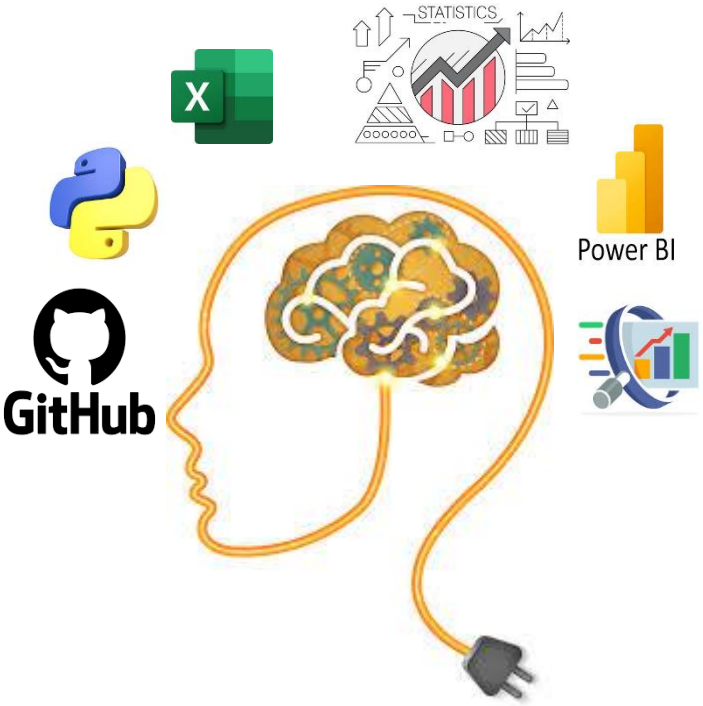
Nutritional Analysis of McDonald's India Menu Using Excel and Power BI

A data visualization and statistical exploration using Excel and Power BI.



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Objective:

I am a student of Applied Mathematics with a strong passion for Biostatistics and a clear vision to build a career in health data analysis. To align my academic background with real-world applications, I undertook a project titled "Nutritional Analysis of McDonald's India Menu", focusing on the intersection of nutrition and data science.

This project was designed to sharpen my analytical skills by exploring nutritional relationships using Microsoft Excel and Power BI. Through data cleaning, statistical exploration, visualization, and regression analysis, I investigated key health indicators such as calorie distribution, fat content, sodium levels, and their interdependencies.

The purpose of this documentation is to provide a structured overview of the project, demonstrate my ability to apply statistical thinking and data tools, and reflect my readiness to contribute to data-driven roles in biostatistics and health analytics.

Dataset Overview

The dataset used for this project was sourced from Kaggle, available at:

📌 McDonald's India Menu Nutrition Facts - Kaggle

The dataset was originally provided in CSV format, I imported the data in Microsoft Excel for cleaning and analysis. The final Excel workbook contains four separate sheets:

1. Raw Data Sheet – The original dataset with necessary preprocessing.
2. Descriptive Statistics Sheet – A summary of key metrics such as Mean, Standard Error, Median, Mode, Standard Deviation, Sample Variance, Kurtosis, Skewness, Range, Minimum, Maximum, Sum, Count for all numerical variables.
3. Correlation Matrix – Paiwise Pearson correlation values between all numeric variables.
4. Regression Analysis – A multiple linear regression model examinig factors influencing calorie content.

📌 DataSet Structure:

- Total Records: 142 rows (with headers)
- Total Variables: 13 columns

📌 Variables Include:

Menu Category, Menu Items, Per Serve Size, Energy (kCal), Protein (g), Total fat (g), Sat Fat (g), Trans fat (g), Cholesterols (mg), Total carbohydrate (g), Total Sugars (g), Added Sugars (g), and Sodium (mg).

📌 Usefulness of the Dataset:

- Descriptive Statistics to summarize nutritional metrics
- Comparative Analysis across menu categories
- Visual Explorations to identify high/low nutrient items
- Regression & Correlation to explore relationships.

Data Cleaning & Preparation

Data Cleaning and Preparation

To ensure the dataset was ready for analysis, I completed the following steps in Microsoft Excel:

1. **Handling Missing Values**
   Blank values in numeric fields were replaced with 0 to maintain data integrity and enable statistical analysis.
2. **Data Type Validation**
   Verified each column's data type:
   - Categorical variables (Menu Category, Menu Items) were stored as text
   - Quantitative variables were converted to numeric types using Excel functions
3. **Column Cleanup**
   Column headers were reviewed for consistency, bolded for better understanding, units were confirmed, and standardized.
4. **Descriptive Statistics Sheet**
   Created using functions like Average(), STDEV.P(), MIN(), MAX(), and MEDIAN() to summarize all numeric columns.
5. **Correlation Matrix Sheet**
   Generated using Excel's Data Analysis ToolPak -----> Correlation tool. Conditional fomatting was applied to highlight strong positive and negative correlation.
6. **Regression Analysis Sheet**
   Conducted using Excel's Data Analysis ToolPak ----> Regression tool. Set the dependent variable as Energy (kCal), and the Independent variable as Total Fat (g), Protein (g), Total Carbohydrated (g) etc. The output included coefficients, R-squared value, standard error, and p-values, which were interpreted in later sections to understand nutrient impact on calorie content.
7. **Final Review**
   All sheets were reviewed for:
   - Consistent formatting
   - Logical data flow
   - Clear labeling of statistical outputs

The workbook was finalized for visualization and insight generation using Excel and Power BI.

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	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Menu Category	Menu Items	Per Serve Size	Energy (kCal)	Protein (g)	Total fat (g)	Sat Fat (g)	Trans fat (g)	Cholesterols (mg)	Total carbohydrate (g)	Total Sugars (g)	Added Sugars (g)	Sodium (mg)
2	Regular Menu	2 piece Chicken Strips	58 g	164.44	10.17	12.38	11.41	0.06	30.10	2.68	0.29	0.00	477.22
3	Regular Menu	3 piece Chicken Strips	87 g	246.65	15.26	18.57	17.12	0.09	45.15	4.02	0.44	0.00	715.83
4	Regular Menu	4 piece Chicken McNuggets	64 g	169.68	10.03	9.54	4.45	0.06	24.66	10.50	0.32	0.00	313.25
5	Regular Menu	5 piece Chicken Strips	145 g	411.09	25.43	28.54	0.15	75.26	6.70	0.73	0.72	0.00	1193.05
6	Regular Menu	6 piece Chicken McNuggets	96 g	254.52	15.04	14.30	6.68	0.10	36.99	15.74	0.48	0.00	469.87
7	Regular Menu	9 piece Chicken McNuggets	144 g	381.77	22.56	21.46	10.02	0.14	55.48	23.62	0.72	0.00	704.81
8	Regular Menu	American Chicken Burger	165 g	446.95	20.29	22.94	7.28	0.15	47.63	38.54	7.48	4.76	1132.30
9	McCafe Menu	American Mud Pie Shake	317 ml	398.19	5.67	12.77	11.38	0.20	10.89	64.75	53.40	34.35	185.73
10	Gourmet Menu	American Triple Cheese Chicken	195 g	457.94	24.43	22.65	11.56	0.17	71.23	37.45	7.64	3.84	1396.17
11	Gourmet Menu	American Triple Cheese Veg	207 g	524.69	19.54	23.16	14.78	0.19	48.74	56.24	7.90	3.84	1174.27
12	Regular Menu	American Veg Burger	177 g	512.17	15.30	23.45	10.51	0.17	25.24	56.96	7.85	4.76	1051.24
13	Breakfast Menu	Americano (L)	455 ml	26.71	1.09	0.06	0.06	0.06	0.55	5.30	0.28	0.00	0.65
14	Breakfast Menu	Americano (R)	347.5 ml	23.07	0.94	0.05	0.05	0.05	0.48	4.57	0.24	0.00	0.57
15	Breakfast Menu	Americano (S)	276.5 ml	12.87	0.52	0.03	0.03	0.03	0.27	2.55	0.13	0.00	0.32
16	McCafe Menu	Babycino	127 ml	143.50	3.87	4.38	3.08	0.15	12.27	22.85	18.53	9.21	96.44
17	Condiments Menu	BBQ diping sauce	25 g	54.89	0.26	0.49	0.15	0.04	0.25	12.36	7.65	2.50	113.23
18	McCafe Menu	Cappuccino (L)	355 ml	219.36	10.51	12.03	8.85	0.36	36.55	19.81	14.45	0.00	155.06
19	Breakfast Menu	Cappuccino (R)	297.5 ml	183.61	8.79	10.02	7.37	0.30	30.48	16.67	12.05	0.00	129.24
20	Breakfast Menu	Cappuccino (S)	201.5 ml	125.25	6.02	7.01	5.15	0.20	21.27	11.02	8.40	0.00	90.39

Fig : The cleaned Dataset

Descriptive Statistics

I calculated the Descriptive statistics using Excel to summarize the central tendencies and variability of each nutritional variable. Key meaures include mean, median, minimum, maximum, and standard deviation. These help identify overall trends, such as average calorie content and nutrient distribution across items. The results are presented in a separate sheet titled “Summary”. This summary provided a baseline for deeper analysis like correlation and regression.

	Energy (kCal)	Protein (g)	Total fat (g)	Sat Fat (g)	Trans fat (g)	Cholesterols (mg)	Total carbohydrate (g)	Total Sugars (g)	Added Sugars (g)	Sodium (mg)
Mean	244.635461	7.493546099	9.991702128	4.997588652	0.687163121	26.35007092	31.19028369	15.46489362	10.33695035	359.4963121
Standard Error	15.62653623	0.702090525	0.870743903	0.412692421	0.532756746	4.23890436	1.735005123	1.321353408	1.202878294	39.78768292
Median	219.36	4.79	7.77	4.27	0.15	8.39	30.82	9.16	3.64	150.9
Mode	12.87	0	0	0	0	0	2.55	0	0	0.32
Standard Deviation	185.5548368	8.336863074	10.33951097	4.900450985	6.326135847	50.33420045	20.60204435	15.69020238	14.28338835	472.4525579
Sample Variance	34430.59747	69.50328591	106.9054871	24.01441986	40.01999475	2533.531735	424.4442313	246.1824509	204.0151828	223211.4194
Kurtosis	0.801440175	1.688689373	1.349059047	0.625304452	140.8987706	13.95063498	-0.295618898	0.269246828	2.033558846	3.3802256
Skewness	0.976921461	1.422867717	1.269928229	1.038434684	11.86799739	3.605096901	0.364823985	1.03790643	1.57974606	1.861694668
Range	834.36	39.47	45.18	20.46	75.26	302.61	93.84	64.22	64.22	2399.49
Minimum	0	0	0	0	0	0	0	0	0	0
Maximum	834.36	39.47	45.18	20.46	75.26	302.61	93.84	64.22	64.22	2399.49
Sum	34493.6	1056.59	1408.83	704.66	96.89	3715.36	4397.83	2180.55	1457.51	50688.98
Count	141	141	141	141	141	141	141	141	141	141

Fig : Descriptive Statistics Table

Correlation and Regression Analysis

Using Excel’s Data Analysis ToolPak, I performed a correlation analysis to examine relationships between nutritional variables. A correlation matrix was generated to identify linear patterns, such as how fat or sugar content may relate to calorie count. Additionally, a multiple linear regression was conducted using calories (Energy (kCal)) as the dependent variable and other nutrients as independent variables. These results are included in two dedicated sheets: “Correlation Matrix” and “Regression Analysis”.

	Energy (kCal)	Protein (g)	Total fat (g)	Sat Fat (g)	Trans fat (g)	Cholesterols (mg)	Total carbohydrate (g)	Total Sugars (g)	Added Sugars (g)	Sodium (mg)
Energy (kCal)	1	0.826833093	0.908642023	0.798444886	0.081401184	0.379386795	0.815603277	0.063306454	0.003638849	0.843557272
Protein (g)	0.826833093	1	0.875593805	0.702714501	0.189193526	0.590031227	0.415217122	-0.282875492	-0.319231338	0.885498922
Total fat (g)	0.908642023	0.875593805	1	0.843380619	0.1584003	0.424339122	0.538477939	-0.220125025	-0.280462193	0.867647172
Sat Fat (g)	0.798444886	0.702714501	0.843380619	1	-0.076430861	0.363134925	0.525836916	-0.05043371	-0.174229971	0.637284038
Trans fat (g)	0.081401184	0.189193526	0.1584003	-0.076430861	1	-0.02968135	-0.123237108	-0.08229664	-0.067124293	0.154242777
Cholesterols (mg)	0.379386795	0.590031227	0.424339122	0.363134925	-0.02968135	1	0.142834152	-0.205699152	-0.225600765	0.469100978
Total carbohydrate (g)	0.815603277	0.415217122	0.538477939	0.525836916	-0.123237108	0.142834152	1	0.508707319	0.45504878	0.494207778
Total Sugars (g)	0.063306454	-0.282875492	-0.220125025	-0.05043371	-0.08229664	-0.205699152	0.508707319	1	0.912167809	-0.296227107
Added Sugars (g)	0.003638849	-0.319231338	-0.280462193	-0.174229971	-0.067124293	-0.225600765	0.45504878	0.912167809	1	-0.270869073
Sodium (mg)	0.843557272	0.885498922	0.867647172	0.637284038	0.154242777	0.469100978	0.494207778	-0.296227107	-0.270869073	1

Fig : Correlation Matrix

The correlation analysis shows that Total Fat (g) and Protein (g) have a strong positive correlation with Energy (kCal), indicating that higher fat and protein levels are closely linked to higher calorie counts.

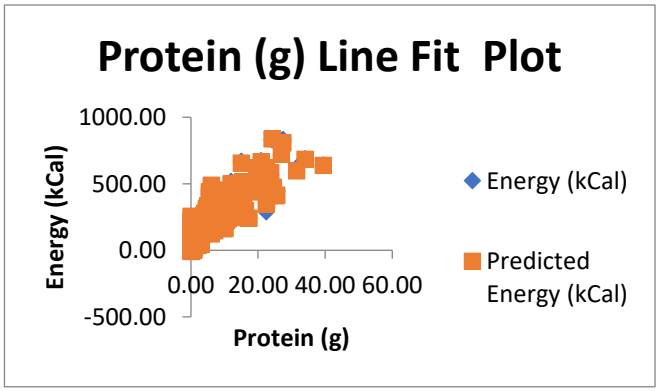
The regression analysis produced an R^2 value of 0.993, suggesting that the model explains over 99% of the variation in calorie content. Among the predictors, Total Fat, Saturated Fat, and Total Carbohydrate had the most significant positive impact on Energy (kCal), while Cholesterol and Sugars showed minimal or even slightly negative effects.

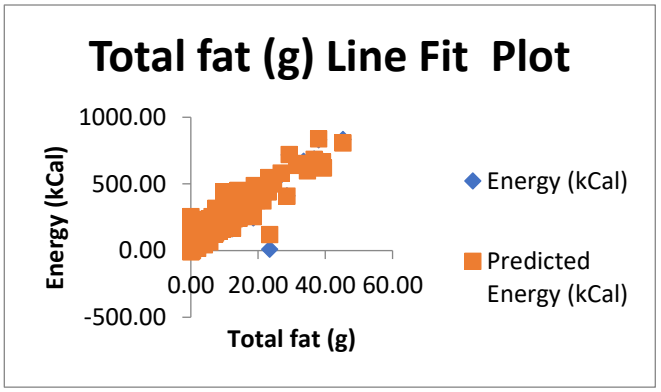
These findings confirm that fat and carbs are the primary drivers of calorie levels in McDonald’s India menu items.

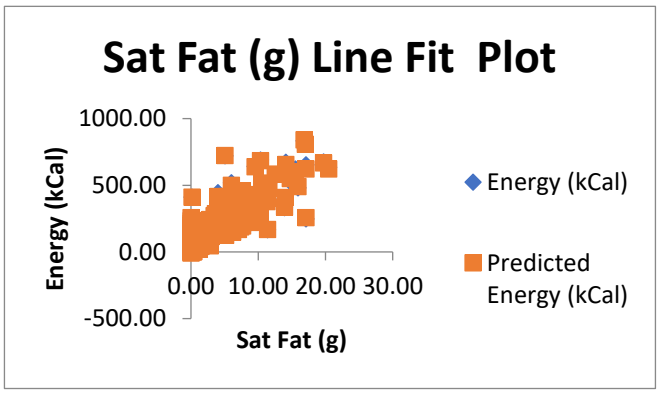
	A	B	C	D	E	F	G	H	I
1	SUMMARY OUTPUT								
2									
3	*Regression Statistics*								
4	Multiple R	0.996888295							
5	R Square	0.993786273							
6	Adjusted R Square	0.993359376							
7	Standard Error	15.12086815							
8	Observations	141							
9									
10	ANOVA								
11		*df*	*SS*	*MS*	*F*	*Significance F*			
12	Regression	9	4790331.72	532259.0801	2327.928441	6.2751E-140			
13	Residual	131	29951.92561	228.6406535					
14	Total	140	4820283.646						
15									
16		*Coefficients*	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
17	Intercept	-7.295469901	2.512077751	-2.904157683	0.004323322	-12.26495892	-2.32598088	-12.26495892	-2.32598088
18	Protein (g)	5.032750278	0.436182268	11.53818173	1.09733E-21	4.169877705	5.895622851	4.169877705	5.895622851
19	Total fat (g)	4.931408595	0.449102639	10.98058253	2.73185E-20	4.042976446	5.819840745	4.042976446	5.819840745
20	Sat Fat (g)	3.456815042	0.596289534	5.797208981	4.77924E-08	2.277212105	4.636417979	2.277212105	4.636417979
21	Trans fat (g)	1.478893324	0.247150825	5.9837685	1.95826E-08	0.989970036	1.967816611	0.989970036	1.967816611
22	Cholesterols (mg)	-0.088888434	0.033168614	-2.679895969	0.008310218	-0.154503865	-0.023273004	-0.154503865	-0.023273004
23	Total carbohydrate (g)	4.73718005	0.135123154	35.0582407	1.98113E-68	4.469874219	5.00448588	4.469874219	5.00448588
24	Total Sugars (g)	-0.432090452	0.249985833	-1.728459756	0.086261984	-0.926622062	0.062441157	-0.926622062	0.062441157
25	Added Sugars (g)	-0.248648385	0.245332607	-1.01351544	0.312682314	-0.733974804	0.236678033	-0.733974804	0.236678033
26	Sodium (mg)	0.029189073	0.007740448	3.770979803	0.000245117	0.013876621	0.044501526	0.013876621	0.044501526

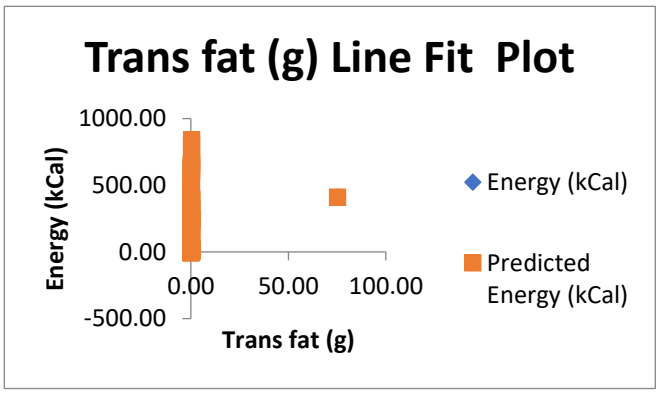
Fig : Regression Analysis Table

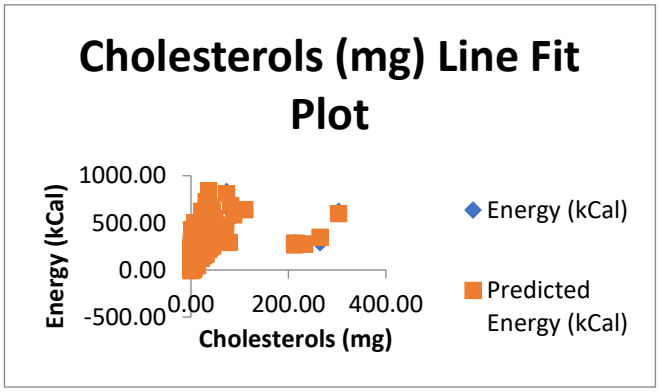
To visually support the regression analysis, I included scatter plots in the “Regression Analysis” sheet. These plots display the relationships between Energy (kCal) and key independent variables like Total Fat, Protein, Carbohydrates, and Sodium, along with trendlines. They help illustrate how strongly each nutrient contributes to the overall calorie count and support the regression model’s findings.

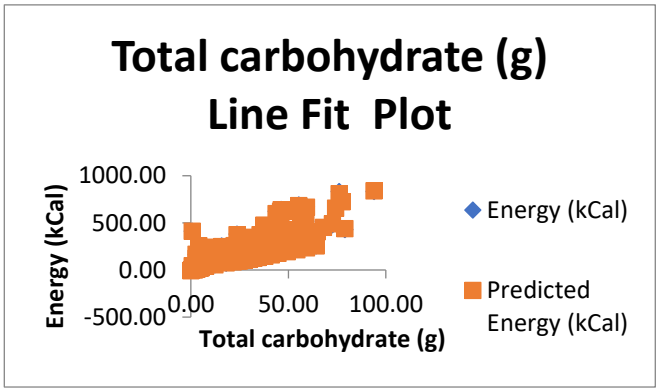


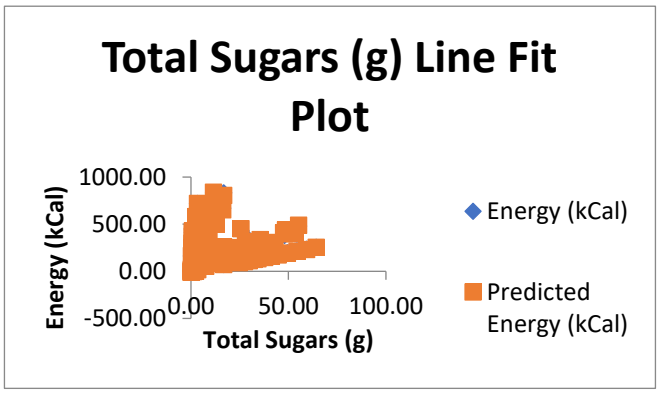


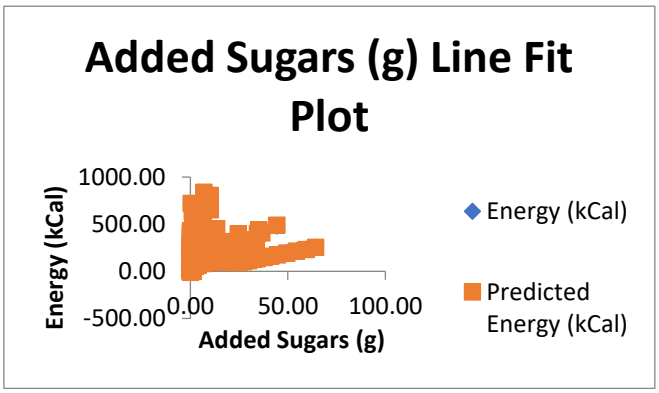


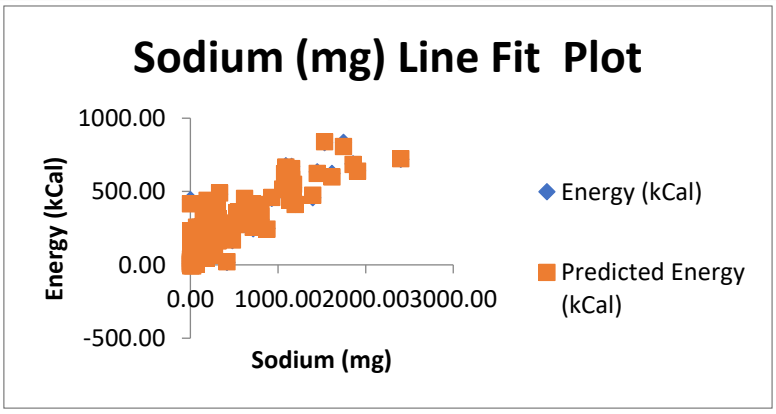








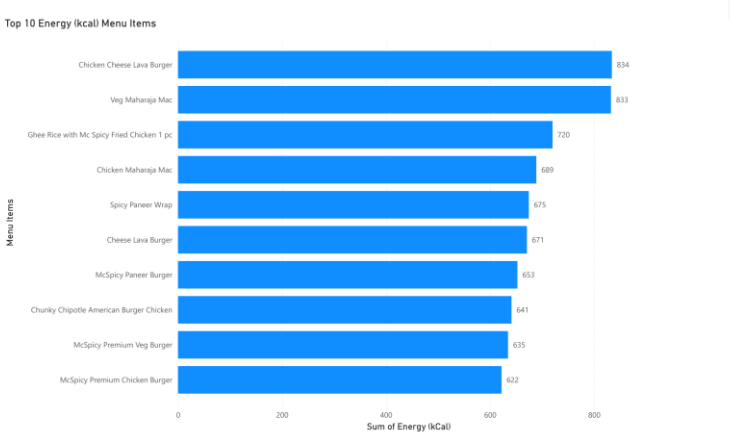




Visualizations (Power BI)

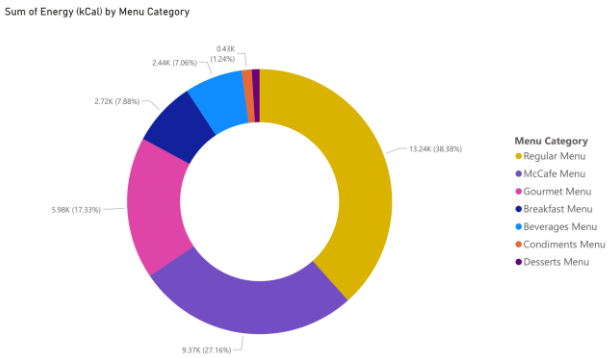
- Bar Chart

  This Bar chart shows the 10 most calorie-dense McDonald's menu items in India. It reveals which items pack the highest energy per serving, which is essential ffor calorie-conscious customers.



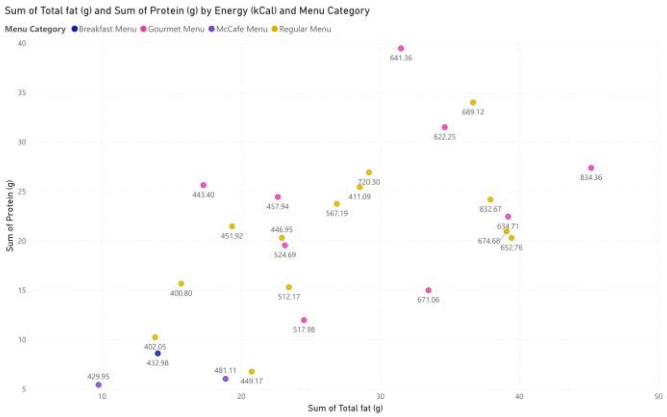
- ## Donut Chart

  This donut chart visualizes how different menu categories contribute to the total calorie content.



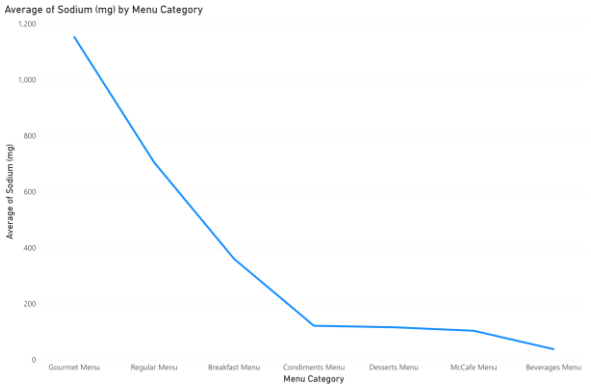
- ## Scatter Plot

  This scatter plot compares fat and protein content in each item. It helps identify items that offer higher protein with lower fat – a great visual for those focused on nutritional balance.



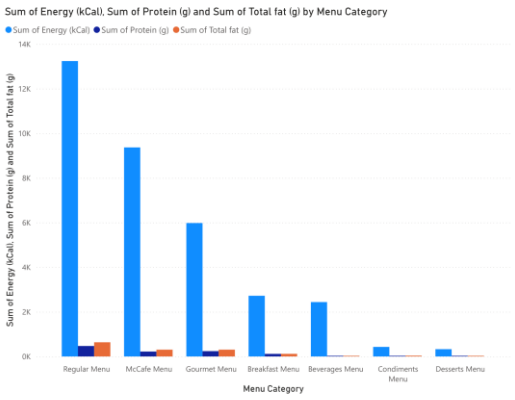
- ## Line Graph

  This line graph shows the average sodium content across different menu categories. It highlights categories that exceed or stay within healthy sodium levels.



- Stacked Column Chart

  This stacked column chart present the distribution of carbs, fats, and proteins in each menu category. It provides a clear picture of how each category contributes to the overall nutritional balance.



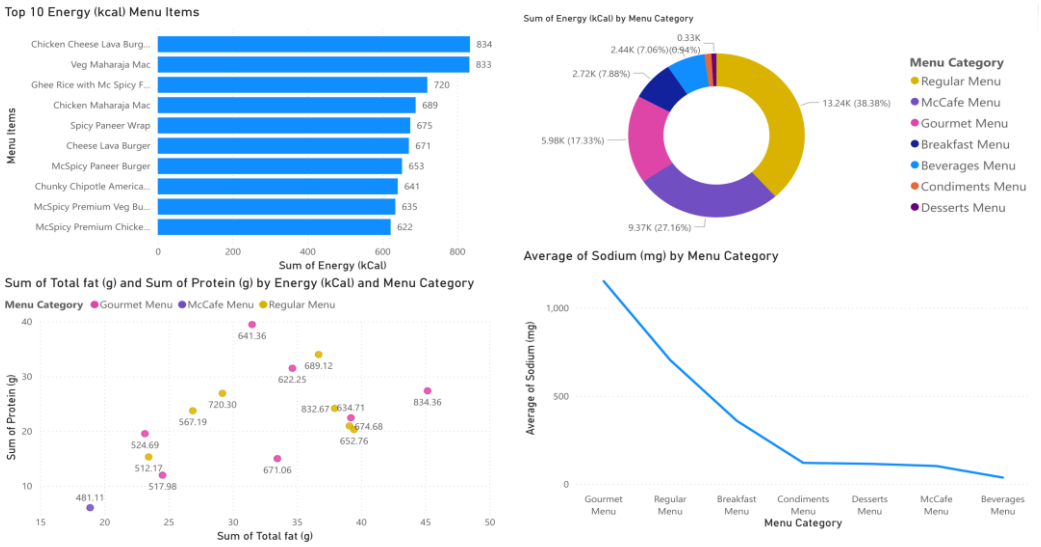
- Summary Table

  This summary table includes descriptive statistics such as mean, median, and standard deviation for key nutrients. It gives as at-a-glance overview of the data's central tendency and spread.

Menu Category	Average of Energy (kCal)	Average of Protein (g)	Average of Total fat (g)	Average of Total Sugars (g)	Average of Sodium (mg)
Beverages Menu	143.33	0.27	0.31	34.68	37.60
McCafe Menu	183.68	4.30	5.95	22.62	103.37
Desserts Menu	162.88	2.82	5.26	19.92	115.82
Condiments Menu	47.47	0.73	3.88	6.10	121.15
Breakfast Menu	181.29	7.64	7.74	4.36	360.38
Regular Menu	367.74	12.99	17.63	5.02	704.76
Gourmet Menu	543.50	21.68	27.67	8.80	1,152.62
Total	**244.64**	**7.49**	**9.99**	**15.46**	**359.50**

Dashboard Summary

This interactive dashboard brings all key insights together – calories, fats, proteins, sodium, and more – in one place. It allows users to explore nutrition patterns across menu categories easily and interactively.



Project Files and Access

This project includes:

- Excel file with raw data, descriptive statistics, correlation, and regression
- Power BI file with charts and dashboard
- This documentation file

All files can be shared upon request.