Data Analysis Report on McDonald's Dataset

Introduction

Fast food is one of the world's fastest growing food types. It now accounts for roughly half of all restaurant revenues in the developed countries and continues to expand there and in many other industrial countries in the coming years. People buy fast food because it's cheap, easy to prepare, and heavily promoted. The last several years have seen an absolute explosion of diversity in both restaurant concepts and menu choices

Consumers of fast food focus on taste, price and quality - in that order. While the food is often highly processed and prepared in an assembly line, these restaurants focus on consistency of experience, affordability, and you guessed it - speed.

Generally fast food has a reputation for unhealthy food, while consumer tastes worldwide continue to drift towards healthier options. While still a risk, this is not a new dynamic and the industry is already fighting back successfully. Franchise concepts based on healthier ingredients and meal choices continue to pop up, and the old stalwarts continue to add healthy options to their menus.

Purpose of the Report

The data at hand contains nutritional facts of the items sold by McDonalds. For the purpose of analysis, we will consider these items are sold across all major outlets worldwide. The purpose of this report is to get some insights about the nutritional values of the items and come up with some observations.

About McDonalds Menu

McDonald's is the leading global foodservice retailer with over 36000 restaurants in more than 100 countries around the world. The restaurant is synonymous with junk food laden with ingredients that can cause health issues, such as trans fats, petrochemicals, high levels of sugar, and artificial sweeteners. Fast food companies such as McDonald's maintain that they're merely providing consumers with choice and convenience. It's ultimately up to the consumer to decide what to eat.

Despite this health-related controversy, McDonald's locations around the world offer a mostly uniform menu—apart from geographic variations to suit local consumer tastes. The company is also always testing out new products and includes unique international menu items to suite customer tastes.

Data specifications

The dataset contains 260 observations of data and 24 attributes defining them.The dataset has no null values. All the items present in the dataset are unique and each row provides information about the particular item.

Following are the attributes with their data types

```
RangeIndex: 260 entries, 0 to 259
Data columns (total 24 columns):
Category                         260 non-null object
Item                             260 non-null object
Serving Size                     260 non-null object
Calories                         260 non-null int64
Calories from Fat                260 non-null int64
Total Fat                        260 non-null float64
Total Fat (% Daily Value)        260 non-null int64
Saturated Fat                    260 non-null float64
Saturated Fat (% Daily Value)    260 non-null int64
Trans Fat                        260 non-null float64
Cholesterol                      260 non-null int64
Cholesterol (% Daily Value)      260 non-null int64
Sodium                           260 non-null int64
Sodium (% Daily Value)           260 non-null int64
Carbohydrates                    260 non-null int64
Carbohydrates (% Daily Value)    260 non-null int64
Dietary Fiber                    260 non-null int64
Dietary Fiber (% Daily Value)    260 non-null int64
Sugars                           260 non-null int64
Protein                          260 non-null int64
Vitamin A (% Daily Value)        260 non-null int64
Vitamin C (% Daily Value)        260 non-null int64
Calcium (% Daily Value)          260 non-null int64
Iron (% Daily Value)             260 non-null int64
dtypes: float64(3), int64(18), object(3)
memory usage: 48.8+ KB
```

Table 1: Attributes and their data types

Apart from category, item and serving size, all other columns are numeric.

- **Summary of data**

We start the analysis by checking the statistical summary of the data.

  - **Of numeric data:**

	count	mean	std	min	25%	50%	75%	max
Calories	260.0	368.269231	240.269886	0.0	210.000	340.0	500.00	1880.0
Calories from Fat	260.0	127.096154	127.875914	0.0	20.000	100.0	200.00	1060.0
Total Fat	260.0	14.165385	14.205998	0.0	2.375	11.0	22.25	118.0
Total Fat (% Daily Value)	260.0	21.815385	21.885199	0.0	3.750	17.0	35.00	182.0
Saturated Fat	260.0	6.007692	5.321873	0.0	1.000	5.0	10.00	20.0
Saturated Fat (% Daily Value)	260.0	29.965385	26.639209	0.0	4.750	24.0	48.00	102.0
Trans Fat	260.0	0.203846	0.429133	0.0	0.000	0.0	0.00	2.5
Cholesterol	260.0	54.942308	87.269257	0.0	5.000	35.0	65.00	575.0
Cholesterol (% Daily Value)	260.0	18.392308	29.091653	0.0	2.000	11.0	21.25	192.0
Sodium	260.0	495.750000	577.026323	0.0	107.500	190.0	865.00	3600.0
Sodium (% Daily Value)	260.0	20.676923	24.034954	0.0	4.750	8.0	36.25	150.0
Carbohydrates	260.0	47.346154	28.252232	0.0	30.000	44.0	60.00	141.0
Carbohydrates (% Daily Value)	260.0	15.780769	9.419544	0.0	10.000	15.0	20.00	47.0
Dietary Fiber	260.0	1.630769	1.567717	0.0	0.000	1.0	3.00	7.0
Dietary Fiber (% Daily Value)	260.0	6.530769	6.307057	0.0	0.000	5.0	10.00	28.0
Sugars	260.0	29.423077	28.679797	0.0	5.750	17.5	48.00	128.0
Protein	260.0	13.338462	11.426146	0.0	4.000	12.0	19.00	87.0
Vitamin A (% Daily Value)	260.0	13.426923	24.366381	0.0	2.000	8.0	15.00	170.0
Vitamin C (% Daily Value)	260.0	8.534615	26.345542	0.0	0.000	0.0	4.00	240.0
Calcium (% Daily Value)	260.0	20.973077	17.019953	0.0	6.000	20.0	30.00	70.0
Iron (% Daily Value)	260.0	7.734615	8.723263	0.0	0.000	4.0	15.00	40.0

Table 2: Summary of numeric data

|	count	unique	top	freq
Category	260	9	Coffee & Tea	95
Item	260	260	Big Breakfast with Hotcakes and Egg Whites (Re...	1
Serving Size	260	107	16 fl oz cup	45

Table 3: Summary of categorical data

Since there are only 9 unique categories, the 260 unique items have been classified in these 9 categories.

- **Categorical distribution of data**

The number of items in each category is as follows

1. Plot graphically which food categories have the highest and lowest varieties.
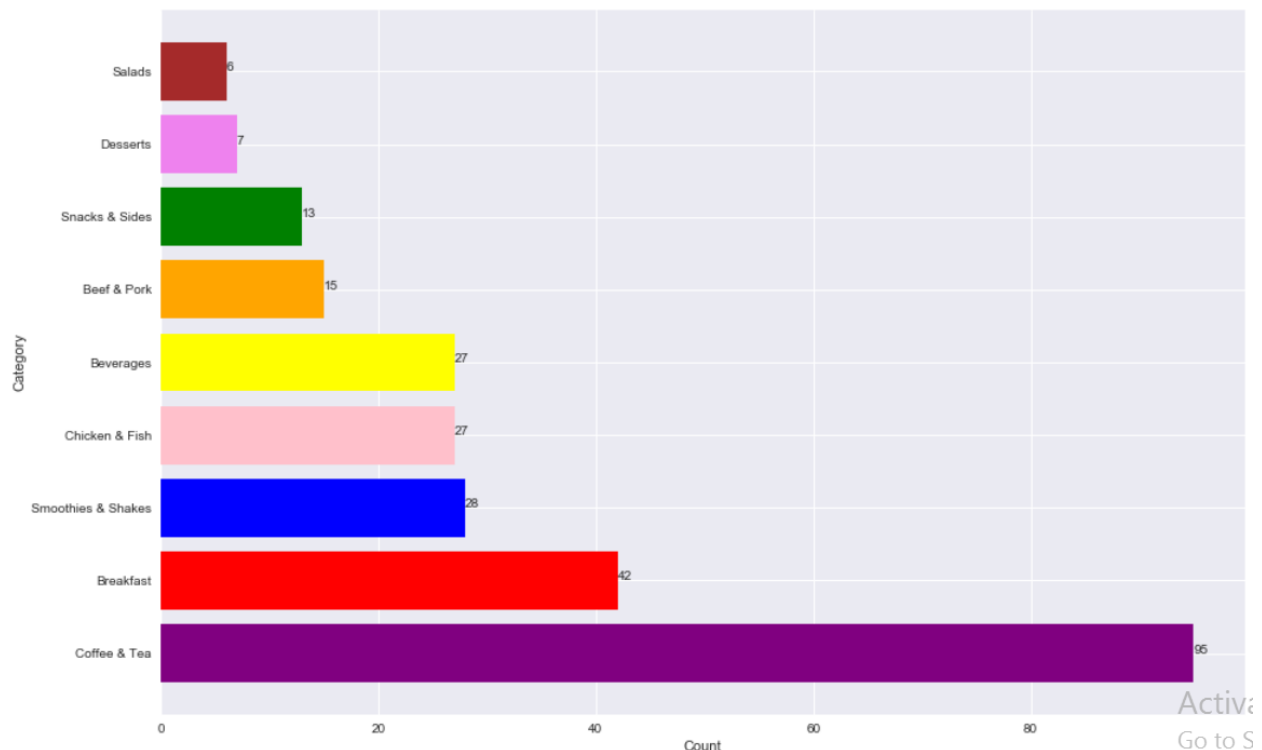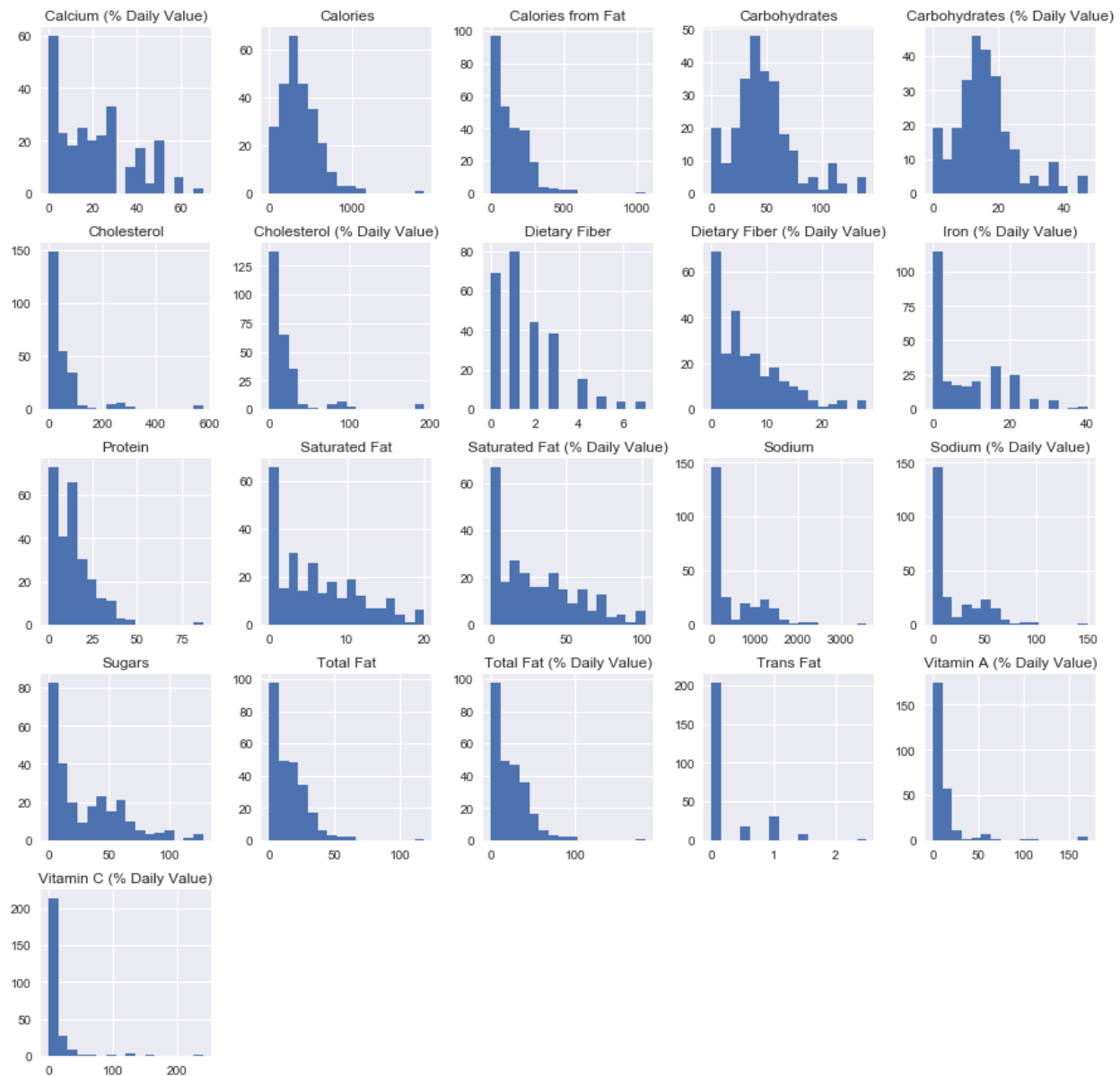

Fig.1: Plot of category and their count

From the bar plot we can see that **Coffee & Tea** have the highest variety of unique items served, i.e. **95** in their category and **salads** has the lowest number of unique items i.e. **6** in its category

- **Histogram representation of all attributes**

Let us analyze the distribution of values of numeric attributes using histogram

Fig.2: Distribution of values of numeric attributes using histogram

We can observe that many attributes are not normally distributed and are skewed to the right side as can be confirmed from their positive skewness values in the following table. This shows that the data is not uniform, in simpler terms it means that the mean values of these attributes do not indicate that maximum amount of observations are having that value. It means the mean value is getting influenced because of presence of extreme values in the data which are considered as outliers. More the skewness, more the attribute mean is influenced by its outliers.

The skewness of each attribute can be seen from the following table

	Skewness
Calories	1.444105
Calories from Fat	2.133110
Total Fat	2.140359
Total Fat (% Daily Value)	2.149518
Saturated Fat	0.659850
Saturated Fat (% Daily Value)	0.681336
Trans Fat	2.123477
Cholesterol	3.776955
Cholesterol (% Daily Value)	3.782217
Sodium	1.535166
Sodium (% Daily Value)	1.537053
Carbohydrates	0.907425
Carbohydrates (% Daily Value)	0.898378
Dietary Fiber	1.166843
Dietary Fiber (% Daily Value)	1.147575
Sugars	1.025977
Protein	1.570794
Vitamin A (% Daily Value)	4.553863
Vitamin C (% Daily Value)	5.470436
Calcium (% Daily Value)	0.590125
Iron (% Daily Value)	1.181044

Table 4: Skewness of all attributes

- **Outlier Identification**

Let us see the presence of outliers in all attributes; it can be done using box plots.

2. Which all variables have an outlier?
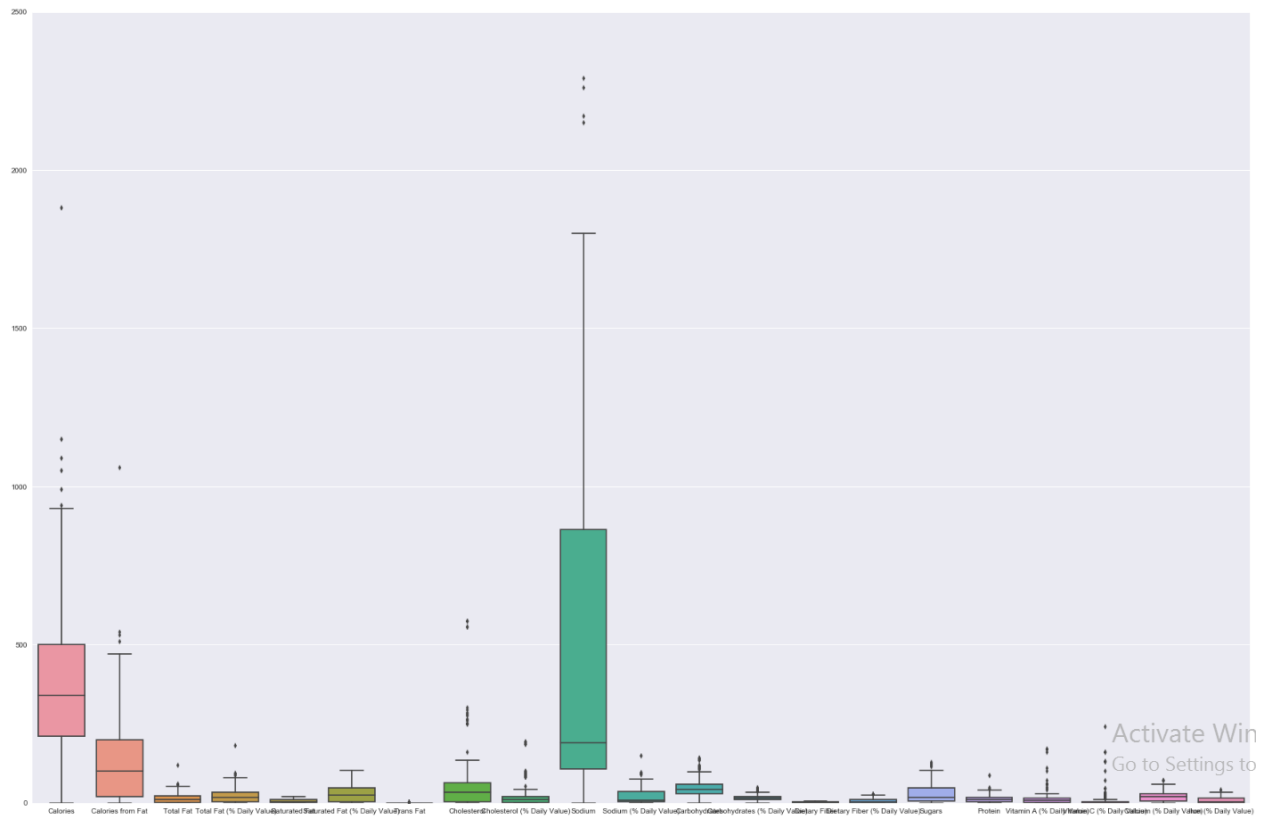
Fig.3: Box plot of all attributes

From the above box plots we can observe that **except Saturated Fat, Saturated Fat (% Daily Value) and Dietary Fibre**, all the other variables have outliers.

- **Checking correlation among the attributes**

To check if two or more variables are related in any way we need to check the correlation between them. This can be achieved by plotting a heat map.

3. Which variables have the highest correlation? Plot them and find out the value?
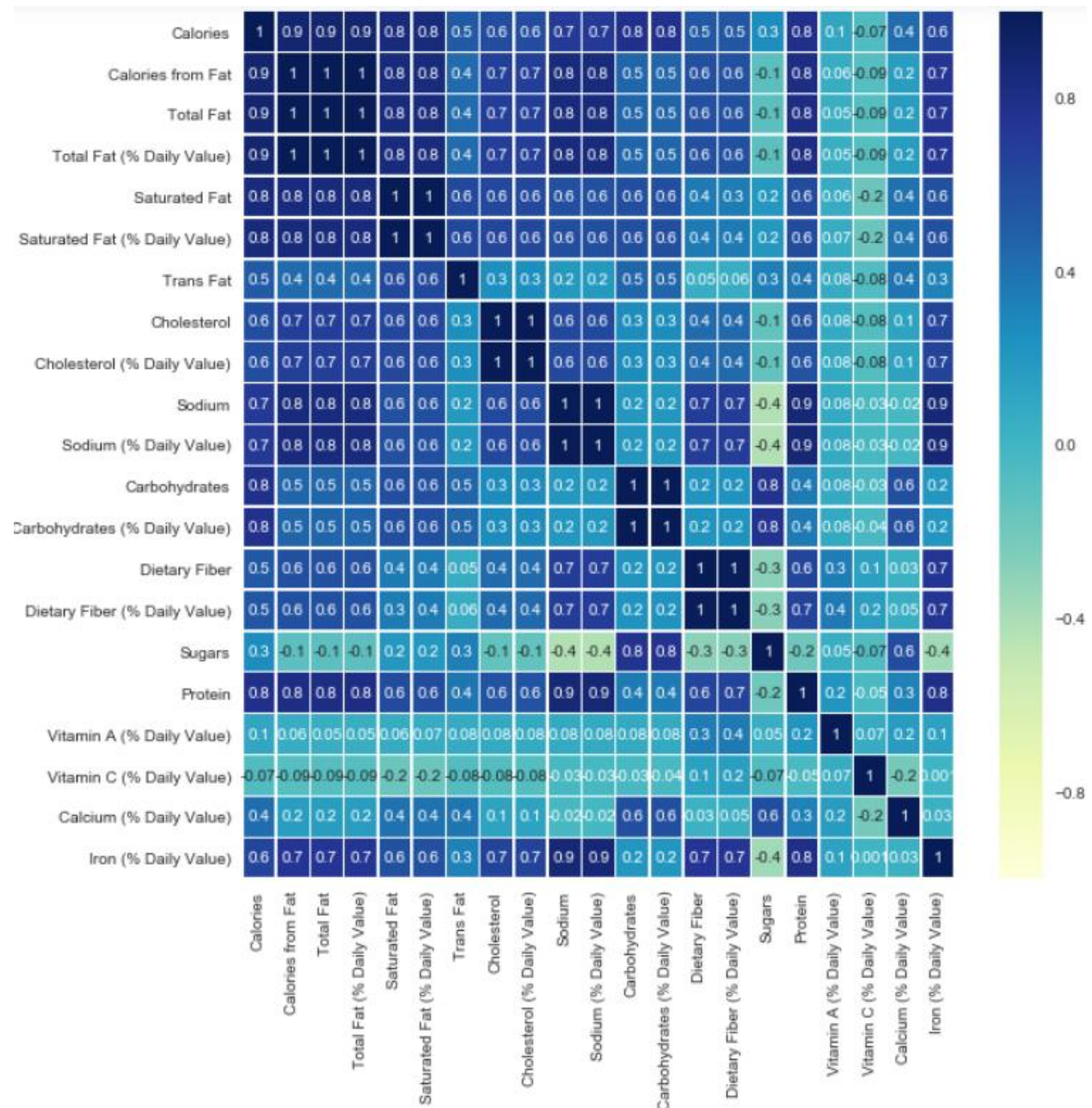

Fig.4: Heat map of dataset

The numerical values in each box are the values of correlation coefficient. It ranges from -1.0 to +1.0. The closer it is to +1 or -1, the more closely the two variables are related.

If it is close to 0, it means there is no relationship between the variables. If positive, it means that as one variable gets larger the other gets larger. If negative, it means that as one gets larger, the other gets smaller (often called an "inverse" correlation).

- **Nutritional distribution of data**

According to the **U.S. Food and Drug Administration (FDA)**, 2,000 calories a day is used as a general guide for nutrition advice. The calorie needs may be higher or lower and vary depending on age, sex, height, weight, and physical activity level of a person.

- **Analyzing data based on % Daily Value criteria**

The % Daily Value (%DV) is the percentage of the Daily Value for each nutrient in a serving of the food. The Daily Values are reference amounts (expressed in grams, milligrams, or micrograms) of nutrients to consume or not to exceed each day.

The %DV shows how much a nutrient in a serving of a food contributes to a total daily diet.

The %DV helps you determine if a serving of food is high or low in a nutrient and whether a serving of the food contributes a lot, or a little, to your daily diet for each nutrient.

As per FDA,

General Guide to %DV

- **5% DV** or less of a nutrient per serving is considered **low**

- **20% DV** or more of a nutrient per serving is considered **high**

More often, choose foods that are:

- Higher in %DV for Dietary Fiber, Vitamins, Calcium, Iron, and Potassium

- Lower in %DV for Saturated Fat, Sodium, and Added Sugars

We will now try to look for items which have **higher %DV** for dietary fiber, calcium, iron, vitamin A and vitamin C from the items in dataset as per the **general guide.**
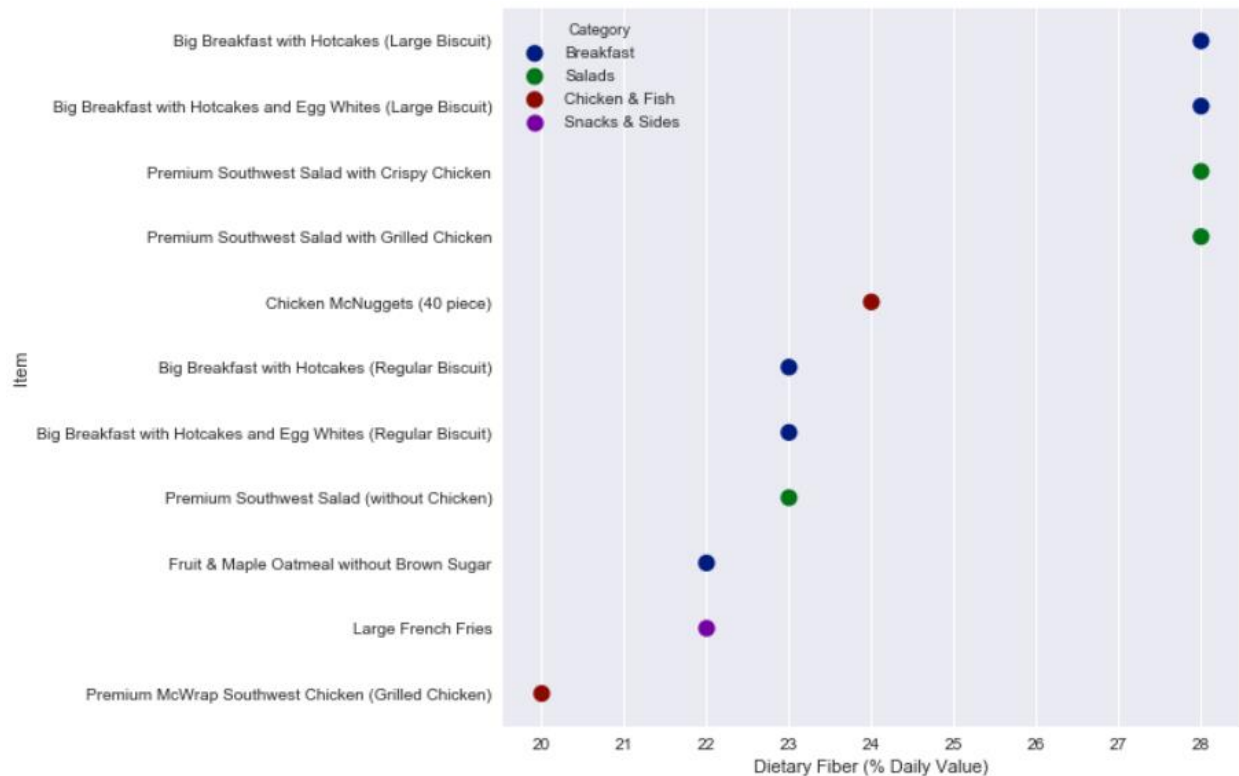
  o **Dietary fibre %DV:**

Fig.5 Point plot of items with high Dietary fibre %DV

The above **11** items have high dietary fibre %DV; most of them belong to **breakfast** category as can be inferred from the above point plot. The items having maximum value of %DV can be seen from above plot.

o **Calcium %DV:**

There are **134** items that high in calcium %DV; all can't be shown using point plot so they are viewed below using swarm plot to see which category they belong to.
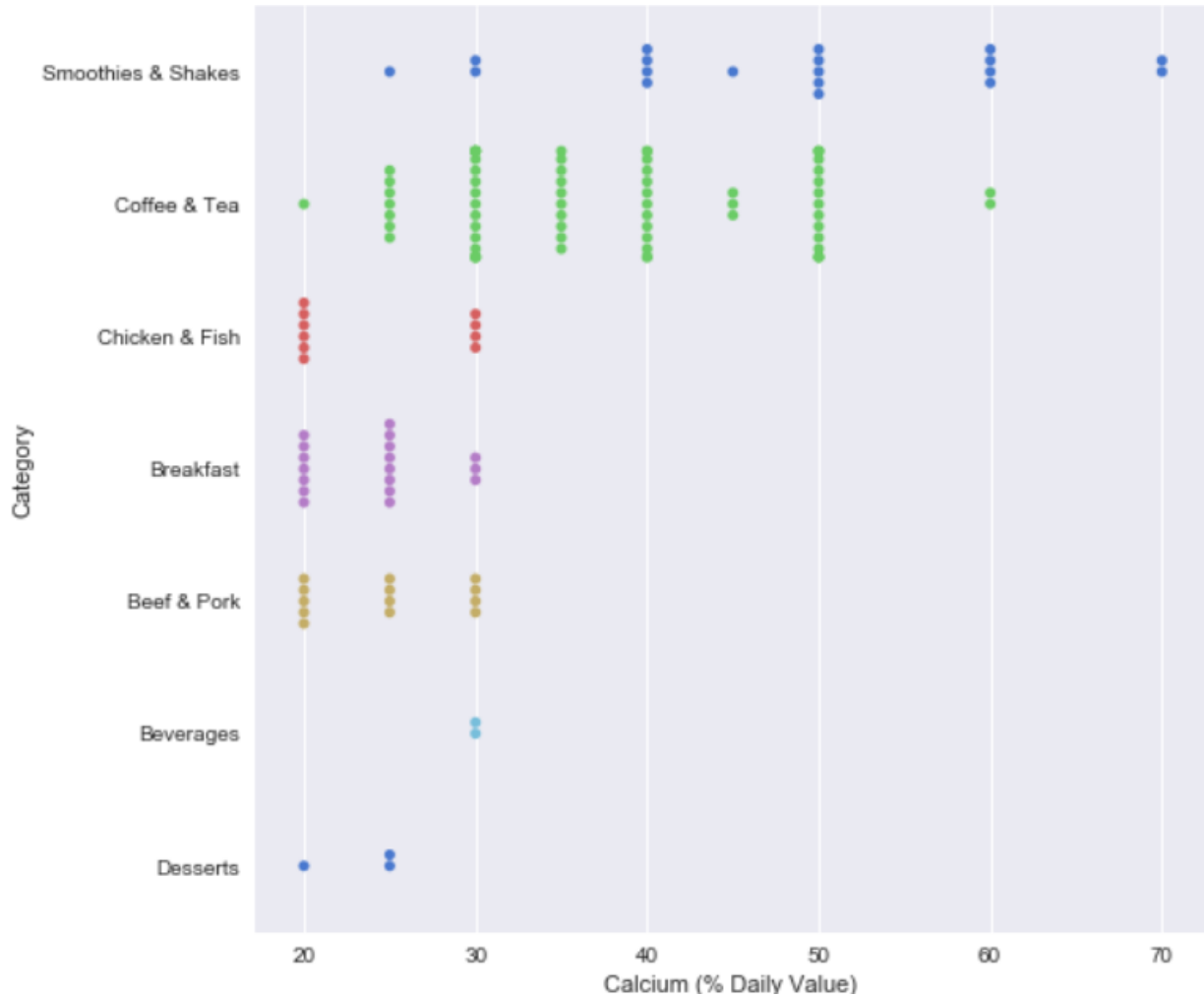
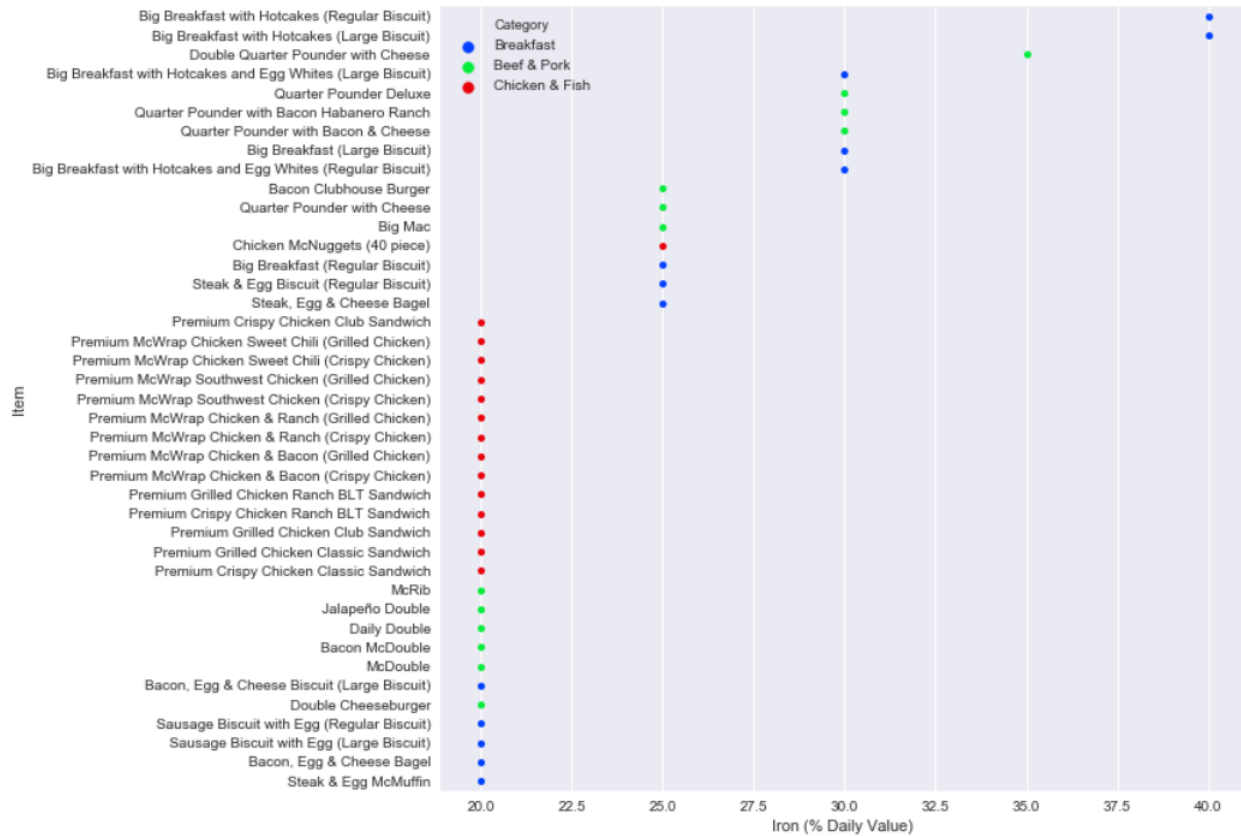**Fig.5 Point plot of items with high calcium %DV**

Most items belong to the **coffee and tea** category.

The top 10 items having high calcium %DV are as follows

|	Category	Item	Calcium (% Daily Value)
253	Smoothies & Shakes	McFlurry with M&M's Candies (Medium)	70
246	Smoothies & Shakes	Strawberry Shake (Large)	70
192	Coffee & Tea	Hot Chocolate (Large)	60
258	Smoothies & Shakes	McFlurry with Reese's Peanut Butter Cups (Medium)	60
251	Smoothies & Shakes	Shamrock Shake (Large)	60
243	Smoothies & Shakes	Vanilla Shake (Large)	60
249	Smoothies & Shakes	Chocolate Shake (Large)	60
195	Coffee & Tea	Hot Chocolate with Nonfat Milk (Large)	60
153	Coffee & Tea	Caramel Latte (Large)	50
189	Coffee & Tea	Nonfat Caramel Mocha (Large)	50

Table 5: Top 10 items having high calcium %DV
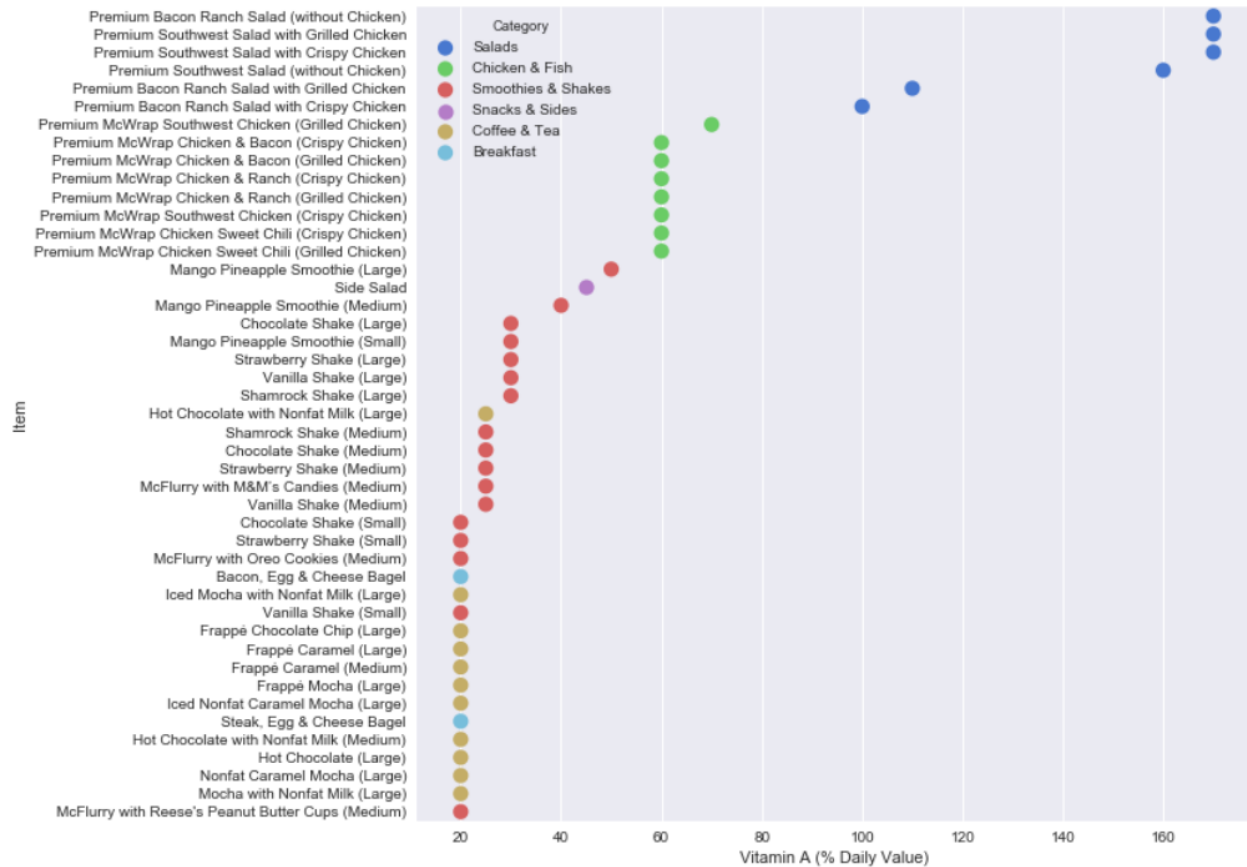
Fig.6 Point plot of items with high iron %DV

From the above plot we can infer that **41** items have high iron %DV out of which many belong to the **Beef & Pork** and **Chicken & Fish** category, since meat is a great source of iron. The items having maximum value of %DV can be seen from above plot. Their categorical distribution can also be viewed from the below count plot.

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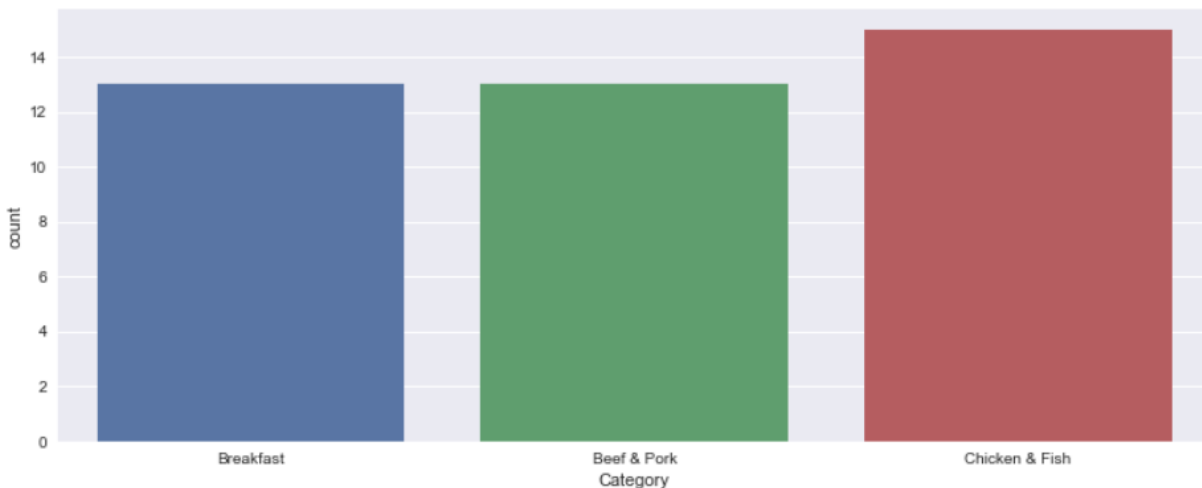
o **Vitamin A %DV:**

Fig.7 Point plot of items with high vitamin A %DV

From the above plot we can infer that **45** items have high iron %DV. The items having maximum value of %DV can be seen from above plot. Their categorical distribution can also be viewed from the below count plot.

o **Vitamin C %DV:**

Fig.8 Point plot of items with high vitamin C %DV

From the above plot we can infer that **34** items have high iron %DV. The items having maximum value of %DV can be seen from above plot. Their categorical distribution can also be viewed from the below count plot.
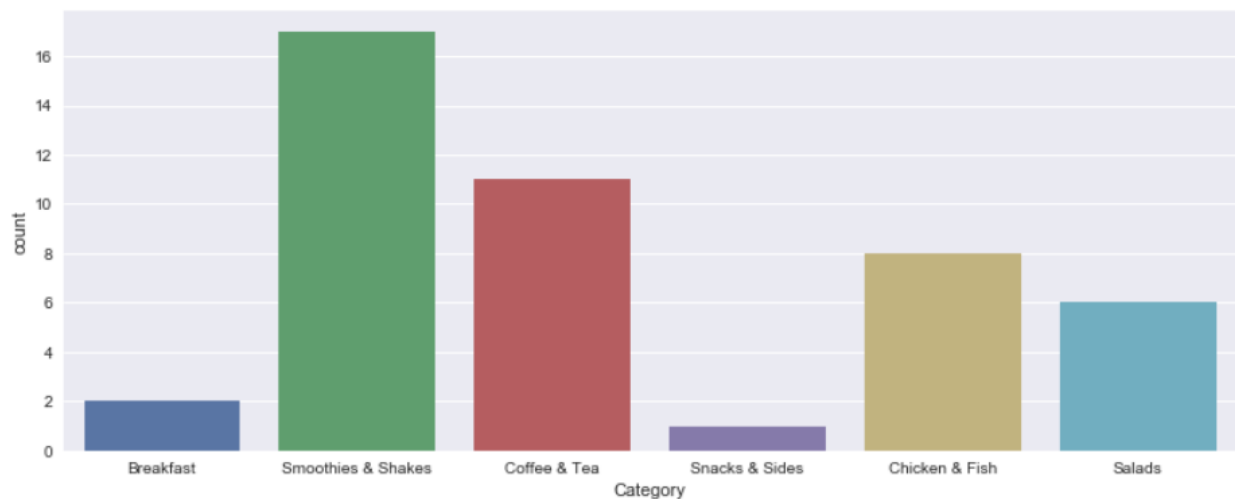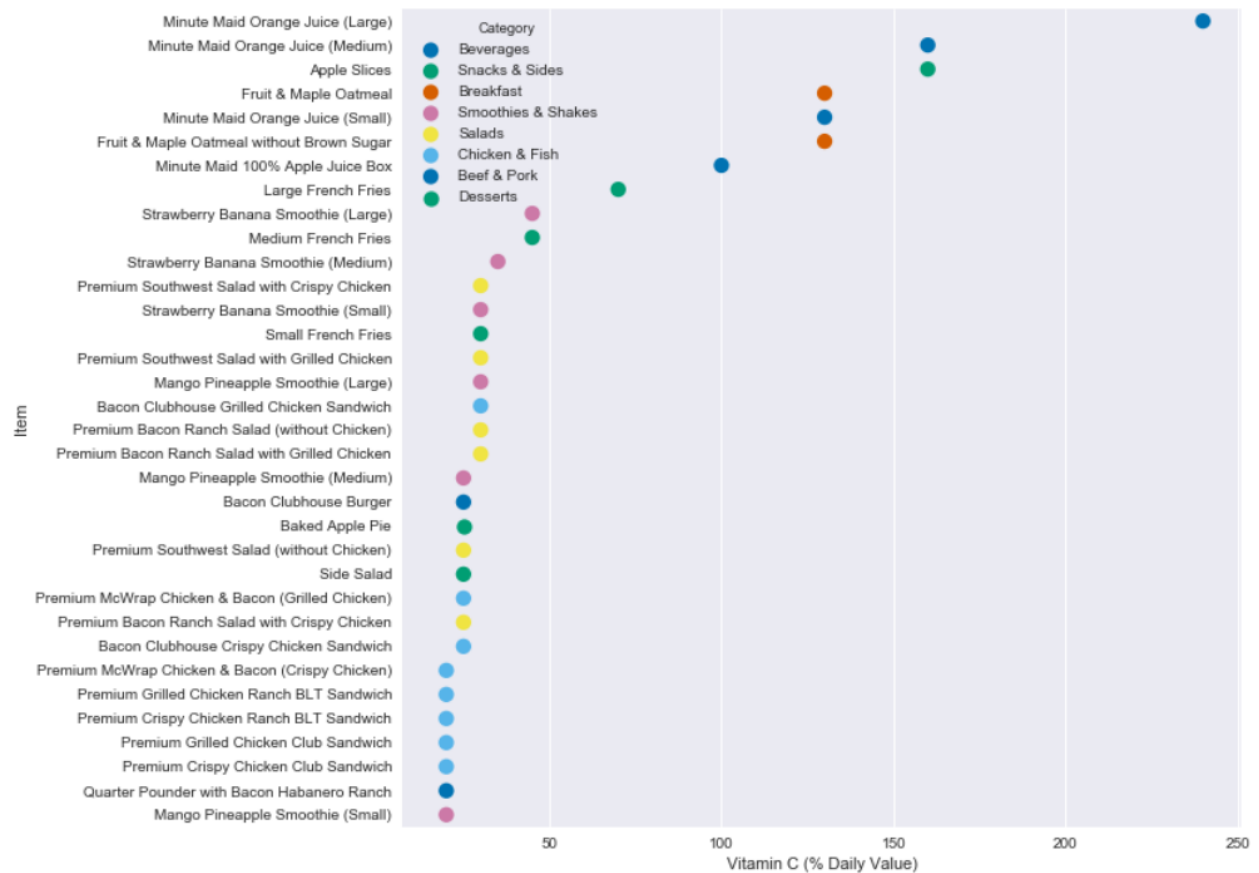
We will now try to look for items which have **lower %DV** for saturated fat, cholesterol and sodium from the items in dataset as per the **general guide.**

- o **Saturated fat %DV:**

Fig.9 Point plot of items with low saturated fat %DV

After analyzing data we come to know that there are **66** items have low Saturated fat %DV. There are many items having 0 %DV, as can be seen from above plot. Their categorical distribution can also be viewed from the below count plot. They are mostly present in the liquid food category.
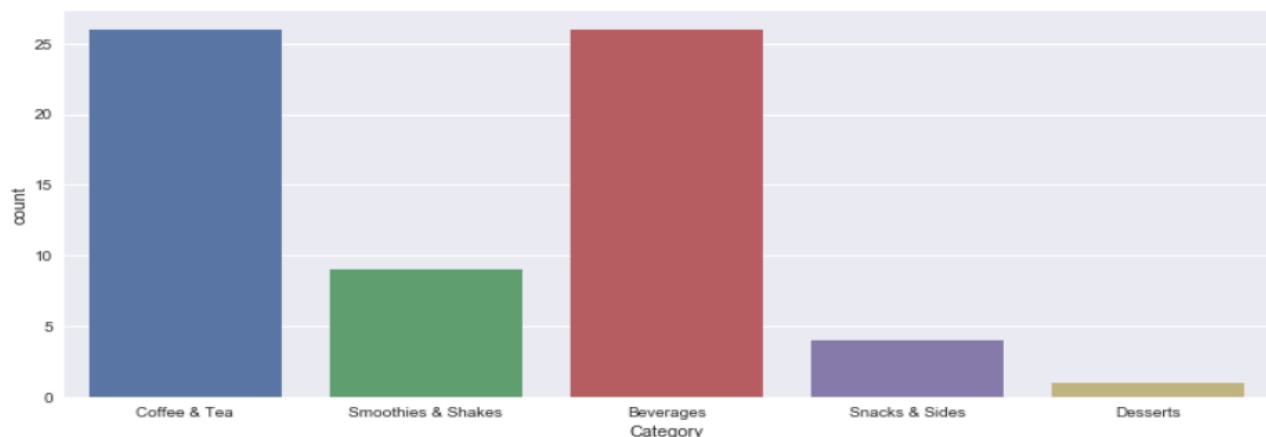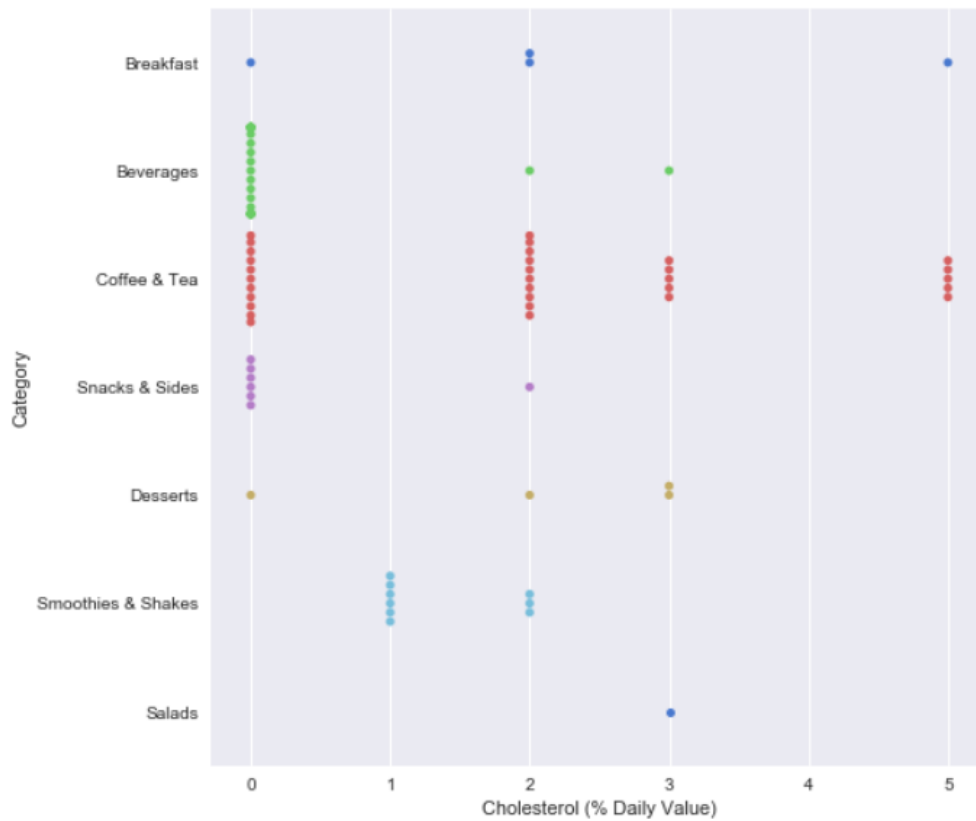
o **Cholesterol %DV:**

Fig.10 Point plot of items with low Cholesterol %DV

After analyzing data we come to know that there are **83** items have low cholesterol %DV. There are many items having 0 %DV, as can be seen from above plot. Their categorical distribution can also be viewed from the below count plot.
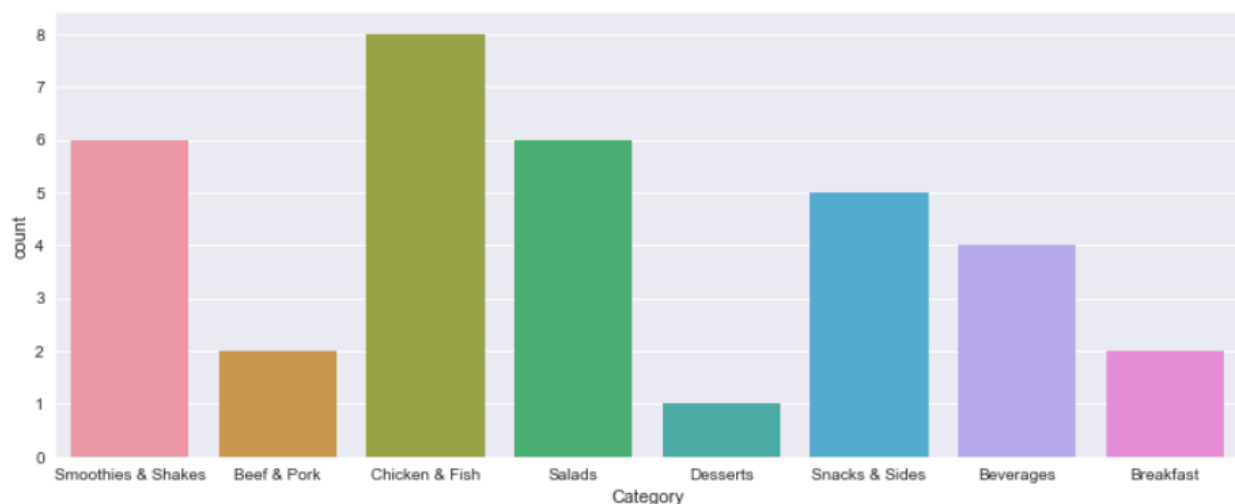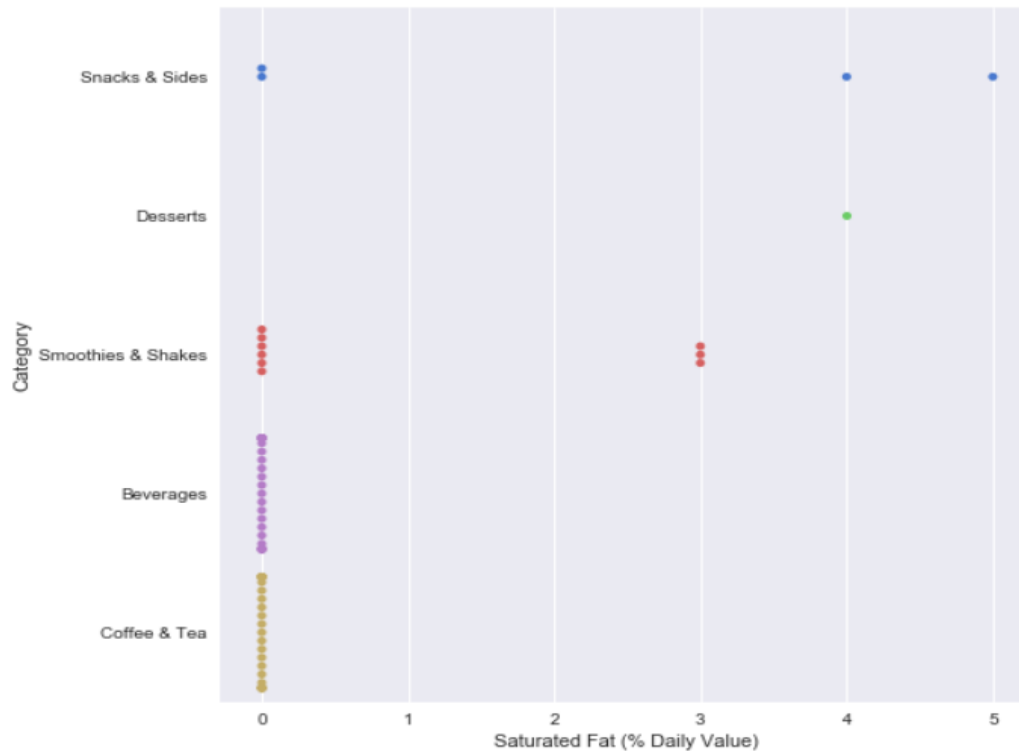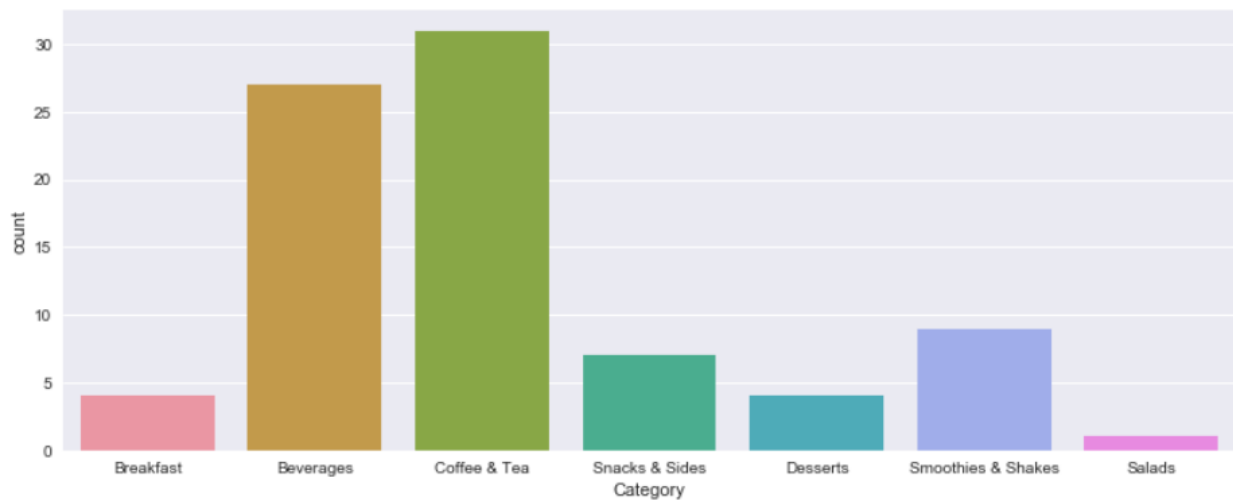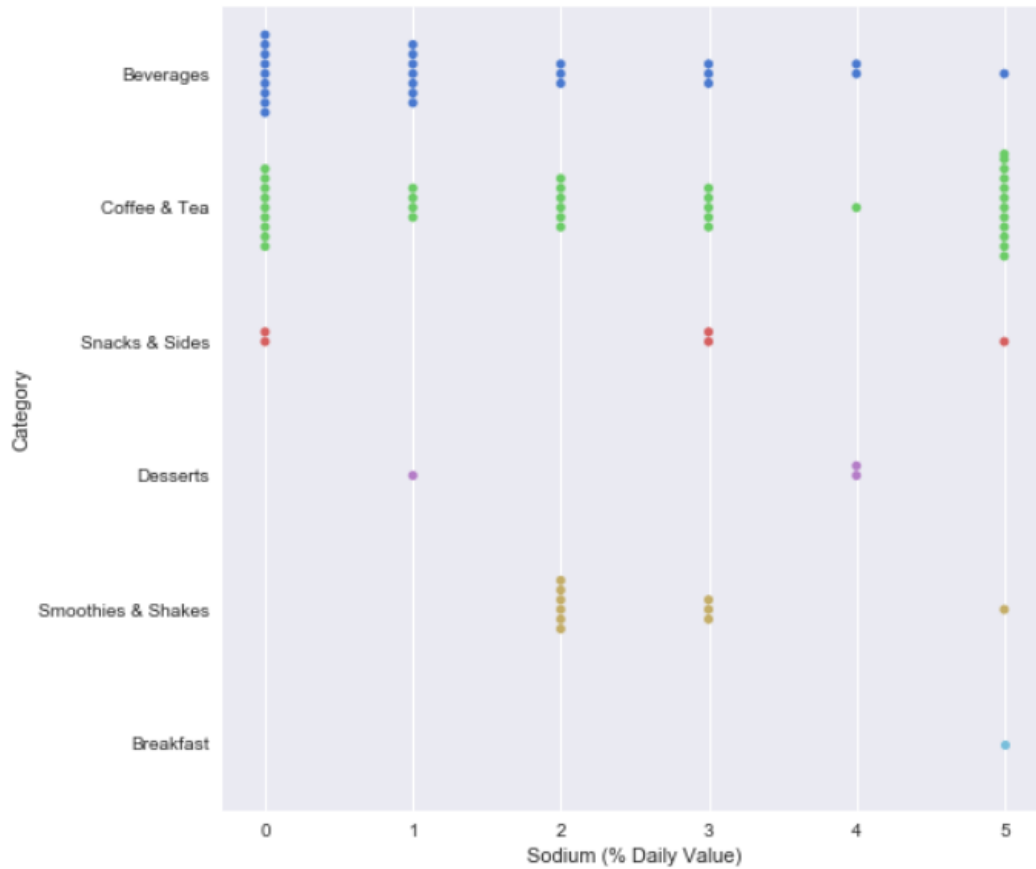
o **Sodium %DV:**

Fig.11 Point plot of items with low Sodium %DV

After analyzing data we come to know that there are **81** items have low sodium %DV. There are many items having 0 %DV, as can be seen from above plot. Their categorical distribution can also be viewed from the below count plot.
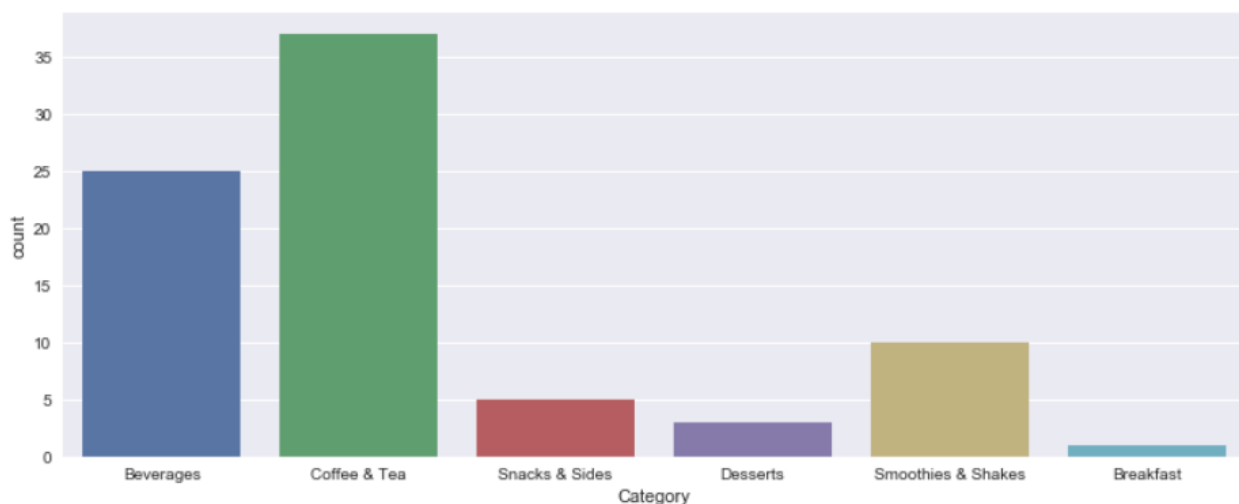
We followed the following approach to go about the solution: First the data is grouped by category. Then the sum of Cholesterol %DV of each category is divided by the sum of Cholesterol %DV values of all categories. We get the following output.

```
Category
Breakfast    44.75115
Name: Cholesterol (% Daily Value), dtype: float64
```

	Item	Sodium
82	Chicken McNuggets (40 piece)	3600

All the top 4 items contain same amount of saturated fat.

	Item	Saturated Fat
231	Frappé Chocolate Chip (Large)	20.0
82	Chicken McNuggets (40 piece)	20.0
32	Big Breakfast with Hotcakes (Large Biscuit)	20.0
253	McFlurry with M&M's Candies (Medium)	20.0

- **Analyzing data based on each category**

We'll now consider each category and see if we can understand them better.

- **Breakfast:**

Breakfast is often called 'the most important meal of the day', and for good reason. As the name suggests, breakfast breaks the overnight fasting period. It replenishes your supply of glucose to boost your energy levels and alertness, while also providing other essential nutrients required for good health. Thus it should be done properly. As per betterhealth government channel, a typical healthy breakfast meal should not be more than 400 calories. And a meal less than 150 calories cannot be considered enough. So we look for breakfast items which are above 150 and up to 400. Out of 42 breakfast items, there were total 9 items, which fit the requirement and they have been plotted as follows
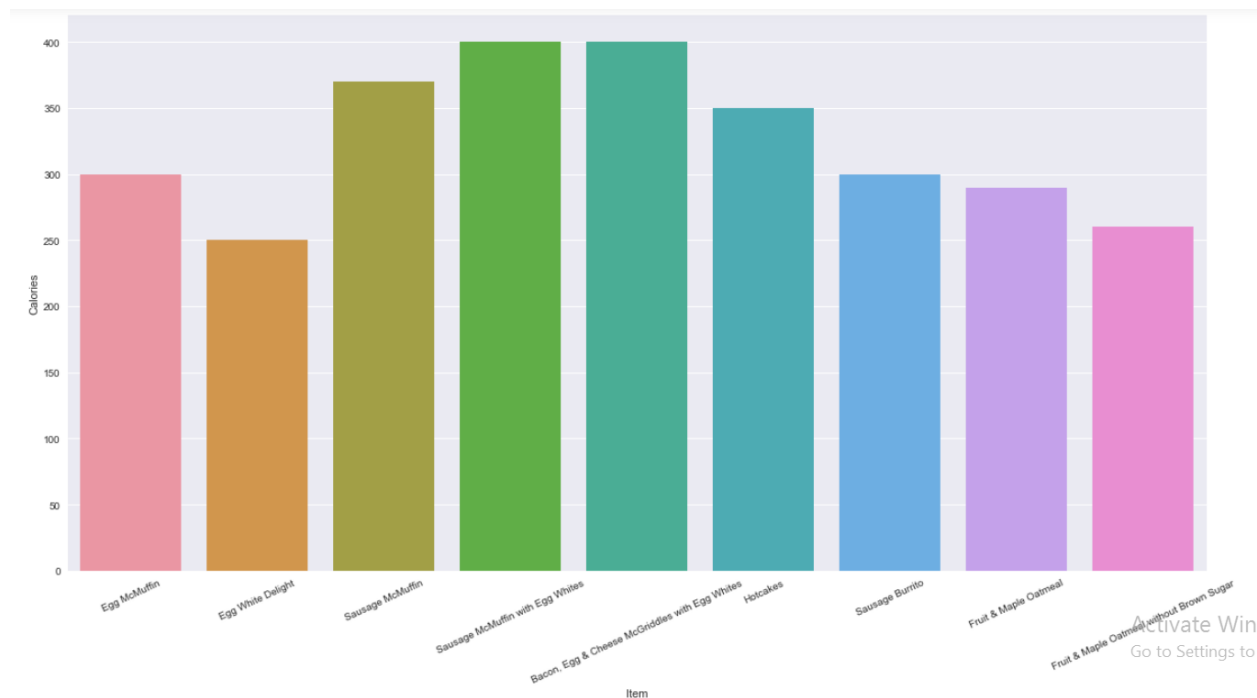
Fig.12 Items with calories between 150 and 400

Some important nutritional information related to these items are tabulated below

	Item	Calories	Protein	Dietary Fiber (% Daily Value)	Vitamin A (% Daily Value)	Vitamin C (% Daily Value)	Calcium (% Daily Value)	Iron (% Daily Value)	Total Fat (% Daily Value)
0	Egg McMuffin	300	17	17	10	0	25	15	20
1	Egg White Delight	250	18	17	6	0	25	8	12
2	Sausage McMuffin	370	14	17	8	0	25	10	35
4	Sausage McMuffin with Egg Whites	400	21	17	6	0	25	10	35
20	Bacon, Egg & Cheese McGriddles with Egg Whites	400	20	9	2	10	15	10	24
35	Hotcakes	350	8	10	0	0	15	15	13
37	Sausage Burrito	300	12	5	10	2	15	15	25
40	Fruit & Maple Oatmeal	290	5	19	2	130	10	10	6
41	Fruit & Maple Oatmeal without Brown Sugar	260	5	22	2	130	6	10	6

Table 6: Nutrition value related to the 9 items in breakfast

If the %DV lies between 10 to 19%, then it can be considered a good enough source of that nutrition.

There was only one item which has a calorie value of less than or equal to 150 calories.

	Item	Calories
38	Hash Brown	150

Having hash browns alone cannot be enough for a healthy diet. Either the serving size of it could be increased or it could be clubbed as a combo item so it is not consumed on its own.

o **Coffee & Tea:**

People from around the world start their days with coffee or tea. Drinking coffee and tea is a part of the daily life of adults and some of the young. The ingredients are easily available and can be experimented with. Both coffee and tea are usually served as a hot beverage, but can be made chilled or iced. Thus it has the highest variety among all the items present.

There were a few items which had zero calories

```
137        Iced Tea (Small)
138       Iced Tea (Medium)
139        Iced Tea (Large)
140        Iced Tea (Child)
145          Coffee (Small)
146         Coffee (Medium)
147          Coffee (Large)
Name: Item, dtype: object
```

Also, it had no other nutrition present apart from a very few amount of sodium.

People can consume it two to three times a day without any problem. These can be promoted by some mild advertising like during breakfast time or any other time which can help in increasing sales by a certain margin.

Having a look at the items with most calories and other non desirable nutritional facts as follows

	Item	Calories	Calories from Fat	Total Fat	Total Fat (% Daily Value)	Saturated Fat	Saturated Fat (% Daily Value)	Trans Fat	Sugars	Cholesterol	Cholesterol (% Daily Value)	Carbohydrates	Carbohydrates (% Daily Value)
231	Frappé Chocolate Chip (Large)	760	280	31.0	48	20.0	101	1.5	99	95	32	111	37
228	Frappé Caramel (Large)	670	250	27.0	42	17.0	87	1.5	88	95	32	96	32
225	Frappé Mocha (Large)	670	240	26.0	41	17.0	85	1.0	88	90	30	98	33
230	Frappé Chocolate Chip (Medium)	630	240	26.0	41	17.0	85	1.0	81	80	26	91	30
227	Frappé Caramel (Medium)	550	200	23.0	35	15.0	73	1.0	71	80	27	79	26
224	Frappé Mocha (Medium)	550	200	22.0	34	14.0	71	1.0	71	75	25	80	27
192	Hot Chocolate (Large)	540	180	20.0	31	12.0	58	0.5	68	60	20	73	24
229	Frappé Chocolate Chip (Small)	530	200	23.0	35	14.0	72	1.0	67	65	22	76	25
180	Mocha (Large)	500	150	17.0	26	10.0	49	0.5	63	50	17	72	24
186	Caramel Mocha (Large)	480	150	17.0	26	10.0	49	0.5	60	50	17	66	22
213	Iced Mocha (Large)	480	150	16.0	25	10.0	49	0.5	62	50	17	70	23
219	Iced Caramel Mocha (Large)	460	150	16.0	25	10.0	48	0.5	59	50	17	65	22
223	Frappé Mocha (Small)	450	160	18.0	28	12.0	59	1.0	57	65	21	65	22
226	Frappé Caramel (Small)	450	170	19.0	29	12.0	60	1.0	57	65	22	64	21
191	Hot Chocolate (Medium)	440	140	16.0	25	9.0	47	0.5	56	50	16	61	20
156	Hazelnut Latte (Large)	430	120	14.0	21	8.0	39	0.0	58	40	14	62	21
153	Caramel Latte (Large)	430	120	14.0	21	8.0	39	0.0	59	40	14	62	21
159	French Vanilla Latte (Large)	420	120	14.0	21	8.0	39	0.0	56	40	14	60	20
179	Mocha (Medium)	410	120	14.0	21	8.0	40	0.0	53	40	14	60	20

Table 7: Details about items with most calories in Coffee & Tea in breakfast

We can observe that **frappes**, **mocha** and **hot chocolate** items are the unhealthiest items in this category.

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Making a correlation plot of the above mentioned attributes
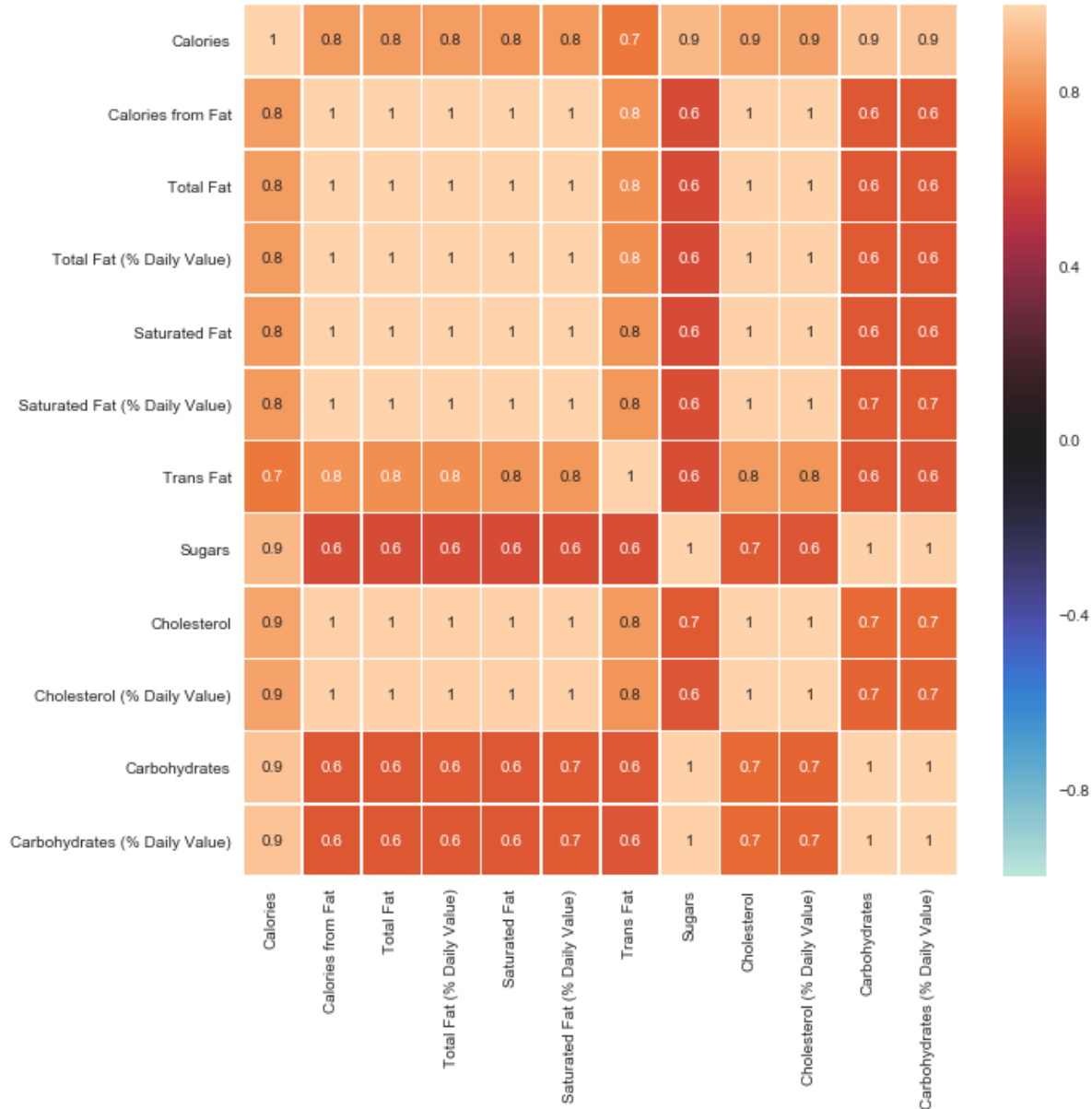
Fig.13 Correlation between undesirable attributes

We can observe from the above heat map that the undesirable elements are highly positively correlated to each other, i.e. if a particular variable increases or decreases we observe the same trend in the other variables too.

- o **Chicken & Fish and Beef & Pork:**

Chicken & Fish and Beef & Pork have been clubbed together as both are meat dominant category. They have **27** and **15** items respectively. We know that non vegetarian food is the greatest source of protein.

Let us check the top 10 items with high protein amounts.

	Item	Protein
82	Chicken McNuggets (40 piece)	87
47	Double Quarter Pounder with Cheese	48
81	Chicken McNuggets (20 piece)	44
64	Bacon Clubhouse Grilled Chicken Sandwich	40
60	Premium Grilled Chicken Club Sandwich	40
51	Bacon Clubhouse Burger	39
45	Quarter Pounder with Bacon Habanero Ranch	37
44	Quarter Pounder with Bacon & Cheese	37
63	Bacon Clubhouse Crispy Chicken Sandwich	36
62	Premium Grilled Chicken Ranch BLT Sandwich	36

Let us also check the top 10 items with high calorie amounts.

	Item	Calories	Protein
82	Chicken McNuggets (40 piece)	1880	87
81	Chicken McNuggets (20 piece)	940	44
63	Bacon Clubhouse Crispy Chicken Sandwich	750	36
47	Double Quarter Pounder with Cheese	750	48
51	Bacon Clubhouse Burger	720	39
59	Premium Crispy Chicken Club Sandwich	670	36
74	Premium McWrap Southwest Chicken (Crispy Chicken)	670	27
70	Premium McWrap Chicken & Bacon (Crispy Chicken)	630	32
45	Quarter Pounder with Bacon Habanero Ranch	610	37
61	Premium Crispy Chicken Ranch BLT Sandwich	610	32

The items in both cases are almost same.

We will try to check the relation between these two variables with the help of scatter plot
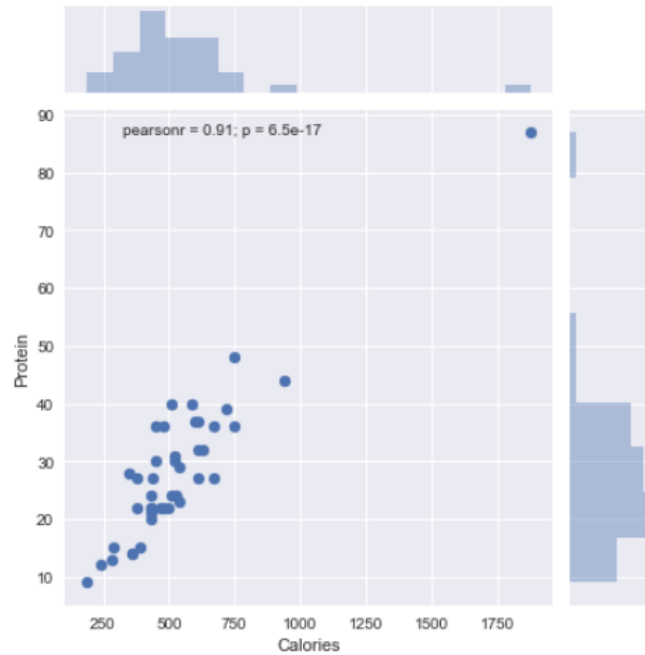
Fig.14 Scatter plot for meat category items

The graph indicates a positive relationship, i.e. with increase in values of one variable, the value of other variable increases too. This relation should hold true for all items too, which can be observed from the following scattering plot
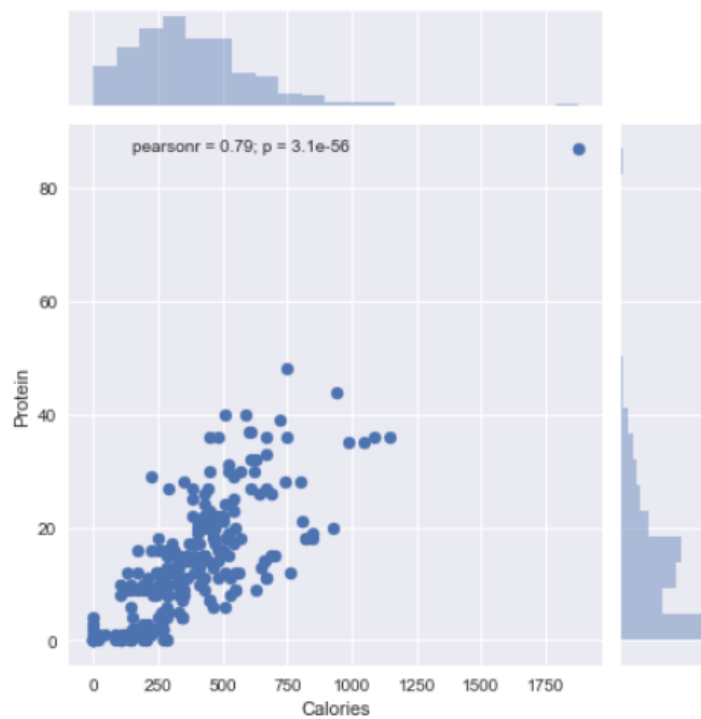
Fig.15 Scatter plot for all items

Let us check out items with the least amount of calories

	Item	Calories	Protein
83	Filet-O-Fish	390	15
52	McDouble	380	22
77	Premium McWrap Chicken Sweet Chili (Grilled Ch…	380	27
66	McChicken	360	14
69	Buffalo Ranch McChicken	360	14
58	Premium Grilled Chicken Classic Sandwich	350	28
49	Cheeseburger	290	15
79	Chicken McNuggets (6 piece)	280	13
48	Hamburger	240	12
78	Chicken McNuggets (4 piece)	190	9

o **Beverages and Smoothies & Shakes:**

The two categories; Beverages and Smoothies & Shakes have been combined together as they come under liquid food category. But they were not clubbed with coffee & tea for analysis purpose since they are not consumed as frequently as them. They have **27** and **28** items under them respectively, showing almost the same amount of variance. These are often clubbed with items from other categories in the form of happy meals.

Let us observe the items with supposedly 0 calories in them. Following are those items.

	Item
114	Diet Coke (Small)
115	Diet Coke (Medium)
116	Diet Coke (Large)
117	Diet Coke (Child)
122	Diet Dr Pepper (Small)
123	Diet Dr Pepper (Medium)
124	Diet Dr Pepper (Large)
125	Diet Dr Pepper (Child)
136	Dasani Water Bottle

There are **9** items as such. Apart from dasani water bottle, all other items have been labelled as 'diet'. After looking at other nutritional facts of these items as follows

	count	mean	std	min	25%	50%	75%	max
Calories	9.0	0.000000	0.000000	0.0	0.0	0.0	0.0	0.0
Calories from Fat	9.0	0.000000	0.000000	0.0	0.0	0.0	0.0	0.0
Total Fat	9.0	0.000000	0.000000	0.0	0.0	0.0	0.0	0.0
Total Fat (% Daily Value)	9.0	0.000000	0.000000	0.0	0.0	0.0	0.0	0.0
Saturated Fat	9.0	0.000000	0.000000	0.0	0.0	0.0	0.0	0.0
Saturated Fat (% Daily Value)	9.0	0.000000	0.000000	0.0	0.0	0.0	0.0	0.0
Trans Fat	9.0	0.000000	0.000000	0.0	0.0	0.0	0.0	0.0
Cholesterol	9.0	0.000000	0.000000	0.0	0.0	0.0	0.0	0.0
Cholesterol (% Daily Value)	9.0	0.000000	0.000000	0.0	0.0	0.0	0.0	0.0
Sodium	9.0	48.888889	46.688983	0.0	15.0	35.0	70.0	140.0
Sodium (% Daily Value)	9.0	2.000000	2.000000	0.0	1.0	1.0	3.0	6.0
Carbohydrates	9.0	0.000000	0.000000	0.0	0.0	0.0	0.0	0.0
Carbohydrates (% Daily Value)	9.0	0.000000	0.000000	0.0	0.0	0.0	0.0	0.0
Dietary Fiber	9.0	0.000000	0.000000	0.0	0.0	0.0	0.0	0.0
Dietary Fiber (% Daily Value)	9.0	0.000000	0.000000	0.0	0.0	0.0	0.0	0.0
Sugars	9.0	0.000000	0.000000	0.0	0.0	0.0	0.0	0.0
Protein	9.0	1.111111	1.536591	0.0	0.0	0.0	2.0	4.0
Vitamin A (% Daily Value)	9.0	0.000000	0.000000	0.0	0.0	0.0	0.0	0.0
Vitamin C (% Daily Value)	9.0	0.000000	0.000000	0.0	0.0	0.0	0.0	0.0
Calcium (% Daily Value)	9.0	0.000000	0.000000	0.0	0.0	0.0	0.0	0.0
Iron (% Daily Value)	9.0	0.000000	0.000000	0.0	0.0	0.0	0.0	0.0

Table 8: Nutritional facts about 0 calorie items in Beverages and Smoothies & Shakes

We can see that they contain small amount of sodium content in them. But this amount is ok and not to be concerned much about.

Now let us look at top 10 items having highest amount of calories.

	Category	Item	Serving Size	Calories
253	Smoothies & Shakes	McFlurry with M&M's Candies (Medium)	16.2 oz (460 g)	930
246	Smoothies & Shakes	Strawberry Shake (Large)	22 fl oz cup	850
249	Smoothies & Shakes	Chocolate Shake (Large)	22 fl oz cup	850
243	Smoothies & Shakes	Vanilla Shake (Large)	22 fl oz cup	820
251	Smoothies & Shakes	Shamrock Shake (Large)	22 fl oz cup	820
258	Smoothies & Shakes	McFlurry with Reese's Peanut Butter Cups (Medium)	14.2 oz (403 g)	810
248	Smoothies & Shakes	Chocolate Shake (Medium)	16 fl oz cup	700
256	Smoothies & Shakes	McFlurry with Oreo Cookies (Medium)	13.4 oz (381 g)	690
245	Smoothies & Shakes	Strawberry Shake (Medium)	16 fl oz cup	690
242	Smoothies & Shakes	Vanilla Shake (Medium)	16 fl oz cup	660

Table 9: Top 10 high calorie items in Beverages and Smoothies & Shakes

The above values are too much to be coming from a liquid food category. They are almost equivalent to calorie consumption from two full meals. And apart from that we can also see that the serving size is not a factor as items with medium size are present in the top 10 too. These items should not be promoted to be consumed frequently as they might cause serious health issues as these are of the most preferred items for children and teenagers age groups.

From the below data summary table for these two categories, we can observe that the mean values for calories, Calories from Fat, Total Fat (% Daily Value), Saturated Fat (% Daily Value), Cholesterol (% Daily Value) and Carbohydrates (% Daily Value) are pretty high which are not desirable at all.

	count	mean	std	min	25%	50%	75%	max
Calories	10.0	782.0	90.283504	660.0	692.50	815.0	842.50	930.0
Calories from Fat	10.0	215.0	42.229532	170.0	185.00	210.0	210.00	290.0
Total Fat	10.0	24.0	4.784233	19.0	20.75	23.0	23.75	33.0
Total Fat (% Daily Value)	10.0	36.6	7.545418	29.0	31.25	35.0	36.00	50.0
Saturated Fat	10.0	14.4	2.412928	12.0	12.25	15.0	15.00	20.0
Saturated Fat (% Daily Value)	10.0	71.7	12.596737	58.0	62.25	73.0	74.75	102.0
Trans Fat	10.0	1.0	0.000000	1.0	1.00	1.0	1.00	1.0
Cholesterol	10.0	77.0	12.292726	55.0	75.00	75.0	88.75	90.0
Cholesterol (% Daily Value)	10.0	25.4	3.864367	19.0	24.00	25.0	29.00	30.0
Sodium	10.0	291.0	71.871799	200.0	260.00	260.0	360.00	400.0
Sodium (% Daily Value)	10.0	12.4	2.951459	9.0	11.00	11.0	15.25	17.0
Carbohydrates	10.0	124.7	14.360826	106.0	114.00	124.5	138.00	141.0
Carbohydrates (% Daily Value)	10.0	41.5	4.881940	35.0	38.00	41.5	45.75	47.0
Dietary Fiber	10.0	0.9	0.994429	0.0	0.00	0.5	2.00	2.0
Dietary Fiber (% Daily Value)	10.0	3.5	3.836955	0.0	0.00	2.5	6.75	9.0
Sugars	10.0	105.3	15.853846	81.0	97.75	102.0	118.75	128.0
Protein	10.0	17.3	2.406011	14.0	15.00	18.0	18.75	21.0
Vitamin A (% Daily Value)	10.0	26.0	3.944053	20.0	25.00	25.0	30.00	30.0
Vitamin C (% Daily Value)	10.0	0.0	0.000000	0.0	0.00	0.0	0.00	0.0
Calcium (% Daily Value)	10.0	58.0	7.888106	50.0	50.00	60.0	60.00	70.0
Iron (% Daily Value)	10.0	5.1	5.782156	0.0	0.00	3.0	10.00	15.0

Table 10: Nutritional summary for Smoothies & Shakes and Beverages categories

o **Salads:**

A salad is a serving in a meal that includes leaf vegetables such as lettuce, spinach, or arugula. Uncooked or cold cooked vegetables that are sliced into small pieces (for example tomato or onion) are then mixed with the leafy vegetables. A salad dressing or vinaigrette is then poured on top of the vegetables. Salad dressings and vinaigrettes are a mixture of oil, herbs, spices, and flavorings.

People also add other foods to the salad, such as croutons, bacon, chicken, grated cheese, tuna, pasta, olives, cooked potatoes, rice, or beans. They are often considered as

healthier food items, and people are often misled by their name without having a look at their nutritional facts. McDonalds have 6 items under the salad category with all their nutritional facts as follows

	84	85	86	87	88	89
Category	Salads	Salads	Salads	Salads	Salads	Salads
Item	Premium Bacon Ranch Salad (without Chicken)	Premium Bacon Ranch Salad with Crispy Chicken	Premium Bacon Ranch Salad with Grilled Chicken	Premium Southwest Salad (without Chicken)	Premium Southwest Salad with Crispy Chicken	Premium Southwest Salad with Grilled Chicken
Serving Size	7.9 oz (223 g)	9 oz (255 g)	8.5 oz (241 g)	8.1 oz (230 g)	12.3 oz (348 g)	11.8 oz (335 g)
Calories	140	380	220	140	450	290
Calories from Fat	70	190	80	40	190	80
Total Fat	7	21	8	4.5	22	8
Total Fat (% Daily Value)	11	33	13	7	33	13
Saturated Fat	3.5	6	4	2	4.5	2.5
Saturated Fat (% Daily Value)	18	29	20	9	22	13
Trans Fat	0	0	0	0	0	0
Cholesterol	25	70	85	10	50	70
Cholesterol (% Daily Value)	9	23	29	3	17	23
Sodium	300	860	690	150	850	680
Sodium (% Daily Value)	13	36	29	6	35	28
Carbohydrates	10	22	8	20	42	28
Carbohydrates (% Daily Value)	3	7	3	7	14	9
Dietary Fiber	3	2	2	6	7	7
Dietary Fiber (% Daily Value)	12	10	10	23	28	28
Sugars	4	5	4	6	12	10
Protein	9	25	29	6	23	27
Vitamin A (% Daily Value)	170	100	110	160	170	170
Vitamin C (% Daily Value)	30	25	30	25	30	30
Calcium (% Daily Value)	15	15	15	15	15	15
Iron (% Daily Value)	6	8	8	10	15	15

Table 11: Information about all salad items

It can be observed that the salads, number 84 and 87 having the least amount of calories are without chicken and can be considered the healthiest among all. The salads, number 86 and 89 having moderate amount of calories contained grilled chicken as compared to high calorie salads, number 85 and 88 which have crispy chicken. Thus we can say that grilled chicken items are healthier alternatives for crispy chicken items.

o **Desserts:**

Dessert is the sweet course eaten at the end of a meal. McDonalds has 7 dessert items in its menu which are as follows

	103	104	105	106	107	108	109
Category	Desserts	Desserts	Desserts	Desserts	Desserts	Desserts	Desserts
Item	Baked Apple Pie	Chocolate Chip Cookie	Oatmeal Raisin Cookie	Kids Ice Cream Cone	Hot Fudge Sundae	Hot Caramel Sundae	Strawberry Sundae
Serving Size	2.7 oz (77 g)	1 cookie (33 g)	1 cookie (33 g)	1 oz (29 g)	6.3 oz (179 g)	6.4 oz (182 g)	6.3 oz (178 g)
Calories	250	160	150	45	330	340	280
Calories from Fat	110	70	50	10	80	70	60
Total Fat	13	8	6	1.5	9	8	6
Total Fat (% Daily Value)	19	12	9	2	14	12	10
Saturated Fat	7	3.5	2.5	1	7	5	4
Saturated Fat (% Daily Value)	35	19	13	4	34	24	20
Trans Fat	0	0	0	0	0	0	0
Cholesterol	0	10	10	5	25	30	25
Cholesterol (% Daily Value)	0	3	3	2	8	10	8
Sodium	170	90	135	20	170	150	85
Sodium (% Daily Value)	7	4	6	1	7	6	4
Carbohydrates	32	21	22	7	53	60	49
Carbohydrates (% Daily Value)	11	7	7	2	18	20	16
Dietary Fiber	4	1	1	0	1	0	0
Dietary Fiber (% Daily Value)	15	3	3	0	3	0	0
Sugars	13	15	13	6	48	43	45
Protein	2	2	2	1	8	7	6
Vitamin A (% Daily Value)	4	2	2	2	8	10	8
Vitamin C (% Daily Value)	25	0	0	0	0	0	4
Calcium (% Daily Value)	2	2	2	4	25	25	20
Iron (% Daily Value)	6	8	6	0	8	0	0

Table 12: Information about all dessert items

The items that look healthier among them after looking at the nutritional facts are baked apple pie and kids ice cream cone. It should be noted that dessert is an unpopular item in the fast food chain industry thus their quantities are so less. But this doesn't mean they can be any less harmful if consumed more than their actual 1 serving amount.

Conclusion

With US and European markets maturing and the fast food market becoming increasingly competitive, McDonald's has been diversifying its portfolio to maintain growth.

McDonalds offers a full or limited breakfast menu. It is also focusing on its McCafé coffee brand and offers a variety of items under it as well as its snack and treat offerings to build stronger relationships with its casual customers. Its aim is to convert its casual customers to committed ones.

It's clear that though McDonald's menu items may not be the healthiest, the company works hard to adjust its menus to the tastes of its consumers. It has started to include healthier options on its menu like lower-calorie salads, fruits, and wraps to its line-up. McDonald's has tried to keep its target market narrowed down to families, but it aims to attract other segments as well.

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