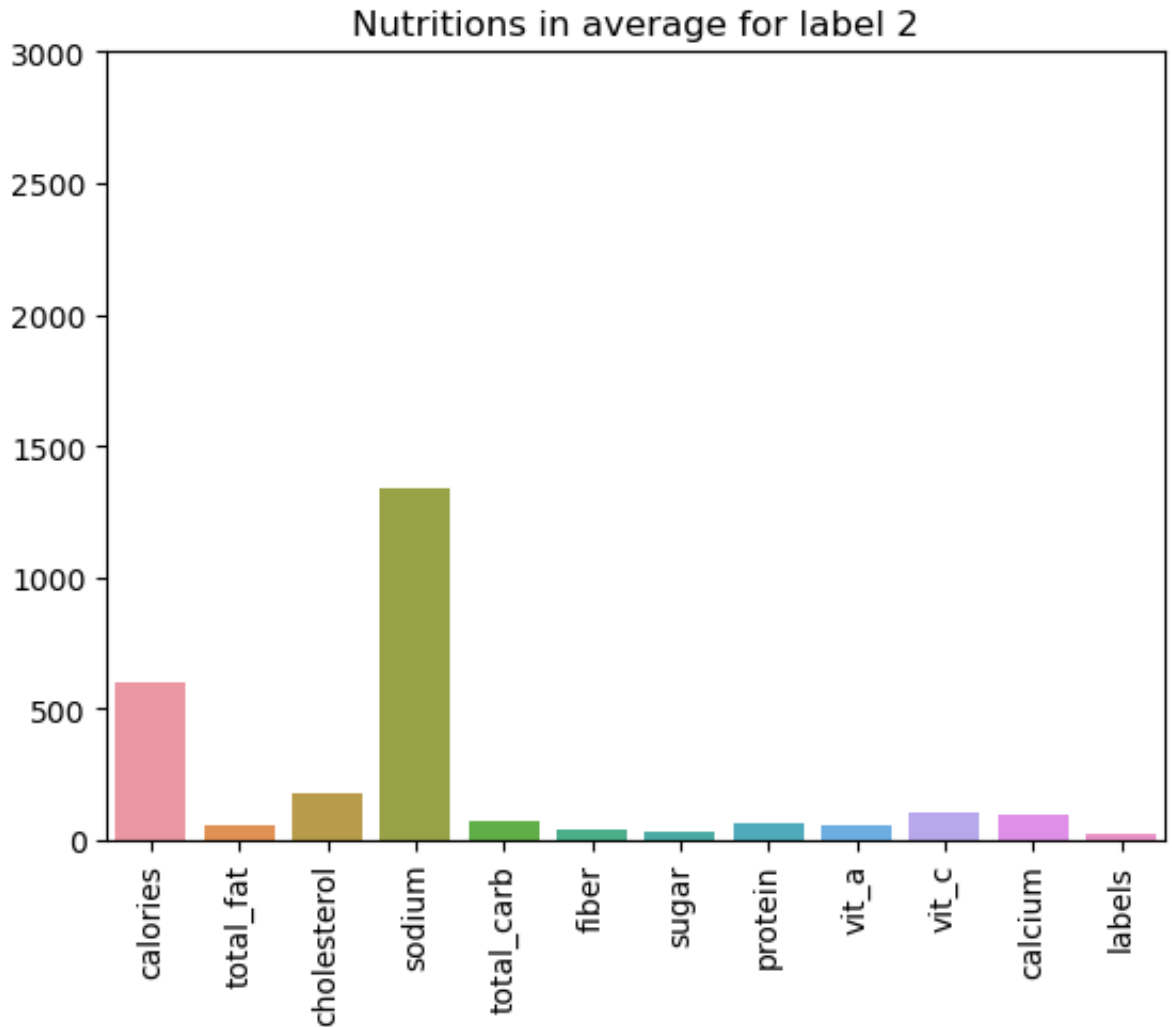
```
In [21]: # label 0
sn.barplot(x=nutritions,y=label_0_nutri_avg)
plt.title("Nutritions in average for label 0")
plt.xticks(rotation=90)
plt.ylim([0,3000])
plt.show()
```



```
In [22]: # label 1
sn.barplot(x=nutritions,y=label_1_nutri_avg)
plt.title("Nutritions in average for label 1")
plt.xticks(rotation=90)
plt.ylim([0,3000])
plt.show()
```



```
In [23]: # label 2
sn.barplot(x=nutritions,y=label_2_nutri_avg)
plt.title("Nutritions in average for label 2")
plt.xticks(rotation=90)
plt.ylim([0,3000])
plt.show()
```



```
In [24]: positive_ntr = ['protein','calcium','total_carb','vit_a','vit_c','f
negative_ntr = ['sugar','calories','total_fat','sodium','cholesteron
```

zipping average values of nutritions and labels (nutritions) in dictionary format

```
In [25]: def zipper(lis1, lis2):
        temp = {}
        for v1, v2 in zip(lis1, lis2):
            temp[v1] = v2
        return temp

label_0_dic = zipper(nutritions, label_0_nutri_avg)
label_1_dic = zipper(nutritions, label_1_nutri_avg)
label_2_dic = zipper(nutritions, label_2_nutri_avg)
print("label_0_zipped", label_0_dic)
print("\n\nlabel_1_zipped", label_1_dic)
print("\n\nlabel_2_zipped", label_2_dic)
```

```
label_0_zipped {'calories': 983.6843765410205, 'total_fat': 54.170
943716023075, 'cholesterol': 159.7229776299231, 'sodium': 2747.683
7127196836, 'total_carb': 74.06228986650855, 'fiber': 16.855846476
00119, 'sugar': 22.031548893984787, 'protein': 64.67569436810251,
'vit_a': 26.03244574783713, 'vit_c': 41.55514836677963, 'calcium':
45.10334093742827, 'labels': 3.0}
```

```
label_1_zipped {'calories': 348.1792618797805, 'total_fat': 53.341
132663545174, 'cholesterol': 81.06354432632749, 'sodium': 651.4759
07381187, 'total_carb': 66.8572915034758, 'fiber': 47.136312059280
49, 'sugar': 44.215208179041106, 'protein': 54.22214806008845, 'vi
t_a': 85.46994362676779, 'vit_c': 93.2214134895857, 'calcium': 75.
50071477749262, 'labels': 37.375}
```

```
label_2_zipped {'calories': 597.7654652211517, 'total_fat': 60.886
046928150904, 'cholesterol': 179.10830332930465, 'sodium': 1338.33
92054964756, 'total_carb': 72.52380115219286, 'fiber': 37.79632293
7000525, 'sugar': 34.45431950755102, 'protein': 62.626861761152654
, 'vit_a': 54.51430051314611, 'vit_c': 106.11250798555193, 'calciu
m': 94.82042994096822, 'labels': 26.25}
```

**creating dictionary for each label (cluster)
with positive nutrition and negative nutrition
average values**

```

In [26]: pn_avg_label_0 = {}
pn_avg_label_1 = {}
pn_avg_label_2 = {}
for i in range(3):
    lis1 = []
    lis2 = []
    lis3 = []
    for pos_val in positive_ntr:
        lis1.append(label_0_dic[pos_val])
        lis2.append(label_1_dic[pos_val])
        lis3.append(label_2_dic[pos_val])
    pn_avg_label_0['pos'] = sum(lis1)/len(lis1)
    pn_avg_label_1['pos'] = sum(lis2)/len(lis2)
    pn_avg_label_2['pos'] = sum(lis3)/len(lis3)

for i in range(3):
    lis1 = []
    lis2 = []
    lis3 = []
    for pos_val in negative_ntr:
        lis1.append(label_0_dic[pos_val])
        lis2.append(label_1_dic[pos_val])
        lis3.append(label_2_dic[pos_val])
    pn_avg_label_0['neg'] = sum(lis1)/len(lis1)
    pn_avg_label_1['neg'] = sum(lis2)/len(lis2)
    pn_avg_label_2['neg'] = sum(lis3)/len(lis3)

```

```

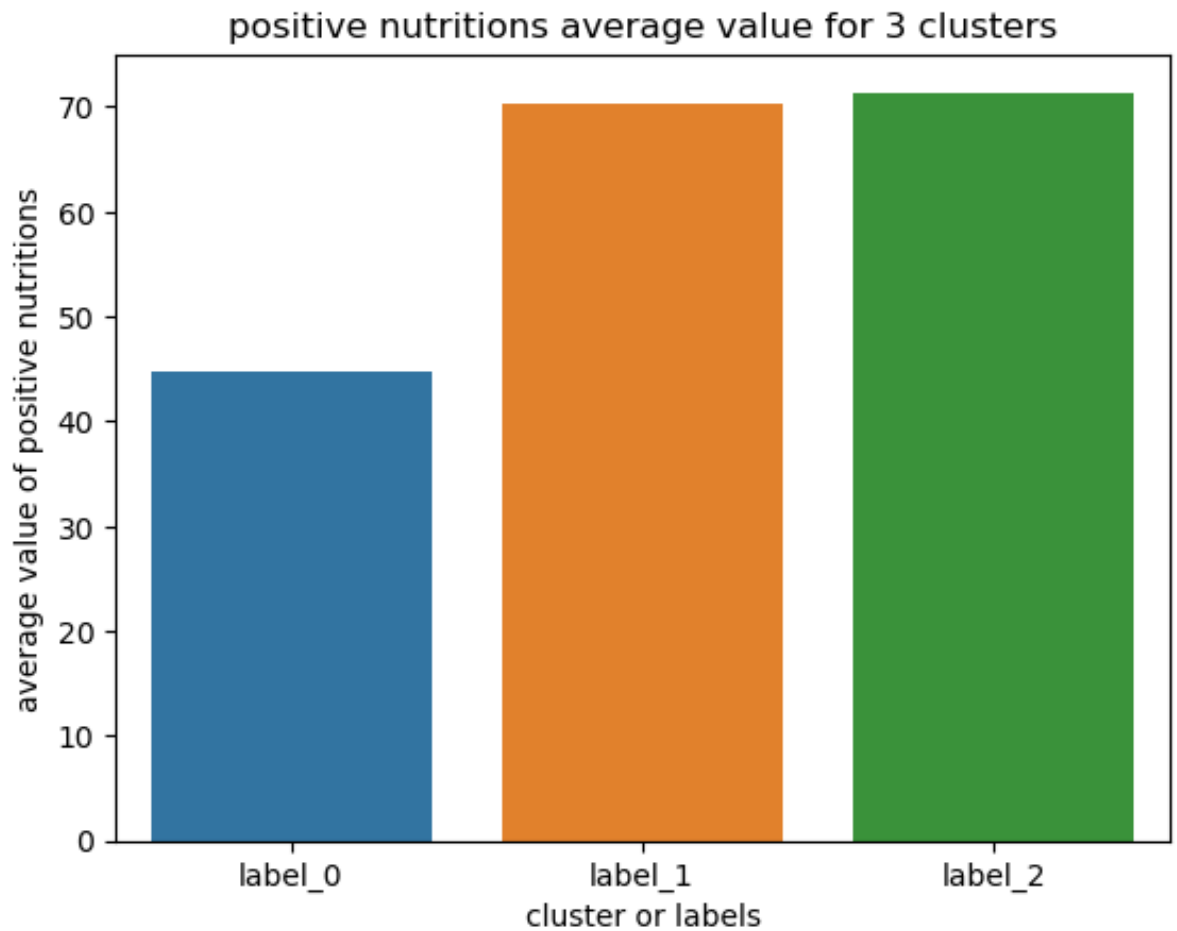
In [27]: pos = [pn_avg_label_0['pos'],pn_avg_label_1['pos'],pn_avg_label_2['pos']]
neg = [pn_avg_label_0['neg'],pn_avg_label_1['neg'],pn_avg_label_2['neg']]

```

positive nutrition average (should be large)

picking high value cluster as winner

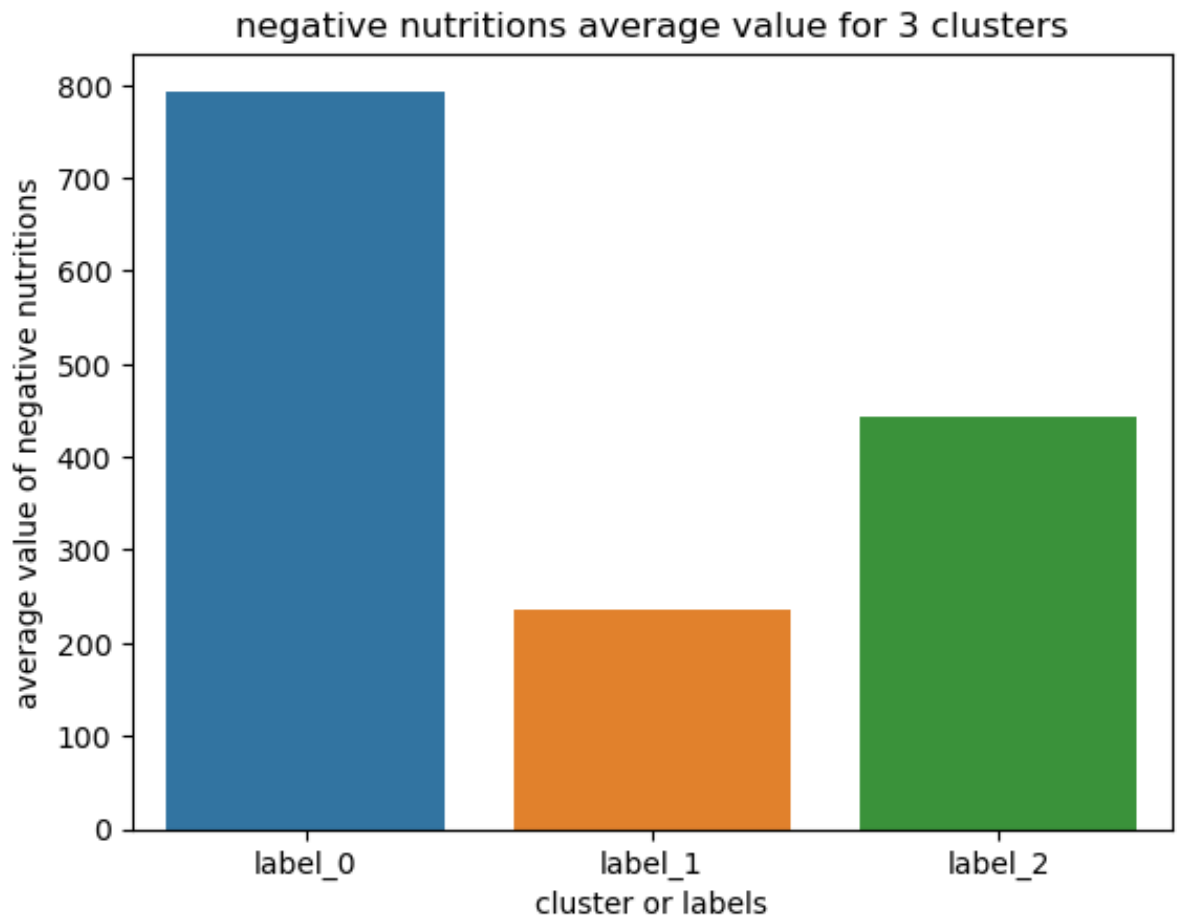
```
In [28]: sn.barplot(x=["label_0","label_1","label_2"],y=pos)
plt.title("positive nutritions average value for 3 clusters")
plt.xlabel("cluster or labels")
plt.ylabel("average value of positive nutritions")
plt.show()
```



negative nutrition average (should be low)

picking low valued cluster as winner


```
In [29]: sn.barplot(x=["label_0","label_1","label_2"],y=neg)
plt.title("negative nutritions average value for 3 clusters")
plt.xlabel("cluster or labels")
plt.ylabel("average value of negative nutritions")
plt.show()
```



Now the exciting part (which food should I consume)

by looking above graphs label 1 having more positive average and less negative average so it get first rank, then label 2 second rank and label 3 will be at last

Healthiest foods

prefer to eat this fast foods rather than others 🍌🍔

```
In [30]: label_1['item'].unique()
'Premium Southwest Salad w/ Grilled Chicken',
'Premium Southwest Salad w/ Crispy Chicken',
'Chargrilled Chicken Club Sandwich',
'Chargrilled Chicken Sandwich', 'Chick-n-Slider',
'1 Piece Chick-n-Strips', '2 Piece Chick-n-Strips',
'3 Piece Chick-n-Strips', '4 piece Chick-n-Strips',
'4 piece Chicken Nuggets', '6 piece Chicken Nuggets',
'8 piece Chicken Nuggets', 'Chicken Salad Sandwich',
'4 Piece Grilled Chicken Nuggets',
'6 Piece Grilled Chicken Nuggets',
'8 piece Grilled Chicken Nuggets',
'12 Piece Grilled Chicken Nuggets',
'Regular Grilled Chicken Sub Sandwich',
'Smokehouse BBQ Bacon Sandwich', 'Chargrilled Chicken Cool
Wrap',
'Hatch Green Chile Cheeseburger', 'Jalapeno Burger', 'Jr. B
urger',
'Jr. Chili Cheeseburger', 'Jr. Deluxe Burger',
'Jr. Deluxe Cheeseburger', 'Sonic Burger W/ Mustard',
'Sonic Burder W/ Ketchup'. 'Sonic Burder W/ Mavonnaise'.
```

Medium healthy food

```
In [31]: label_2['item'].unique()
'4 Piece Super Crunch Chicken Strip Dinner',
'4 Piece Super Crunch Chicken Strip Dinner',
'Traditional Ultimate Chicken Sandwich', 'Ultimate Chicken
Club',
'All Beef Chicago Dog - 6"', 'Cheesy Bacon Pretzel Dog - 6
In.',
'Footlong Quarter Pound Coney', "Beef 'n Cheddar Classic",
"Beef 'n Cheddar Mid", 'Bourbon BBQ Brisket Sandwich',
'Bourbon BBQ Chicken Sandwich', 'Bourbon BBQ Steak Sandwich
',
'Buttermilk Buffalo Chicken Sandwich',
'Buttermilk Chicken Bacon & Swiss',
'Buttermilk Chicken Cordon Bleu Sandwich',
'Buttermilk Crispy Chicken Sandwich',
'Classic French Dip & Swiss/Au Jus', 'Double Roast Beef',
'Fire-Roasted Philly Steak', 'Grand Turkey Club', 'Greek Gy
ro',
'Half Pound Roast Beef Sandwich', 'Loaded Italian Sandwich'
,
'Pecan Chicken Salad Sandwich',
'5 piece Prime-Cut Chicken Tenders' 'Bourbon Sandwich'
```

Less healthy foods

```
In [32]: label_0['item'].unique()
```

```
Out[32]: array(['10 piece Buttermilk Crispy Chicken Tenders',  
                '12 piece Buttermilk Crispy Chicken Tenders',  
                '20 piece Buttermilk Crispy Chicken Tenders',  
                '40 piece Chicken McNuggets',  
                '6 piece Sweet N' Spicy Honey BBQ Glazed Tenders",  
                "10 piece Sweet N' Spicy Honey BBQ Glazed Tenders",  
                '30 piece Chicken Nuggets', 'Chicken Enchiladas Meal Kit',  
                'Buffalo Dunked Ultimate Chicken Sandwich',  
                '5 Piece Super Crunch Chicken Strip Dinner',  
                "Half Pound Beef 'n Cheddar Sandwich",  
                'Half Pound French Dip & Swiss', 'Triple Decker Sandwich',  
                '4 Piece Chicken Strip Basket w/ Country Gravy',  
                '6 Piece Chicken Strip Basket w/ Country Gravy',  
                'Footlong Big Hot Pastrami', 'Footlong Big Philly Cheeseste  
ak',  
                'Footlong Carved Turkey & Bacon w/ Cheese',  
                'Footlong Corned Beef Reuben', 'Footlong Italian B.M.T.',  
                'Footlong Italian Hero', 'Footlong Spicy Italian',  
                'Footlong Turkey Italiano Melt (with Provolone)',  
                'Turkey, Bacon & Guacamole Wrap'], dtype=object)
```

```
In [ ]:
```