

Optimising Customer Retention and Profitability for Tea Kadai

Capstone Project
Business Data Management

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Summary:

This capstone project analyzes a prominent tea shop located in the Thrissur district of Kerala that goes by the name Tea Kadai. It is famous for its diverse range of foods and ambience apart from its primary beverages which is tea and coffee. Tea shops and snacks has been an integral part of Kerala's culture and way of life. They provide a convenient, affordable, and enjoyable way for people to socialize, relax, and refuel throughout the day. Since the pandemic, a lot of people prefer to have food outdoors.

This project aims to increase the customer retention and optimize profitability by analyzing the existing customer experience at Tea Kadai and developing a comprehensive strategy to enhance it. We will be focusing on the East-Fort branch of the outlet.

The analysis for this project involved three main components: collecting customer feedback from Google reviews, analyzing sales data from Tea Kadai, and observing customer behavior. Let's dive into each component in brief. To collect customer feedback, web scraping was utilized to scrape Google reviews. After collecting the Google reviews, sentiment analysis was performed. Sentiment analysis helps classify reviews as positive or negative, similar to binning data. By analyzing the sentiment of the reviews, I gained insights into customer perceptions and identified areas for improvement based on the project's goals. Moving on to the sales data analysis, sales data was collected from Tea Kadai. The sales data consisted of daily sales records for each month. By leveraging tools like Excel and the Pandas library in Python, the sales data was processed and analyzed. This analysis aimed to identify trends, determine the most sold items, and generate valuable insights. The analysis of sales data allowed me to understand the performance of Tea Kadai over time. By examining monthly sales trends, I could identify patterns, such as seasonal variations or changes in customer preferences. Furthermore, identifying the most sold items provided valuable information for inventory management and future product planning. Observing customer behavior was another key aspect of the analysis. It likely involved monitoring customer interactions, preferences, and habits within Tea Kadai. By understanding how customers behave, such as their purchase patterns or preferred menu items, I could make data-driven decisions to enhance the customer experience and optimize business operations. These analytical approaches provided insights into customer perceptions, sales performance, and customer behavior patterns.

The tools used as part of this analysis are as follows:

- Python - For data extraction via web scraping and for data processing
- Pandas - A python library for easy, quick processing and exploratory data analyses of big data
- Matplotlib - A python library for plotting and visualizing data
- Seaborn - A python library for plotting and visualizing data
- SerpAPI - An API service provider that scrapes data from Google services effectively
- TextBlob - For performing sentiment analyses on data

The expected outcomes of this project include increased customer loyalty, improved brand reputation, and increased revenue for Tea Kadai. This project has significant potential to provide valuable insights for Tea Kadai that can build a strong customer base and position itself as a leading tea shop in Kerala.



Figure 1: EastFort Tea Kadai

Proof Of Originality Of Data:

Before I could collect the data, I spoke with the owner to learn more about how Tea Kadai took off and the challenges associated with scaling it to reach mass consumers. After a good discussion, I was finally able to convince and get the data from their office. The staff was kind but didn't want to expose themselves through photos. Hence to prove that the data collected is original, I have attached a link below where I have recorded the conversation between myself and the owner. The link to access the data has also been made available.

Audio Proof: <https://bit.ly/capstone2580>

Data Proof: <https://bit.ly/capstonedata2580>



Figure 2: EastFort Tea Kadai

Metadata And Descriptive Statistics:

restaurant_invoice_no	date	kot_no	payment_type	order_status	sub_order_area	virtual_braassign_to	group_name	customer_ph	customer_id	customer_persons	order_canc_my	amount	total_tax	discount	delivery_ch	container	service_charge	waived_off	
Madurai Ve	50661	01-08-2022 08:03	1, 2, 6, 7, 9	CARD	Dine In	Success	Dine In		Pinto	Menu				480	24	0	0	0	0
Madurai Ve	50662	01-08-2022 08:03	8	Cash	Pick Up	Success	Take Away			Menu				94.52	4.72	0	0	0	0
Madurai Ve	50663	01-08-2022 08:07	3, 4, 5	CARD	Dine In	Success	Dine In		VISHNU	Menu				189	9.44	0	0	0	0
Madurai Ve	50664	01-08-2022 08:11	15	Cash	Pick Up	Success	Take Away			Menu				134.52	6.72	0	0	0	0
Madurai Ve	50665	01-08-2022 08:18	20	CARD	Pick Up	Success	Take Away			Menu				356	17.8	0	0	0	0
Madurai Ve	50666	01-08-2022 08:24	10, 14	CARD	Dine In	Success	Dine In		VISHNU	Menu				615	30.76	0	0	0	0
Madurai Ve	50667	01-08-2022 08:28	18	Online	Delivery	Pa Success	Madurai VeSwiggy	Madurai Vegetarian		Menu	SWIGGY			440	23.4	0	0	28	0
Madurai Ve	50668	01-08-2022 08:28	16	Online	Delivery	Pa Success	Madurai VeSwiggy	Madurai Vegetarian		Menu	SWIGGY			410	22.06	0	0	31	0
Madurai Ve	50669	01-08-2022 08:28	17	Online	Delivery	Pa Success	Madurai VeSwiggy	Madurai Vegetarian		Menu	SWIGGY			265	11.5	55.99	0	21	0
Madurai Ve	50670	01-08-2022 08:28	13	Online	Delivery	Pa Success	Madurai VeSwiggy	Madurai Vegetarian		Menu	SWIGGY			105	5.6	0	0	7	0
Madurai Ve	50671	01-08-2022 08:28	12	Online	Delivery	Pa Success	Madurai VeSwiggy	Madurai Vegetarian		Menu	SWIGGY			330	17.56	0	0	21	0
Madurai Ve	50672	01-08-2022 08:28	11	Online	Delivery	Pa Success	Madurai VeSwiggy	Madurai Vegetarian		Menu	SWIGGY			200	8.44	56	0	25	0
Madurai Ve	50673	01-08-2022 08:35	21	Cash	Dine In	Success	Dine In							200	10	0	0	0	0
Madurai Ve	50674	01-08-2022 08:35	19	Other	[Pine	Dine In	Success	Dine In		VISHNU	Menu			346	17.3	0	0	0	0
Madurai Ve	50675	01-08-2022 08:42	41	Online	Delivery	Pa Success	Madurai VeSwiggy	Madurai Vegetarian		Menu	SWIGGY			505	24.46	55.98	0	40	0
Madurai Ve	50676	01-08-2022 08:43	22, 23	Cash	Dine In	Success	Dine In		Pinto	Menu				230	11.5	0	0	0	0
Madurai Ve	50677	01-08-2022 08:46	32, 33, 35	Cash	Dine In	Success	Dine In		VISHNU	Menu				316	15.8	0	0	0	0
Madurai Ve	50678	01-08-2022 08:46	30	Cash	Dine In	Success	Dine In		NASHEEDA	Menu				25	1.26	0	0	0	0
Madurai Ve	50679	01-08-2022 08:49	27, 29	CARD	Dine In	Success	Dine In		VISHNU	Menu				450	22.5	0	0	0	0
Madurai Ve	50680	01-08-2022 08:49	38	Other	[Pine	Dine In	Success	Dine In		VISHNU	Menu			158	7.9	0	0	0	0
Madurai Ve	50681	01-08-2022 08:50	34	Other	[Pine	Dine In	Success	Dine In		VISHNU	Menu			70	3.5	0	0	0	0
Madurai Ve	50682	01-08-2022 08:55	24, 25, 26	Other	[Pine	Dine In	Success	Dine In		VISHNU	Menu			1598.04	79.9	0	0	0	0
Madurai Ve	50683	01-08-2022 08:57	36, 49	CARD	Dine In	Success	Dine In		VISHNU	Menu				210	10.5	0	0	0	0
Madurai Ve	50684	01-08-2022 08:58	39, 40	CARD	Dine In	Success	Dine In		VISHNU	Menu				309.52	15.48	0	0	0	0
Madurai Ve	50685	01-08-2022 08:58	51	Cash	Dine In	Success	Dine In	Anand	Menu					121	6.04	0	0	0	0

Figure 3: MetaData Of Monthly Time Series Sales

The data contains the following main columns:

- Restaurant - Outlet Name
- Invoice No - Identifies bills separately
- Date - Purchase Date Of Item
- Payment Type - Cash/Card/Online
- Order Type - DineIn/PickUp/Delivery
- Status - Success/Failure
- Area - Swiggy/Zomato
- My Amount - The amount associated with only food items before surcharges
- Total - The total amount corresponding to each invoice including delivery charges and Tax

In total we have 16,459 Rows and 26 Columns but rest Of the columns are not required for analysis and hence are of no use to us.

Date:	2022-08-01 to 2022-08-31	Name:	Itemwise Sales Summary (Consolidated) Row Wise					
Taxable	Restaurant	Category	Item	Qty	My Amount	Discour Tax	Gross Sales	Sap Co
Total				45138	1383062.98	412.84	69023.58	1451673.72
Min.				1	0	0	0	0
Max.				9413	107590.59	35.79	5401.38	112991.97
Avg.				210.93	6462.91	1.93	322.54	6783.52
Taxable	Tea Kadai@Eastfort	General	Default Item	1.00	33.00	0.00	1.66	34.66
	Tea Kadai@Eastfort	Snacks	Banana Roll	1.00	26.66	0.00	1.34	28.00
	Tea Kadai@Eastfort	Hot Beverages	A Tea	9413.00	107590.59	0.00	5401.38	112991.97
	Tea Kadai@Eastfort	Hot Beverages	Filter Coffee	3155.00	75089.00	0.00	3767.62	78856.62
	Tea Kadai@Eastfort	Hot Beverages	Nescafe	144.00	4387.68	0.00	219.02	4606.70
	Tea Kadai@Eastfort	Hot Beverages	Lemon Tea	1478.00	16893.54	0.00	849.46	17743.00
	Tea Kadai@Eastfort	Hot Beverages	Black Tea	1890.00	17992.80	0.00	904.12	18896.92
	Tea Kadai@Eastfort	Hot Beverages	Black Coffee	231.00	3298.68	0.00	165.50	3464.18
	Tea Kadai@Eastfort	Hot Beverages	Hot Chocolate	293.00	8927.71	0.00	445.64	9373.35
	Tea Kadai@Eastfort	Hot Beverages	Horlicks	157.00	4783.79	0.00	238.76	5022.55
	Tea Kadai@Eastfort	Hot Beverages	Boost	405.00	12340.35	0.00	615.94	12956.29
	Tea Kadai@Eastfort	Cold Pressed Juices	Musambi Juice (Small)	37.00	2405.00	0.00	120.52	2525.52
	Tea Kadai@Eastfort	Hot Beverages	Badam Milk	231.00	7038.57	0.00	351.34	7389.91
	Tea Kadai@Eastfort	Cold Pressed Juices	Musambi Juice (Large)	27.00	2295.00	0.00	114.92	2409.92
	Tea Kadai@Eastfort	Chaats	Pani Puri	820.00	46800.00	19.84	2343.98	49124.14
	Tea Kadai@Eastfort	Cold Pressed Juices	Watermelon Juice (Small)	81.00	4555.00	0.00	228.42	4783.42
	Tea Kadai@Eastfort	Chaats	Sev Puri	267.00	18080.00	5.23	905.82	18980.59
	Tea Kadai@Eastfort	Cold Pressed Juices	Watermelon Juice (Large)	46.00	3510.00	0.00	175.84	3685.84
	Tea Kadai@Eastfort	Chaats	Dahi Puri	555.00	45950.00	28.33	2296.52	48218.19
	Tea Kadai@Eastfort	Cold Pressed Juices	Grape Juice (Small)	61.00	4225.00	0.00	211.64	4436.64
	Tea Kadai@Eastfort	Chaats	French Fries	31.00	3540.00	0.00	177.00	3717.00
	Tea Kadai@Eastfort	Chaats	Masala Puri	192.00	13565.00	0.00	678.28	14243.28
	Tea Kadai@Eastfort	Cold Pressed Juices	Grape Juice (Large)	32.00	2800.00	0.00	140.20	2940.20
	Tea Kadai@Eastfort	Chaats	Masala Fries	4.00	520.00	0.00	26.00	546.00
	Tea Kadai@Eastfort	Chaats	Bhel Puri	533.00	35445.00	5.23	1775.94	37215.71
	Tea Kadai@Eastfort	Cold Pressed Juices	Pineapple Juice (Small)	84.00	5140.00	0.00	257.00	5397.00
	Tea Kadai@Eastfort	Chaats	Aloo Tikki Pav	33.00	1355.00	0.00	67.76	1422.76
	Tea Kadai@Eastfort	Chaats	All in One	26.00	1600.00	0.00	84.76	1774.76

Figure 4: MetaData Of Monthly Item Wise Sales

The data contains the following main columns:

- Restaurant - Outlet Name
- Category - Identifies category of food item
- Item - Explains the food item
- Qty - Determines total quantity purchased
- My Amount - The amount associated with only food items before surcharges

- Total - The total amount corresponding to each invoice including surcharges

In total we have 214 Rows and 8 Columns but rest Of the columns are not required for analysis and hence are of no use to us.

Now Coming to Descriptive Statistics,

Total Sales (6 months): Rs.4,82,20,115.59

Total Expenses (6 months): RS.4,36,73,797.95

Total Income (6 months): Rs.45,46,317,64

Card Sales (6 months): Rs.5,94,039.92

Cash Sales (6 months): Rs.12,85,825

UPI Sales (6 months): Rs.23,27,561.80

	invoice_no	kot_no	customer_phone	my_amount	total_tax	discount	delivery_charge	container_charge	service_charge	waived_off	round_off	total
count	16459	16459	201	16459	16459	16459	16459	16459	16459	16459	16459	16459
mean	120344	267.6383741	8825749534	93.56484294	4.703958928	0.100605748	0	0.575004557	0	0	0.024336837	98.76748284
std	4751.448376	155.928693	1246077020	117.3908515	5.89350231	2.401568907	0	3.92692205	0	0	0.195180078	123.7705594
min	112115	1	565372825	0	0	0	0	0	0	0	-0.49	0
25%	116229.5	133	8089219592	25	1.26	0	0	0	0	0	-0.01	26
50%	120344	266	9496839439	59.05	2.96	0	0	0	0	0	0	62
75%	124458.5	399	9562134868	120	6.02	0	0	0	0	0	0.02	126
max	128573	598	9995111797	6829.8	341.5	190.4	0	75	0	0	0.5	7171

Figure 5: Statistical Description Of Daily Sales Dataset

	Qty	My Amount	Discount	Tax	Gross Sales
count	213.000000	213.000000	213.000000	213.000000	213.000000
mean	7.063693	216.436617	0.064607	10.801552	227.173562
std	24.306282	399.400158	0.209960	20.031857	419.375019
min	0.033333	0.000000	0.000000	0.000000	0.000000
25%	0.233333	20.000000	0.000000	1.000667	21.000000
50%	1.033333	80.166667	0.000000	4.017333	84.184000
75%	4.566667	234.619000	0.000000	11.711333	246.330333
max	313.766667	3586.353000	1.193000	180.046000	3766.399000

Figure 6: Statistical Description Of Item Wise Sales Dataset

Detailed Explanation Of Analysis:

To address the problems that have been identified at Tea Kadai, the first step was to gather and analyze data. Fortunately, the company stores its data on the cloud, and the staff uses Tally software to clean and arrange data. This makes it easy to fetch data in spreadsheet format that has already been cleansed, making it easier to perform data analysis using Excel and Python. Excel and Python are powerful tools for data analysis and data visualization. The data collected from Tea Kadai includes the point of sales or billing data. The billing data contains the history of all the bills which in turn provides us with the food items purchased by the customer followed by quantity and price.

To address the first problem related to maximization of profits, the point of sales or billing data had to be analyzed. The data was categorized based on the total sales made every month, and a histogram was plotted to identify the trends and build insights. This will enable us to find the month when profits started to dip. I then analyzed the sales made during that month to see what went wrong and this will help them take necessary and corrective actions.

I also analyzed the sales of each category of food item made and compared them with those made in the previous months. If there is a huge difference I proceeded by creating a pie chart. This will help us identify the most sold items on the menu and eliminate items that are least sold. This will reduce wastage and we could utilize the ingredients for other items on the menu. I then analyzed the prices of items sold in the menu with nearby restaurants and estimated the perfect price that would generate more revenue and help retain customers. We can employ statistics to forecast the growth with our new pricing strategies.

We can take the above approaches by extracting data into Python, preprocessing the data and cleaning the data to remove any noise. This can be done by using a library - 'Pandas'. We can then perform exploratory data analysis using the same library itself.

To address the second problem related to customer experience and satisfaction, I scraped data from Google reviews available on the web and analyzed them. Scraping data from the web can be implemented using Python. But this was not very easy as sites associated with Google being primarily dynamic resulted in its HTML Tree structure being periodically updated. Hence scraping data using a python library - 'Beautiful Soup' had its own limitations. Another solution was to scrape the reviews using web automation involving another tool - 'Selenium' but Google being smart detected this process in advance and prevented me from extracting more than 10 reviews associated with a business. Hence I finally utilized services from an API provider - 'SerpAPI'. I wrote a script in Python that would continuously send requests to the API provider. Each call would fetch ten reviews and hence I was able to collect over two hundred reviews. These reviews were then stored in a text file. I then used sentiment analysis and categorized reviews into positive and negative separately for Tea Kadai. Sentiment Analysis is best employed using Python via a library - 'TextBlob'. By identifying keywords, I further classified the reviews. We then analyze the outlets for defects, behavior of customers and staff followed by quality control. By noticing areas of improvement, I then came to a conclusion as to how we can improve customer satisfaction and increase retention.

Furthermore, I used the sales data to analyze the traffic pattern around Tea Kadai to identify peak times and compare the number of customers based on the sales data. I also identified the types of customers coming in, which provided insights into customer preferences and this will help the management to adjust their offerings accordingly. The analyzed data was plotted and visualized mainly using two Python libraries that is 'Matplotlib' and 'Seaborn'.

In conclusion, by analyzing data and taking a data-centered approach we can optimize profits and improve customer satisfaction and retention at Tea Kadai. By identifying trends and patterns, we can make informed decisions and take necessary actions to address the issues that have been identified. By doing so, Tea Kadai can continue to be a popular spot providing a great experience at an affordable price.

Results And Findings:

The data collected from Tea Kadai includes the point of sales or billing data. The billing data contains the history of all the bills which in turn provides us with the food items purchased by the customer followed by quantity and price.

Data collected involves the entire sales data associated with 6 months. Since we are focussing only on a single unit, I have chosen the EastFort outlet. Herewith I have attached a link below that contains all the preprocessed data and the observations. Preprocessing of the data was performed using Excel and Jupiter Notebook. All the observations and findings were plotted with Python by using Seaborn and Matplotlib libraries.

Preprocessed Data With Observations: <https://bit.ly/capstonefinal2580>

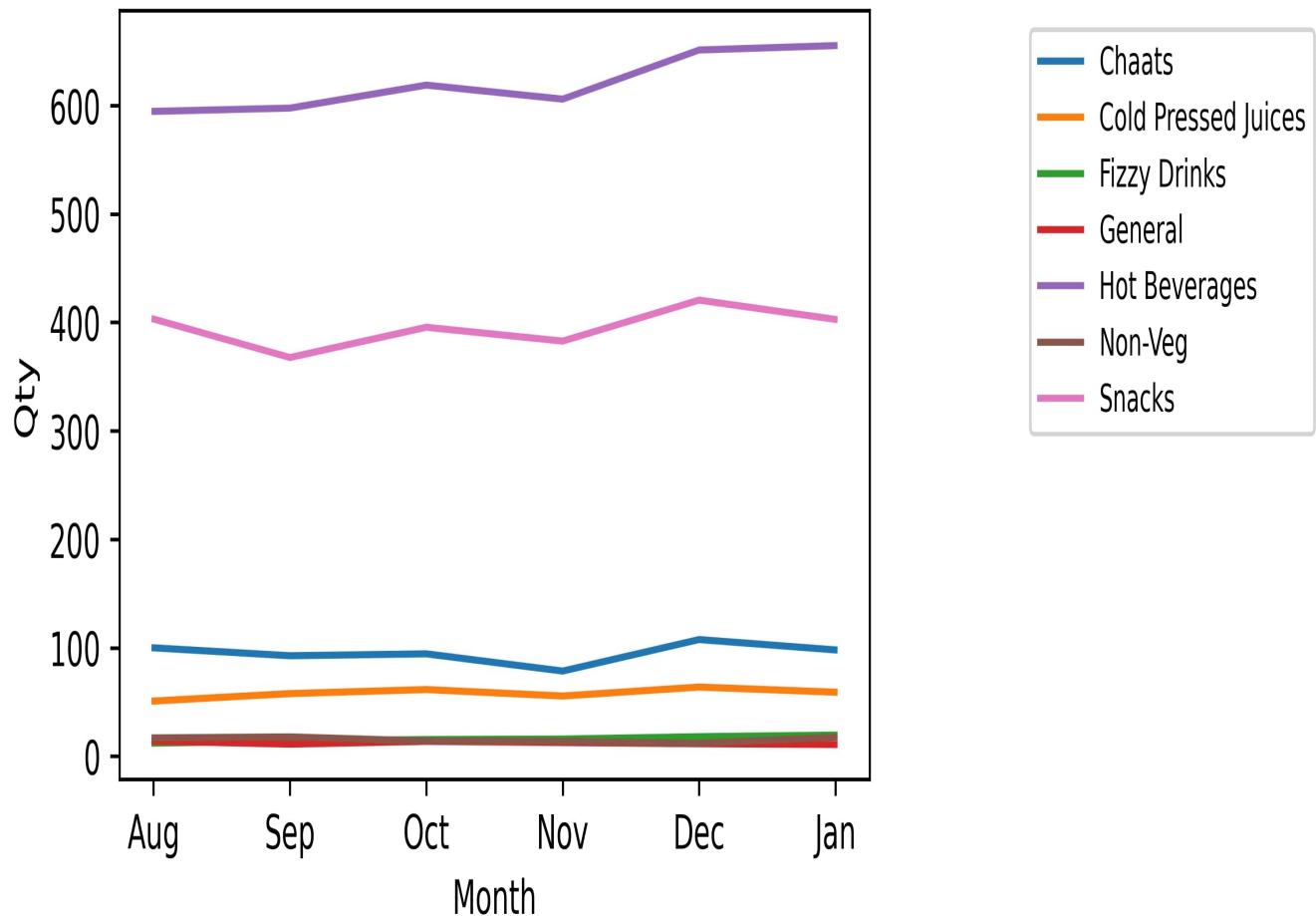


Figure 7: Food Item Category Trend across 6 months

We have analyzed data starting from August 2022 till January 2023. We can see that 'Hot Beverages' and 'Snacks' are the categories with the most sales. Moreover we can also learn that the sales of 'Hot Beverages' and 'Snacks' are highly correlated. As the sales of 'Hot Beverages' increase, there is also an increase in the sale of 'Snacks'.

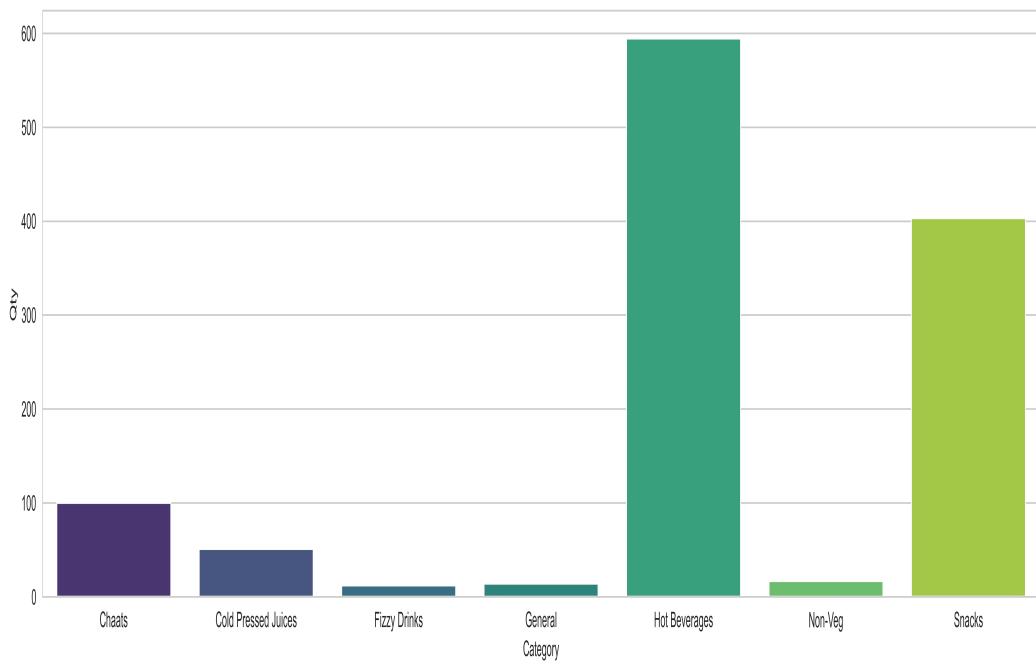


Figure 8: Food Item Category (per day trend) in August 2022

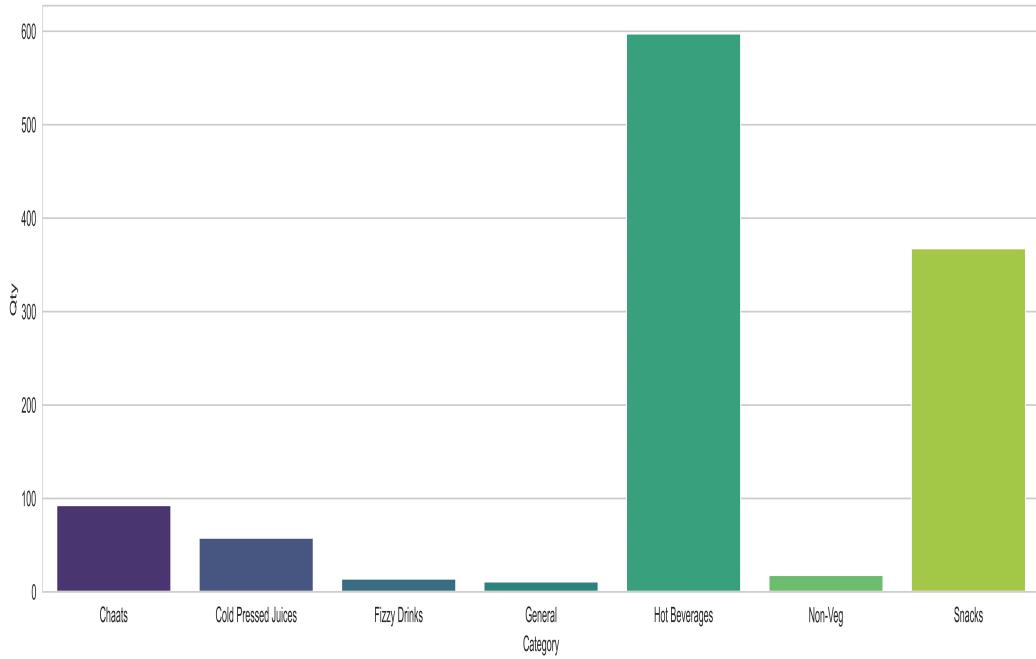


Figure 9: Food Item Category (per day trend) in September 2022

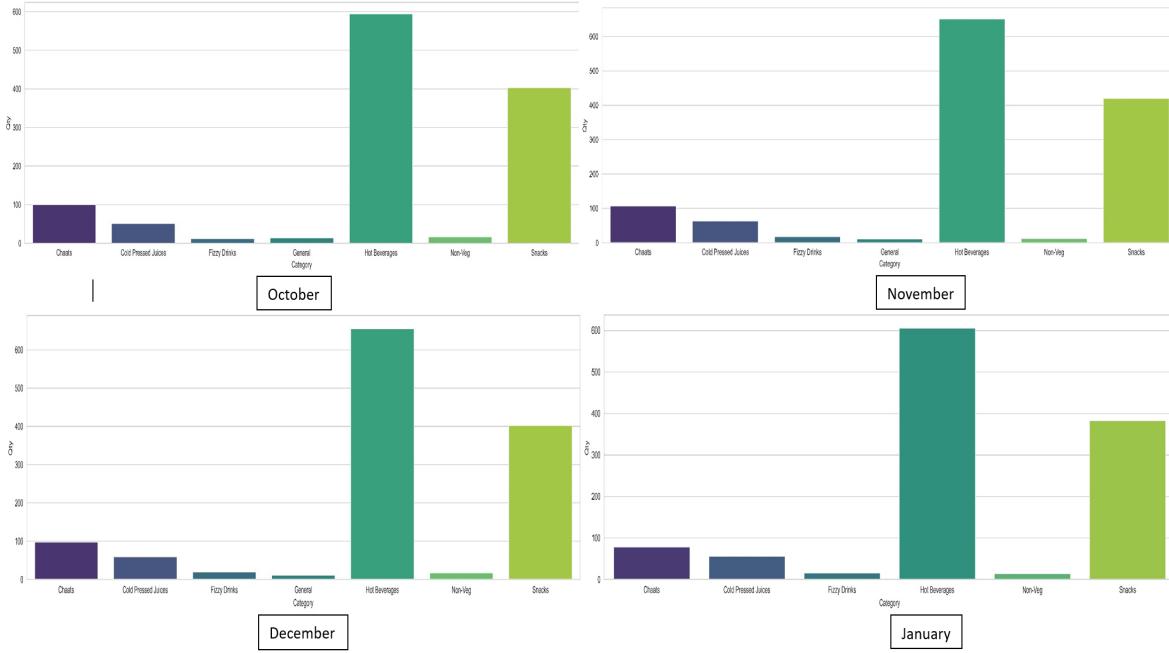


Figure 10: Food Item Category (per day trend) for next 4 months

The month wise histograms also make it evident that individuals favor hot drinks and snacks over other categories, primarily due to the lower cost of food items within that category. This suggests that people are reluctant to spend more on low cost food. Another potential explanation could be that the taste of other categories is not satisfactory. It appears that individuals visit Tea Kadai primarily for socializing and enjoying the atmosphere, rather than solely for the food.

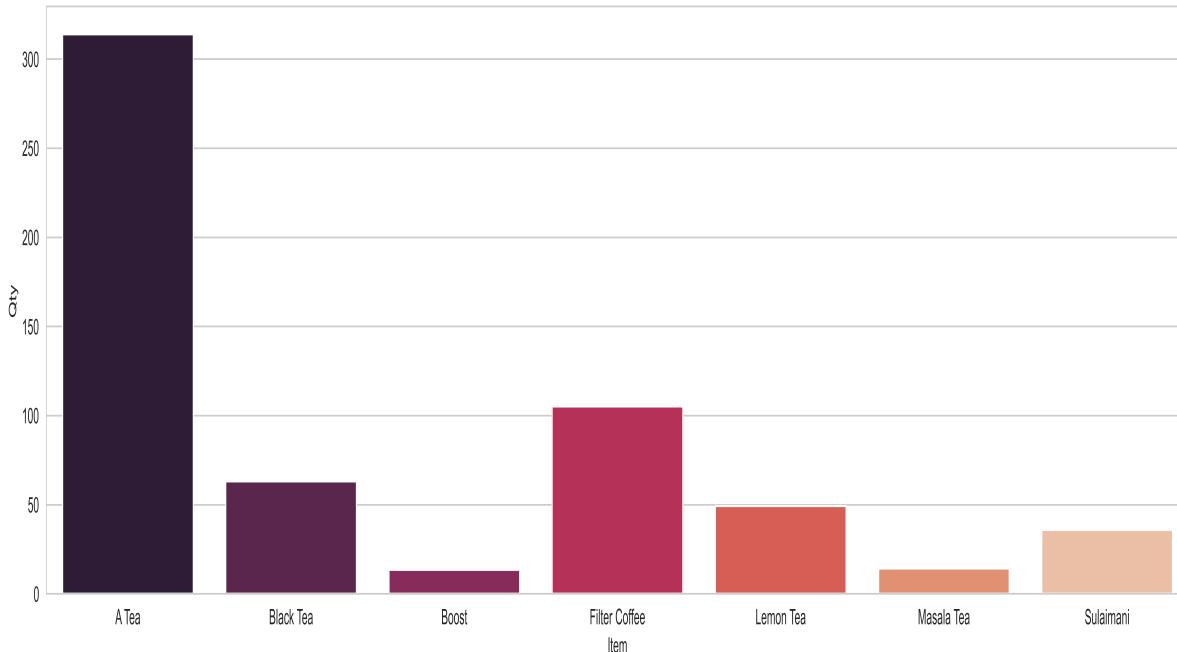


Figure 11: Hot Beverages (per day trend) in August 2022

If we take a look at the Hot Beverages category, the most sold items are Tea, Coffee and Black Tea.

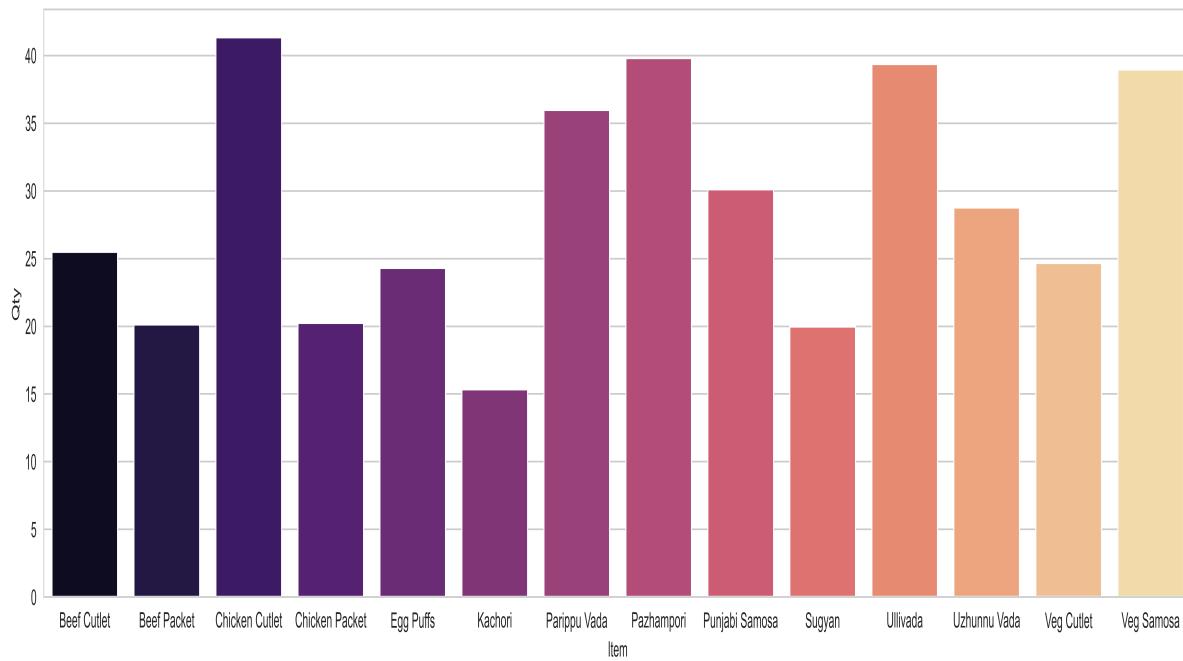


Figure 12: Snacks (per day trend) in August 2022

If we take a look at the Snacks category, the most sold items are Chicken Cutlet, UlliVada and Pazhampori.

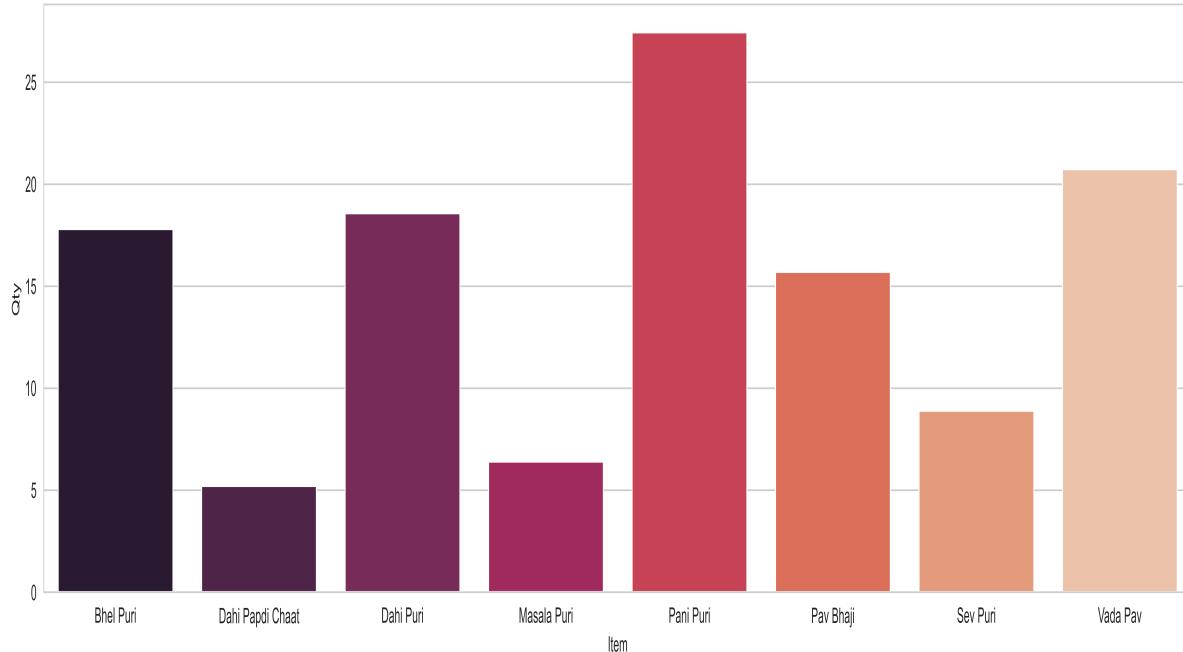


Figure 13: Chaats (per day trend) in August 2022

If we take a look at the Chaats category, the most sold items are Pani Puri, Vada Pav and Bhel Puri.

Month	Total Sales	Chaat Sales	Cold Pressed Sales	Fizzy Drinks Sales	Hot Beverages Sales	Non-Veg Sales	Snacks Sales
August	45137	4407	2364	545	19607	1841	13467
September	43174	4046	2553	678	19365	1685	12258
October	44397	4376	2638	750	19969	1381	12377
November	42448	3718	2473	736	19717	1178	12189
December	47902	5036	2843	840	21232	1289	13407
January	46079	4148	2786	813	20989	1390	12979

Figure 14: Monthly sales associated with each category of food item

On analyzing we can see that the trend remains very consistent throughout those 6 months. On an average, Hot Beverages accounts for 45%, Snacks account for 27%, Chaats account for 9% and Cold Drinks account for 7% of the total sales for each month.

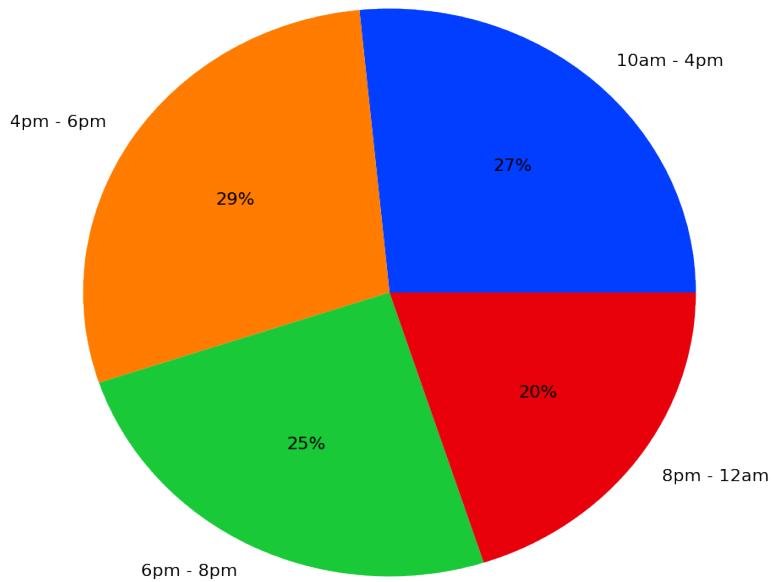


Figure 15: Trend of Sales In Each Month across Afternoon, Evening and Night

As indicated in the above diagram, Tea Kadai experiences its highest sales during the hours after 4pm, which on

average account for approximately 74% of total sales. This suggests that individuals tend to spend their evenings and nights at Tea Kadai, indicating that the establishment's customer base consists primarily of working-class individuals and students.

Good atmosphere for have tea and food loved it

Good sitting space with varieties of snacks..tea.. n cool drinks..

Best spot for chats and snacks Best chats in town 😊 good tea and non veg varieties

This outlet of Tea Kadai is located near East Fort. Parking is a squeeze, you might have to use the pay and park next to it if you are driving a car. The chaat/snacks and drinks are at par with all other tea kadai outlets and dont disappoint.

Good location for tea coffee mojito

Too costly but average qualityI ordered a strawberry shake but no minimum level sugar added and added strawberry essence , icecream & milk.. No real strawberries

Tasty and variety stuff. Cost is a bit above average.But nice food.It's not very comfy or spacious. But ok for a quick bite.

Best place to have tea in Thrissur. Nice ambience..nice tea. Kudos to the tea maker . Our usual hangout space. Other than tea many items are not nudges friendly

Great place for quick snacks and Beverages

I had tea and vadapav there and it tasted amazing .. Lots of Indian chaat food is available there. You should try it when you get there and you will love it

Place is nice but little congested free parking area ia very less space. overall it's a nice place👍

Good place for a evening hang out

Nice place to hang out with friends and family of little taste of chai

It's a very good place with very good ambience 😊👍

Super spot.... tasty food....best place for chaat... reasonable rate....can include more seating space

Aswome place.. Authentic filter coffee

A very good experience altogether. Had a scrumptious chaat items..N the Mohabbat ka sharbat is just awesome.

Excellent place , Superb options and Authentic Tastetry Pav Baji , Tea , and Chciiken Summosa

Figure 16: Average Monthly Trend of Sales across Afternoon, Evening and Night

As indicated in the above diagram, We have web scraped google reviews from Tea Kadai. All the analysis was done using Python and TextBlob. We can find that 42.813% of the reviews are positive while remaining 57.187% of the reviews are negative. After classifying the reviews, I identified common keywords from the negative and positive reviews separately. People found that the food at Tea Kadai was not only expensive but also lacked taste and was less in quantity than expected. At the same time, people see Tea Kadai as a spot to hangout and socialize thanks to the amazing ambience.

Findings made from frequent visits and observation of customer and staff behaviours are as follows,

- Based on my personal experience and observations of customer behavior during frequent visits, I have noticed that customers often receive incorrect orders, particularly when it comes to 'Chaat' items. This is likely due to the fact that customers are called by item name rather than invoice number, which can cause confusion. To

improve the quality of service, Tea Kadai should address this issue.

- Another concern is that many Tea Kadai customers are unaware that non-vegetarian items such as Kebabs are served. Additionally, the staff can be slow and inattentive when taking orders. In order to retain customers, Tea Kadai should also focus on improving the taste of their food.
- The televisions placed in front of the outlets to display the menu are often switched off, rendering them useless. As a result, customers may not be aware of the full range of items available in the outlet. The existing points program also seems to exist in name only.
- On a positive note, there is an Amul Parlour located across the street from Tea Kadai. By partnering with this establishment, Tea Kadai could potentially boost sales and attract more customers, resulting in a win-win situation for both businesses.

By identifying areas of improvement and taking necessary actions, this will ultimately result in higher revenues and profits for the company while maintaining customer satisfaction and retention.



Figure 17: Tea Kadai Menu before price hikes

Interpretation of Results and Recommendation:

The analysis of Tea Kadai reveals several key observations about customer preferences and areas for improvement. It is evident that customers are highly interested in hot beverages accompanied by snacks, as they enjoy sipping tea and indulging in the cozy atmosphere while grabbing a quick bite. This also indicates that customers are willing to spend more on these items. Additionally, customers, particularly the working class, have a preference for fast service and expect their food to be served promptly, as they often have limited time to spare.

Another noteworthy observation is that in Kerala, especially in Thrissur, customers have a fondness for juices and shakes. However, Tea Kadai's sales of cold-pressed juices and fizzy drinks are considerably low. The primary reason for this discrepancy appears to be the pricing strategy, which may be perceived as less favorable by customers. Therefore, Tea Kadai needs to reconsider its pricing strategy to make these items more appealing to customers.

Tea Kadai is often associated with vegetarian food due to its green logo, and many customers are unaware that they also serve non-vegetarian options. Consequently, sales in the general category, which includes non-vegetarian items, are significantly lower. To address this issue, Tea Kadai should take steps to raise awareness among customers about their diverse menu offerings, which may help boost sales in the general category.

One common concern among customers, as observed through reviews and direct observation, is the taste of chaats. Customers express dissatisfaction with the taste, particularly considering the relatively high prices they pay for these items. It is clear that there is a need for improvement in taste and a potential reduction in prices to align with customer expectations and enhance their overall dining experience.

Tea Kadai experiences a surge in customer visits primarily after 5 pm. It would be beneficial for the establishment to introduce new or less popular items during this time, as many customers may not be aware of their existence. By offering these items to customers, Tea Kadai can encourage them to try something new, thus boosting sales. Additionally, leveraging the television screens at the front of the outlets to display the menu can help alleviate crowding near the queues and facilitate a smoother ordering process.

Another area for improvement lies in the customer points program. Many customers are unaware of its existence or find it relatively ineffective due to the high number of orders required to redeem any meaningful rewards. Additionally, the staff at the counter show little interest in informing customers about the program or encouraging them to participate. Enhancing the visibility and value proposition of the points program, as well as training the staff to actively engage with customers and promote the program, can significantly enhance its effectiveness as a loyalty-building tool.

Furthermore, there is a need for comprehensive staff training, particularly those involved in taking customer orders. Simple strategies, such as suggesting new items or offering small samples for customers to taste, can be employed to introduce customers to unfamiliar menu items. By equipping the staff with product knowledge and customer engagement skills, Tea Kadai can enhance the overall customer experience and drive sales.

Lastly, there are instances where customers become confused when orders require a waiting period. Instead of using bill numbers, the staff sometimes calls out orders based on the name of the item, which can lead to confusion, especially if multiple customers have ordered the same item. To prevent such confusions and improve efficiency, Tea Kadai should consider implementing a more systematic and clear order identification system.

In summary, the analysis of Tea Kadai's operations and customer feedback highlights several areas for improvement. These include revisiting the pricing strategy, enhancing taste and quality, raising awareness of the menu offerings, leveraging peak hours for introducing new items, optimizing the customer points program, providing comprehensive staff training, and implementing an efficient order identification system. By addressing these observations and taking appropriate actions, Tea Kadai can enhance customer satisfaction.

Based on the interpretations and observations made from the analysis of Tea Kadai, the following recommendations can be made to improve the business and enhance customer satisfaction:

- **Menu Diversification:** Tea Kadai should consider reworking on its menu to include a better range of items. This should include more vegetarian options such as on the go Masala Dosa or Chola Bhature. By offering such choices, Tea Kadai can cater to a broader customer base and attract those who are looking for specific food preferences. This can help increase customer satisfaction and loyalty.
- **Pricing Strategy:** The pricing strategy needs to be carefully revisited, especially for items such as chaats and juices. It is essential to ensure that the prices are reasonable and align with customer expectations in terms of taste, portion size, and overall value for money. Conducting market research and analyzing competitors' pricing strategies can help Tea Kadai set competitive prices while maintaining profitability.

- Service Efficiency: Given that Tea Kadai attracts a working-class customer base, focusing on improving service speed and efficiency is crucial. Tea Kadai should invest in streamlining processes to reduce waiting times and ensure prompt service. This may involve optimizing kitchen operations, training staff on efficient order handling, and implementing technology solutions to expedite the ordering and payment process.
- Promote Special Items: Tea Kadai can utilize the television screens at the outlets to display special items or lesser-known menu options. This visual promotion can attract customers' attention and create curiosity about trying new items. Offering limited-time promotions or discounts on these special items can further incentivize customers to explore and diversify their dining experience at Tea Kadai.
- Staff Training and Engagement: Investing in comprehensive training programs for the staff is essential. This should include product knowledge, customer engagement skills, and upselling techniques. Staff members should be encouraged to proactively suggest new items to customers, offer samples, and provide personalized recommendations based on individual preferences. By engaging with customers in a friendly and attentive manner, staff can create a positive and memorable experience, leading to increased customer satisfaction and loyalty.
- Loyalty Program Enhancement: Tea Kadai should revamp its points program to make it more rewarding and attainable for customers. Consider reducing the number of orders required to redeem rewards or introducing tiered benefits for loyal customers. Additionally, the program should be promoted effectively to customers, both through in-store signage and staff engagement. Staff members should actively inform customers about the program and its benefits during the ordering process, encouraging them to participate and reap the rewards.
- Clear Order Identification: Implementing a more efficient and clear system for identifying and calling out orders is crucial. This can involve using bill numbers, unique order identifiers, or a digital order management system. This will minimize confusion and improve order accuracy, ensuring a smoother and more organized customer experience. By reducing errors and delays in order delivery, Tea Kadai can enhance customer satisfaction and perception of service quality.

By implementing these recommendations, Tea Kadai can enhance customer satisfaction, attract a wider customer base, and increase sales. It is important to regularly monitor customer feedback and adapt to evolving preferences to maintain a competitive edge in the market. Tea Kadai should also establish mechanisms to collect and analyze customer data to gain insights into customer preferences, purchase patterns, and feedback, which can further inform future menu planning, marketing strategies, and operational improvements.

Machine Learning Model for Prediction of Order Type:

Our dataset has a column dedicated to the type of order. The metadata is as follows:

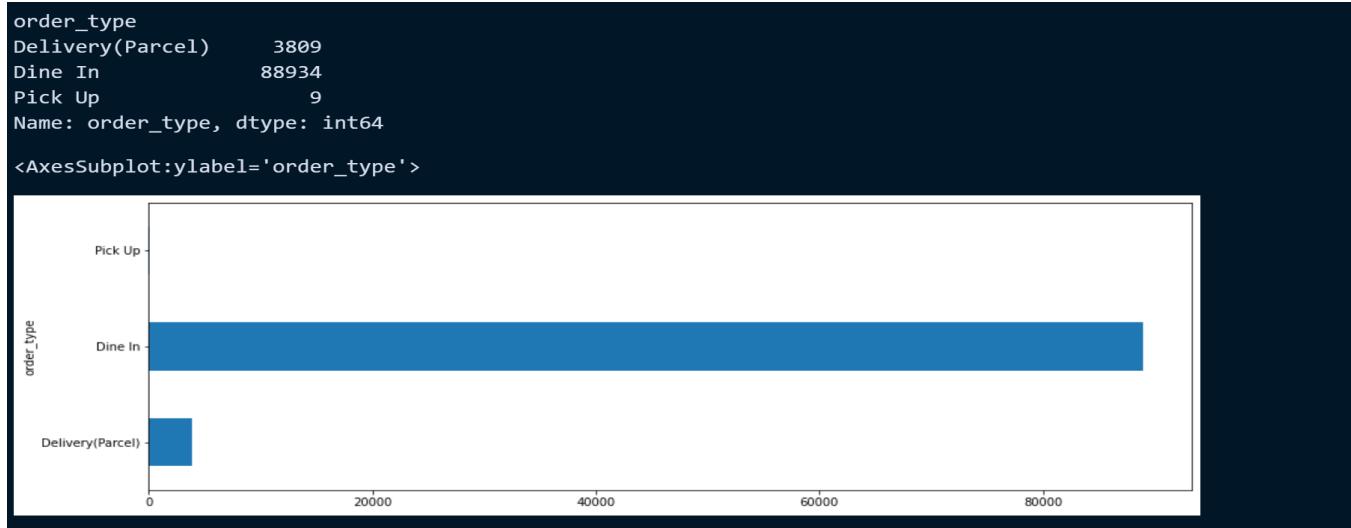


Figure 18: MetaData of order-type column

To enhance order management and minimize confusion at Tea Kadai, I developed a machine learning model utilizing the random classifier algorithm. The model was constructed by consolidating the daily logged data for each month into a unified data source. After performing data cleaning, encoding categorical columns, and eliminating unnecessary information, the data was divided into separate training and validation sets. The random classifier model from the sklearn library was then trained on the training dataset. Subsequently, predictions were validated using the validation dataset. With the aid of this model, Tea Kadai can streamline their operations and operate more efficiently.

```
x_train = df_train[col2use].values
x_valid = df_valid[col2use].values
y_train = df_train['order_type_encoded'].values
y_valid = df_valid['order_type_encoded'].values
print('Training shapes:', x_train.shape, y_train.shape)
print('Validation shapes:', x_valid.shape, y_valid.shape)

Training shapes: (64926, 4) (64926,)
Validation shapes: (27826, 4) (27826,)

from sklearn.ensemble import RandomForestClassifier
rf=RandomForestClassifier(max_depth = 5, n_estimators=100, random_state = 42)
rf.fit(x_train, y_train)

RandomForestClassifier(max_depth=5, random_state=42)

Data_Point = [['20','20','30','0']]
Prediction = rf.predict(Data_Point)
if Prediction == 1:
    print("Dine-In")
elif Prediction == 2:
    print("Pick-Up")
else:
    print("Delivery")

Dine-In
```

Figure 19: MetaData of order-type column

ML Model: <https://bit.ly/capstone2580ML>