Objective Questions:

1. What is the total no. of tables present in the data?

Ans-: Given that there's only one sheet in the Excel file, there is one table Present in the data.

2. What is the total no. of attributes present in the data?

Ans-: There are 37 attributes (columns) in the dataset.

3. The data consists of some inconsistent and missing values so ensure

Ans-: The given data is already given in their best form. But i do some changes in the given data by those changes the data is easier and more approachable for given tasks. We can see those changes in my excel table There are 3 new column first is Date and second is Month and third is operational cost.

For extracting date i use this function =TEXT(P2,"yyy-mm-dd")

(P= CreatedAT)

And for extracting month i use this function =TEXT(Q2,"mmmm yyyy")

(Q=Date)

And for analysis for hour wise i extract the hours by using hour function in given created time =HOUR(P2)

And for get the profit cost i use this formula =AH2-AF2

(AH= Net amount), (AF=astrologersEarnings)

You can see my new edit excel data that I shared . Where we can see the changes that i did in data.

4. What is the change in daily call volume day by day and also find the average of daily call volume?

Ans-: Average daily call volume -: 245.97

Avg. Change in call volume (day-by-day) in %-: 2.51%

Approach-:

So the call volume is the count of incoming calls.

First from given data i extract the date from the giving column CREATEDAT and create a new column in the right of CREATEDAT column and the new column name is DATE after this i get the date of every consultation.

And then I created a new data table named Objective questions. And in that data table i create a pivot table from a given data table. In pivot table i picked DATE in ROW and CallSid in VALUE with COUNT function. After this I get the count of the call volume of each day.

And then I use Avg. to calculate the avg of call volume

You can see this in my given screenshot.

And for changes in call volume i used this formula =((B5-B4)/B4)*100 in column E of

Objective question data table after using this i get the changes of call volume of each day Then I calculate the avg change of call volume. For this I use avg. function.

A	B	C	D	E
consultationType	Call		average daily call volume	
			245.97	
date	Count of CallSid			Change in call volume (day-by-day) in %
2023-12-01	228		Avg. Change in call volume (day-by-day) in %	0
2023-12-02	332		2.51	45.61
2023-12-03	383			15.36
2023-12-04	364			-4.96
2023-12-05	253			-30.49
2023-12-06	254			0.40
2023-12-07	254			0.00
2023-12-08	138			-45.67
2023-12-09	288			108.70
2023-12-10	430			49.31
2023-12-11	424			-1.40
2023-12-12	358			-15.57
2023-12-13	348			-2.79
2023-12-14	226			-35.06
2023-12-15	276			22.12
2023-12-16	258			-6.52
2023-12-17	185			-28.29
2023-12-18	233			25.95
2023-12-19	209			-10.30
2023-12-20	178			-14.83
2023-12-21	159			-10.67
2023-12-22	163			2.52
2023-12-23	241			47.85
2023-12-24	232			-3.73
2023-12-25	258			11.21
2023-12-26	255			-1.16
2023-12-27	242			-5.10
2023-12-28	181			-25.21
2023-12-29	258			42.54
2023-12-30	179			-30.62
2023-12-31	158			-11.73
2024-01-01	115			-27.22
2024-01-02	196			70.43
2024-01-03	107			-45.41

5. Which months experienced the highest and lowest call volumes?

Ans-:

month	Count of CallSid
January 2024	418.00
December 2023	7947.00

Approach-:

For this question First i extract the month from given data table i create a new column name of Month i also mention this in my previous question. By extracting the month i get the months detail from that i create a pivot table in objective question data table from given data table, my pivot table range is G1:H3 i put Month in row and callsid in value with count function from pivot table i get the call volume of each month. So December 2023 having highest call volume and January 2024 having the lowest call volume.

6. What is the total operational cost for that month?

Ans-: The operational cost for the month of december 2023 is 93786.1629
This is the highest operational cost of that month.
And January 2024 having a lowest operational cost that is 5360.40

month	SUM of astrologersEarnings
December 2023	93786.16295
January 2024	5360.408

Approach-:

So there is no specific column for Operational cost in given data so but in given data We have net amount and astrologersEarnings so the operational cost for the company is Astrologer earning is the operational cost of the company from this we get the operational cost of the company Then getting the operational cost i create a pivot table in objective question data table from given data table. My pivot table range is F17:G20. In my pivot table in put month in row and operational cost in value with sum function. from pivot table i get the operational cost of every month.

7. What is the average number of calls handled per agent per day?

Ans. The avg. The number of calls handled by an agent per day is 1.88 calls per day.

average number of calls handled per agent per day
1.88

As you can see I linked my answer from my Objective question data table.
Approach-:
So first i create a pivot table in my objective question data table from given data table My pivot table range is AD:BN So in pivot table i use the Astro guru unique Id in row and Date in column and calls status in value with countA function from pivot table i get how many calls were attended by the guru in a day and then for the avg of calls i select all days column and then use the avg. function by this i get the avg call of the day.

8. How many repeat callers are there, and what percentage of total calls do they represent?

Ans-: There are 4737 repeat calls and the percentage of repeat calls is 56.63%. And there are 1275 repeat callers.

Count of repeat callers

1275

repeat calls	total call	percentage of total repeat calls
4737	8365	56.63

Approach-:

In given data there are unique id(uid) for user and also for a calls unique id(caller sid) so in create a pivot table in objective question data table from given data table my pivot table range is J:L I put uid in row and calls sid in value with count function then i get the total call by user and then i using this function to calculate the number if repeat calls =IF(K2>1, K2-1, 0) from that i get the total number of repeat calls and then i use this function to calculated total calls were made by the user =SUM(K2:K) then i calculated the repeat calls percentage by using this formula =(M2/N2)*100.
And for repeat callers I calculate the user from who calls more than one time from the column I count the user who calls more than one time.

9. What is the total sales generated by the call center for each product category?

Ans-: In given data table we don't have any specific column of category so we can choose the consultant type in category and total sale is the net amount of the company.
So the total sales generated by the call center is 168442.035.

consultationType	SUM of netAmount
Call	168442.035
Chat	45494.68333
Complementary	0
public_live_Call	50.597
Grand Total	**213987.3153**

Approach-:

So I select the consultant type in category and net amount in total sales. I create a pivot table in my objective question data table from the given data table. My pivot table range is F7:G12. In my pivot table i put consultation type in row and net amount in value with sum Function.

10. How many calls were made for each user ID and guru ID?

Ans-: Total calls made by guru id is 16258 and total calls made by the user id is 9345.

Approach-:

For calculating the total calls made by the guru id and user id i created the 2 pivot table in the First pivot table I put guru id in row and count of guru call status in value. And in the second pivot Table I put user id in row and count of user status in value. From these 2 pivot tables I get the count Of calls that are made by user id and guru id. And my pivot table range is Q:T in my Objective question data table

Total made by Guru id

16258

Total call made by User id

9345

Total made by Guru id
16258
Total call made by User id
9345

Q	R	S	T
gid	Count of astrologerCallStatus	Row Labels	Count of userCallStatus
8	5	1	
11	2	162	2
12	18	437	6
13	33	507	1
14	303	511	
16	5	535	
18	26	543	2
19	708	576	
22	36	595	
26	17	735	1
27	135	787	3
28	21	910	
29	1	939	
30	181	995	
44	11	1103	2
49	23	1105	3
60	162	1213	1
64	6	1233	1
72	11	1280	
74	19	1326	
75	469	1419	
76	2	1463	
77	123	1472	
78	2	1490	3
80	1	1520	2
82	5	1555	2
83	8	1744	1
85	50	1877	
87	312	1880	
91	88	1935	3
92	3	2044	12
95	293	2228	
96	28	2329	10
97		2335	1
98	184	2347	3
99	10	2394	2
100	33	2429	2
101	83	2581	2
109	22	2700	
110	88	2727	2
111	20	2735	10
112	51	2779	
115	179	2813	
117	126	2878	1
121	18	2880	
132	94	2887	6
174	196	2902	
176	12	2958	2
177	13	2986	11
178	119	3100	5
179	19	3347	
180	6	3432	
181	20	3473	1

11. What is the correlation between call duration and customer satisfaction?

Ans-: The correlation between call duration and customer satisfaction is -0.002024514064

No Correlation: The result is close to 0, it means there's no significant relationship between call duration and customer satisfaction.

correlation between call duration and customer satisfaction
-0.0002024514064

12. Which guru has the highest and lowest customer satisfaction scores?

Ans-:

This guru highest customer satisfaction scores
Tarot Mystical = 7.5
Astro Pujaa Rai = 7.5
This guru lowest customer satisfaction scores
Tarot Rittika = 0

Approach-:

So given data there is a rating column so we can assume it as a customer satisfaction toward the company and to the astro gurus. So I create a pivot in objective question table from given data. My pivot table range is X:Z so i picked guru name in the row and rating in the value with avg. function because there are lots of guru who provide the consultant to the different different users so from avg we got the avg. rating of each user by this i got the avg. rating of each guru.

13. What is the average customer satisfaction score by month?

Ans-: This is the avg. customer satisfaction by month.

December 2023 is the highest customer satisfaction month.

And January 2024 is the lowest customer satisfaction month.

month	AVERAGE of rating
December 2023	2.949637572
January 2024	2.676413255

Approach-:

So for this question i create a pivot table in objective question data table from given data table from. My pivot table range is F24:G26. So in the pivot table I put the month in the row and rating in the value with avg. function from this we get the avg. rating of every month.

14. How many categorical columns are there in the data?

Ans-: There are 19 categorical columns based on the description of the data.

categorical columns are there in the data
1. user: User ID (categorical, unique IDs).
2. chatStatus: Status of the chat (e.g., incomplete, failed, completed).
3. guru: Unique identifier for the guru (categorical, IDs).

4. guruName: Name of the guru.
5. gid: Guru ID (categorical, IDs).
6.uid: User ID.
7. consultation Type: Type of consultation (e.g., Chat, Call).
8. website: Source of the consultation (e.g., gurucool).
9. Refund Status: Indicates if the session is refundable or not (e.g., no-refund).
10.is WhiteList User: Boolean indicating if the user is whitelisted.
11. chat Seconds: Duration of the chat in seconds.
12. queue: Boolean indicating if the session was queued.
13. FreeCall: Boolean indicating if the call was free.
14. Free Chat: Boolean indicating if the chat was free.
15. callChannel: Channel used for the call.
16. callIvrType: IVR type used during the call.
17. callStatus: Status of the call.
18. region: Region of the user.
19. userCallStatus: Status of the user's call.

Approach-:

To determine how many categorical columns are in the data, let's first identify which columns are categorical based on given data. Categorical columns contain discrete values, often text-based categories. There are 19 categorical columns based on the description of the data. These columns contain distinct categories such as statuses, types, boolean values, and IDs, which can be used for classification or grouping.

Subjective Questions-:

1-: Should the investment be used to hire more agents, improve training programs, or upgrade call center technology?

Ans-:

Approach:

Use descriptive statistics and performance metrics to analyze:

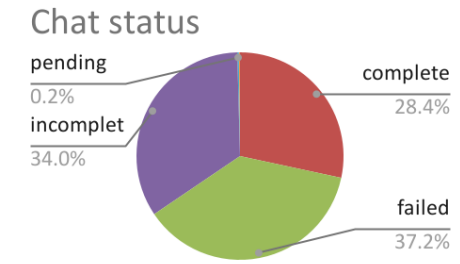
- **Chat duration (`chatSeconds`)**
- **Call durations (`userOnCallDuration`, `astrologerOnCallDuration`)**

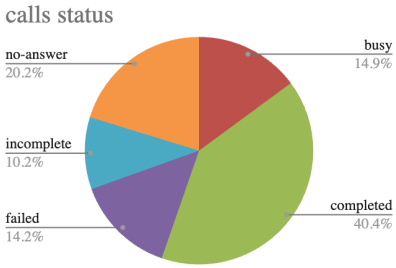
- **Chat/call statuses (`chatStatus`, `callStatus`)**
- **Agent performance (`astrologersEarnings`, `astrologerOnCallDuration`)**

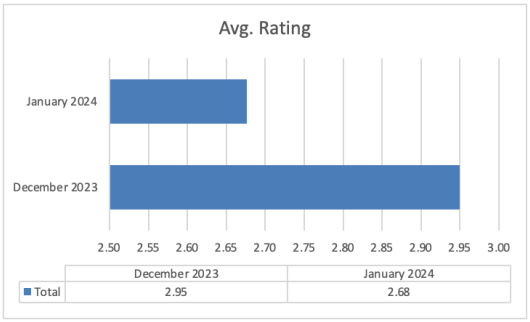
Key Metrics:

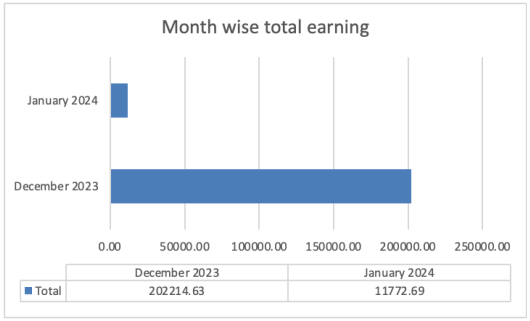
- **Average call/chat durations and satisfaction (`rating`)**
- **Call/chat completion rates**
- **Agent earnings and efficiency**

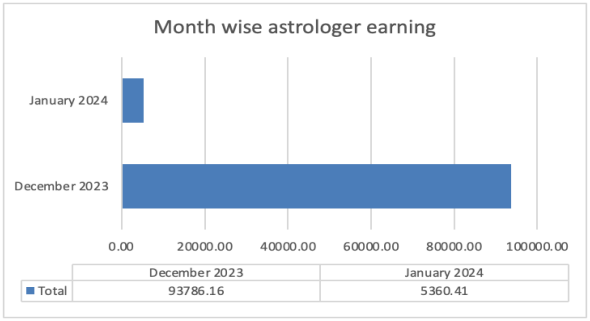
Visualization-:











Insights:

- **Long call durations or incomplete chats and calls indicate potential inefficiencies, pointing to a need for training improvements.**
- **High refund rates or failed calls indicate issues in service, which may require technology upgrades.**
- **There are so many gurus who take less than 25 calls in their whole session.**
- **There are so many gurus whose average rating is less than 5.**

- **The avg. The earring of an astro guru is only ₹11.**

Recommendation:

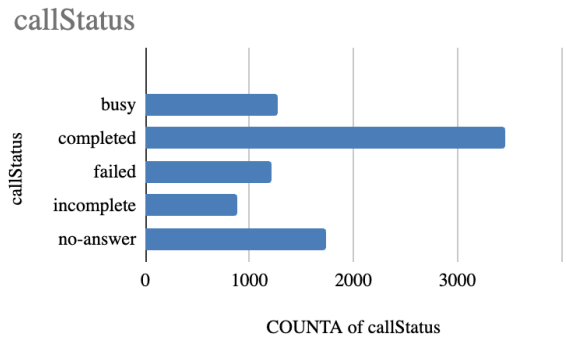
- **Call durations are high but satisfaction is low, invest in agent training to improve efficiency.**
- **There are technical issues leading to failed or queued sessions, focusing on upgrading technology to reduce these problems.**
- **There is no need to hire a new agent because there are so many agents who don't attend more than 25 calls.**

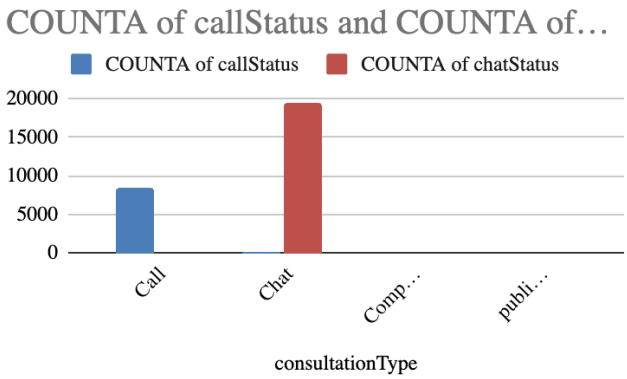
2. What are the potential risks of each investment option (hiring, training, technology upgrades), and how can they be mitigated?

Ans-: Approach:

- **Risk assessment can be done by analyzing:**
  - **Free or low-revenue sessions (`FreeCall`, `FreeChat`)**
  - **Earnings trends for astrologers (`astrologersEarnings`)**

Visualization-:





Insights:

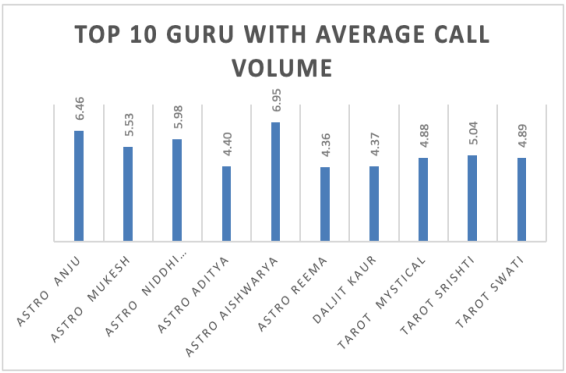
- **Hiring more agents could lead to underutilization if chat/call volumes don't justify it.**
- **Training requires significant time and may not immediately improve performance.**
- **Technology upgrades might be costly and complex but can solve underlying issues.**

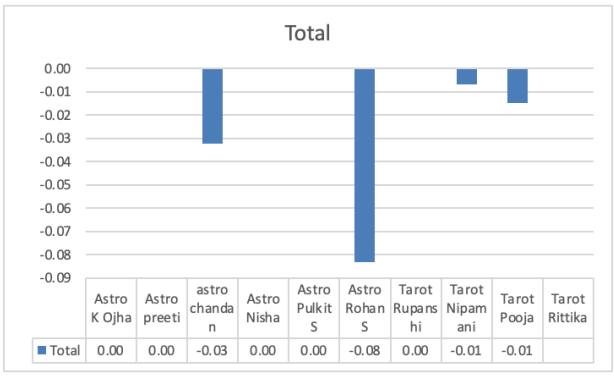
Recommendation:

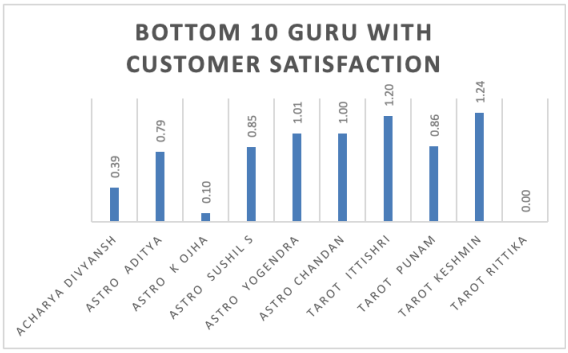
- **Hiring Risk Mitigation: Start with part-time or contract agents.**
- **Training Risk Mitigation: Use periodic performance reviews to assess training effectiveness.**
- **Tech Upgrades Risk Mitigation: Run pilot tests on new systems before full implementation**

3-: How does AstroSage call center performance compare to that of AstroGuru in terms of average call volume, customer satisfaction, and agent performance? Will you use any aggregation function or a visualization here to solve the problem?

Ans-: Approach: I compare the top 10 guru with customer satisfaction and with top 10 avg. call volume and also showing bottom 10 guru who have least customer satisfaction and bottom 10 who have the least avg. call volume.







Recommendation-: as we can see in the given visualization the customer satisfaction and guru rating are not that good. For that we can use the training program from guru to increase the satisfaction of customers and we can also work on technology of call centers to reduce the failed calls and not connected calls.

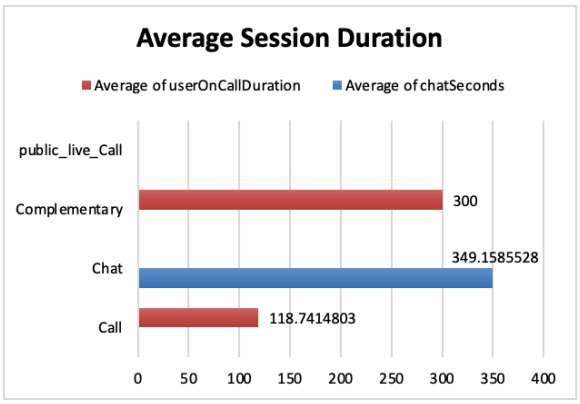
4. How can the call center improve its handling of peak call periods to ensure high

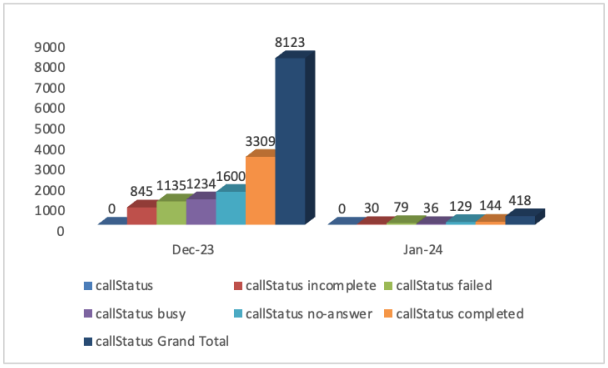
Customer satisfaction?

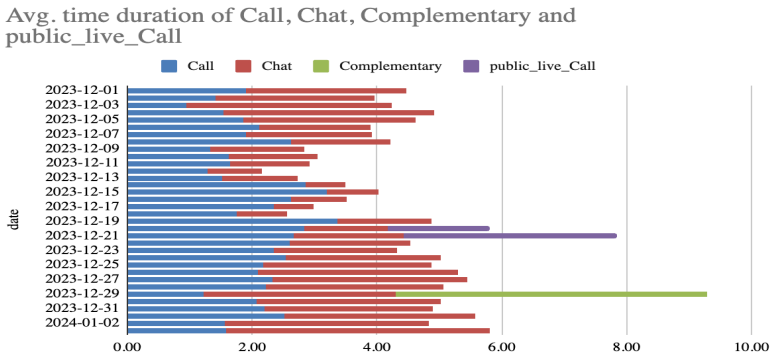
Ans-: Approach:

- **Analyze call volumes during peak hours using the columns `chatStartTime` and `chatEndTime` to identify when the highest volume of calls occurs.**
- **Examine the relationship between call volumes and call/chat completion statuses (`chatStatus`, `callStatus`), as well as the number of failed or incomplete calls during those peak hours.**

Visualization-:







Insights:

- **A high number of incomplete or failed calls may indicate a lack of agents during peak periods.**
- **So many failed calls means we have to improve the call center technology to reduce the no. of failed calls.**

Recommendation:

- **Implement dynamic scheduling where more agents are available during peak times.**

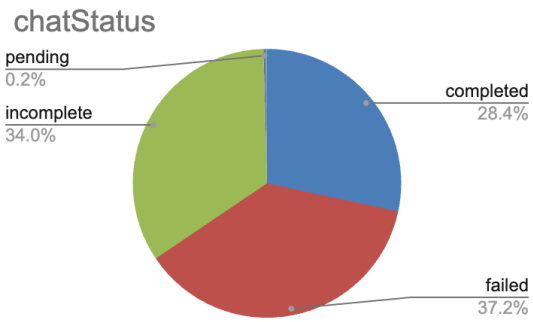
- **Use data visualization to show trends over time and ensure proper staffing during peak periods.**

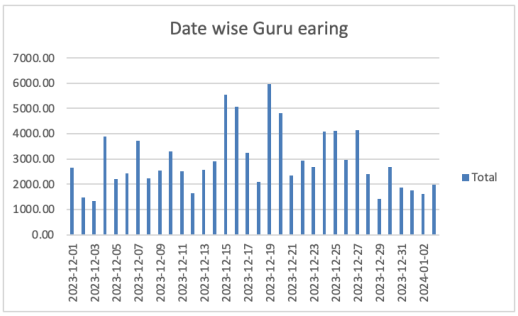
5-: Based on historical data, what strategic initiatives should be prioritized to improve overall efficiency and customer satisfaction?

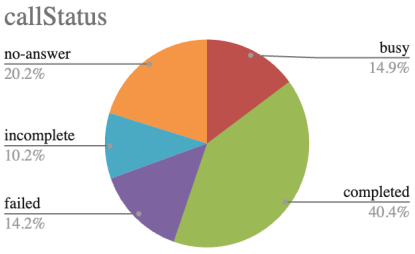
Ans-: Approach:

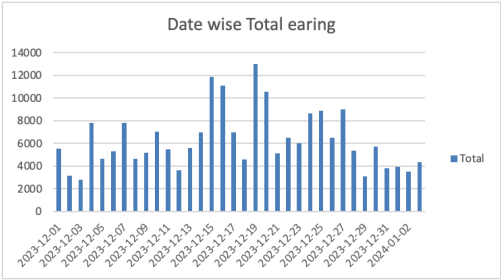
- **Use trend analysis on `rating`, `amount`, `astrologersEarnings`, and `callStatus` `chatstatus` over time.**
- **The total avg. rating is out of 10.**

Visualization-:









Insights:

- **Declining satisfaction ratings or increasing refund rates suggest a need to improve service quality.**
- **So as we can see the avg. rating is too low i.e the customer satisfaction rate is also too low so need to improve the training of the agents.**

Recommendation:

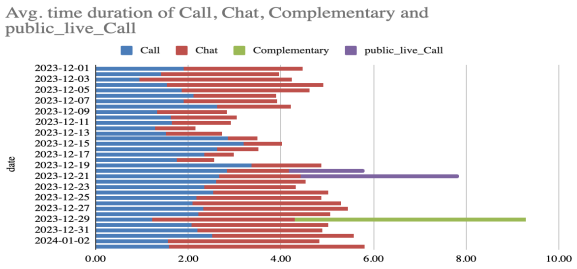
- **Prioritize agent training or technology upgrades based on the root cause of dissatisfaction.**
- **Focus on reducing failed sessions and enhancing the customer experience.**

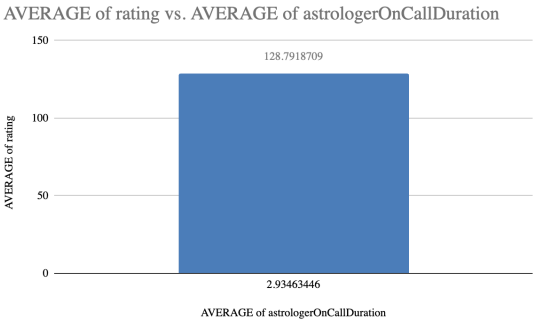
6-: What can be the key factors contributing to high customer satisfaction scores, and How can these be leveraged to improve overall performance?
What is the basis for the suggestions? And mention how did you decide if the Does the satisfaction score affect the ratings?

Ans-: Approach:

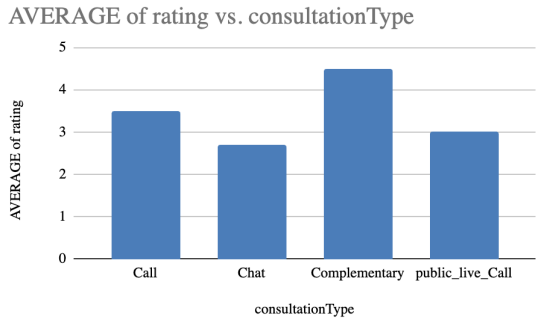
- **Analyze rating in conjunction with variables like astrologerOnCallDuration, chatSeconds, callStatus, Refund Status, and queue using descriptive statistics and correlation analysis.**
- **Look at completed sessions and the duration of interactions to assess the quality of service.**
- **Compare customer satisfaction scores between different agents and consultation types using rating and consultationType.**

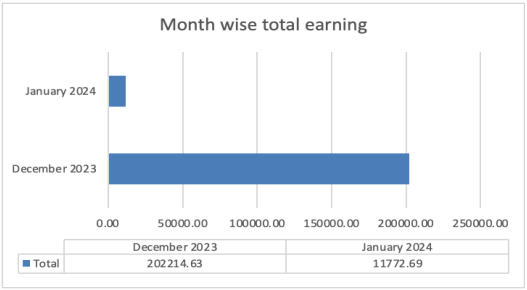
Visualization-:

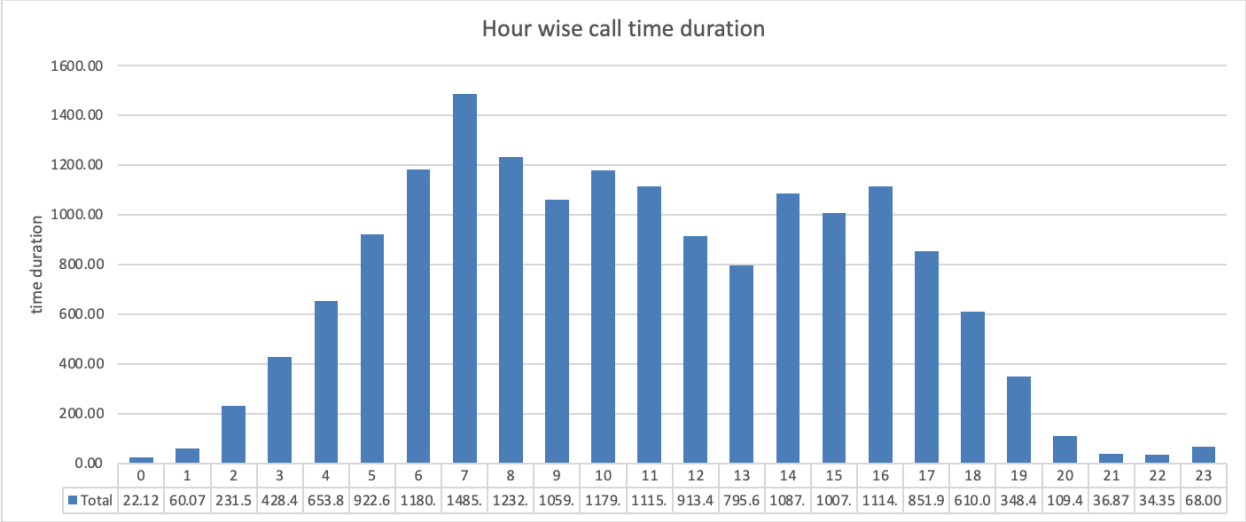




correlation between call duration and customer satisfaction
-0.0002024514064







Insights:

- **Agent performance (measured by astrologerOnCallDuration and astrologersEarnings) has a direct impact on customer satisfaction. Agents who spend more time effectively interacting with customers tend to achieve higher satisfaction scores.**
- **Shorter queue times and fewer refunds indicate more satisfied customers, as delays often lead to frustration.**
- **Call/Chat completion rates (sessions marked as completed) correlate strongly with higher customer satisfaction.**

Recommendations:

- **Leverage high-performing agents by assigning them to critical consultations or during peak periods to ensure higher satisfaction.**
- **There is no correlation between customer satisfaction or agents so we have to focus on our service and we have to train our agents.**
- **Optimize completion rates by addressing factors that cause call/chat interruptions, ensuring customers receive a complete consultation.**

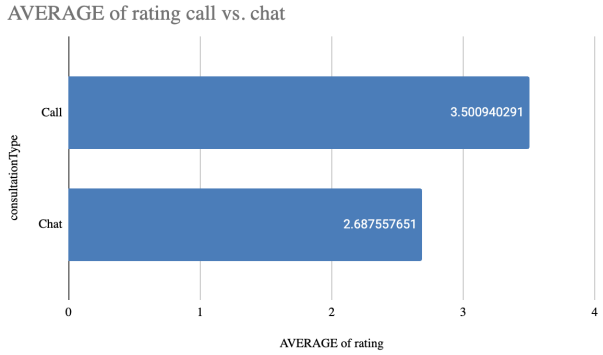
7-: How should the call center balance the workload among agents to ensure optimal performance and avoid burnout?
Mention your approach and spreadsheet function for the answer?

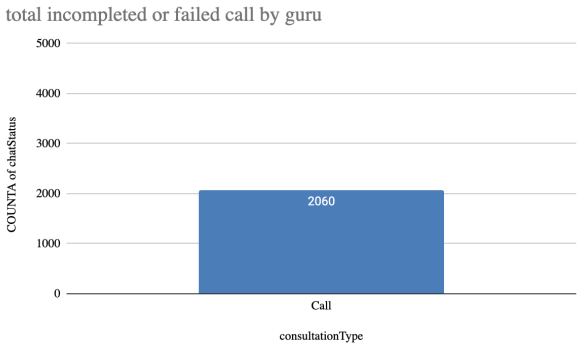
Ans-: Approach:

- **Use correlation analysis to determine how factors like callStatus, rating, and interact with customer satisfaction.**

- **Analyze high rating sessions and determine common contributing factors (e.g., completed sessions, shorter wait times).**

Visualization-:





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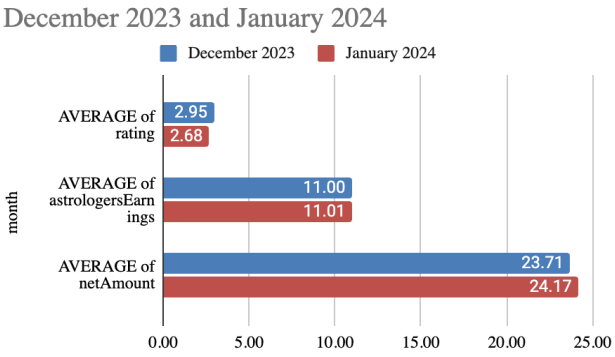

correlation between call duration and customer satisfaction
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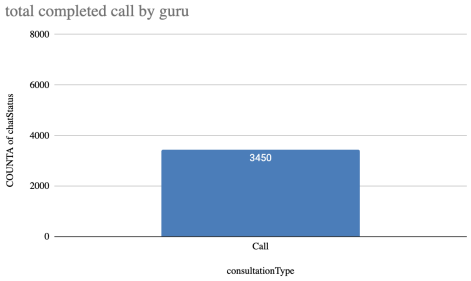
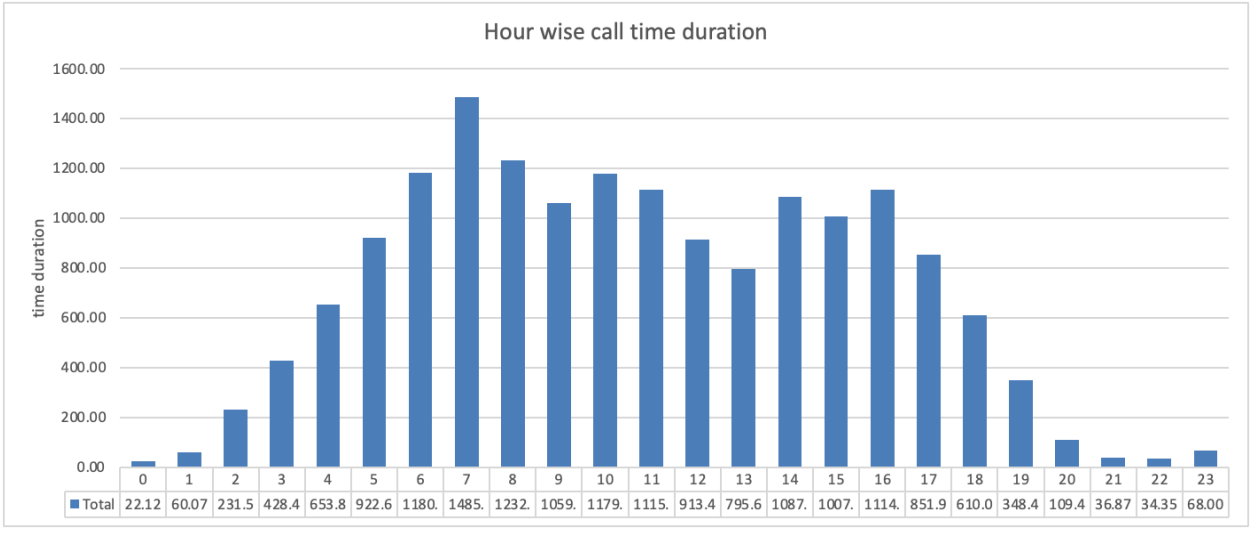




	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Total	22.12	60.07	231.5	428.4	653.8	922.6	1180.	1485.	1232.	1059.	1179.	1115.	913.4	795.6	1087.	1007.	1114.	851.9	610.0	348.4	109.4	36.87	34.35	68.00

Insights:

- **High satisfaction scores tend to correlate with completed sessions and lower refund rates. incomplete sessions negatively impact customer satisfaction.**
- **Refundable sessions, when marked for a refund, tend to have lower customer ratings.**
- **Completion Rates: Sessions marked as "completed" show strong correlations with higher satisfaction. Incomplete or interrupted sessions lead to dissatisfaction, as customers do not feel their concerns were fully addressed**
- **Agent Performance: Agents with longer call durations (measured by astrologerOnCallDuration) and higher earnings (astrologersEarnings) tend to receive higher satisfaction ratings, indicating that quality interaction time matters**

Recommendations:

- **Use predictive analytics to identify dissatisfaction triggers early (e.g., long wait times, refunds) and address them proactively by reallocating agents or resolving issues in real-time.**
- **Session Completion Focus: Focus on increasing the completion rates of chats and calls by identifying and addressing technical or operational issues that interrupt session**
- **Leverage High-Performing Agents: Assign agents who consistently score well in terms of satisfaction to critical and peak-time consultations to improve overall performance.**

8-: What new technologies or tools could be implemented to enhance call center operations and customer service?

Ans-: Approach:

- **Analyze the impact of technological interventions like AI chatbots and predictive analytics tools by reviewing call/chat volumes and durations.**
- **Introduce AI-driven solutions to handle simple customer queries and allow human agents to focus on complex issues.**

Insights:

- **AI Chatbots: Implementing AI chatbots can significantly reduce queue times and increase agent productivity by automating repetitive and routine tasks like answering FAQs or processing basic transactions.**
- **Predictive Analytics: Predictive analytics tools can optimize staffing by forecasting peak call/chat periods based on historical data. This reduces the likelihood of under or overstaffing, ensuring that customer wait times remain low.**
- **Real-time Monitoring: Real-time performance monitoring dashboards enable managers to assess agent productivity and track customer satisfaction in real time, allowing for quick adjustments when necessary.**

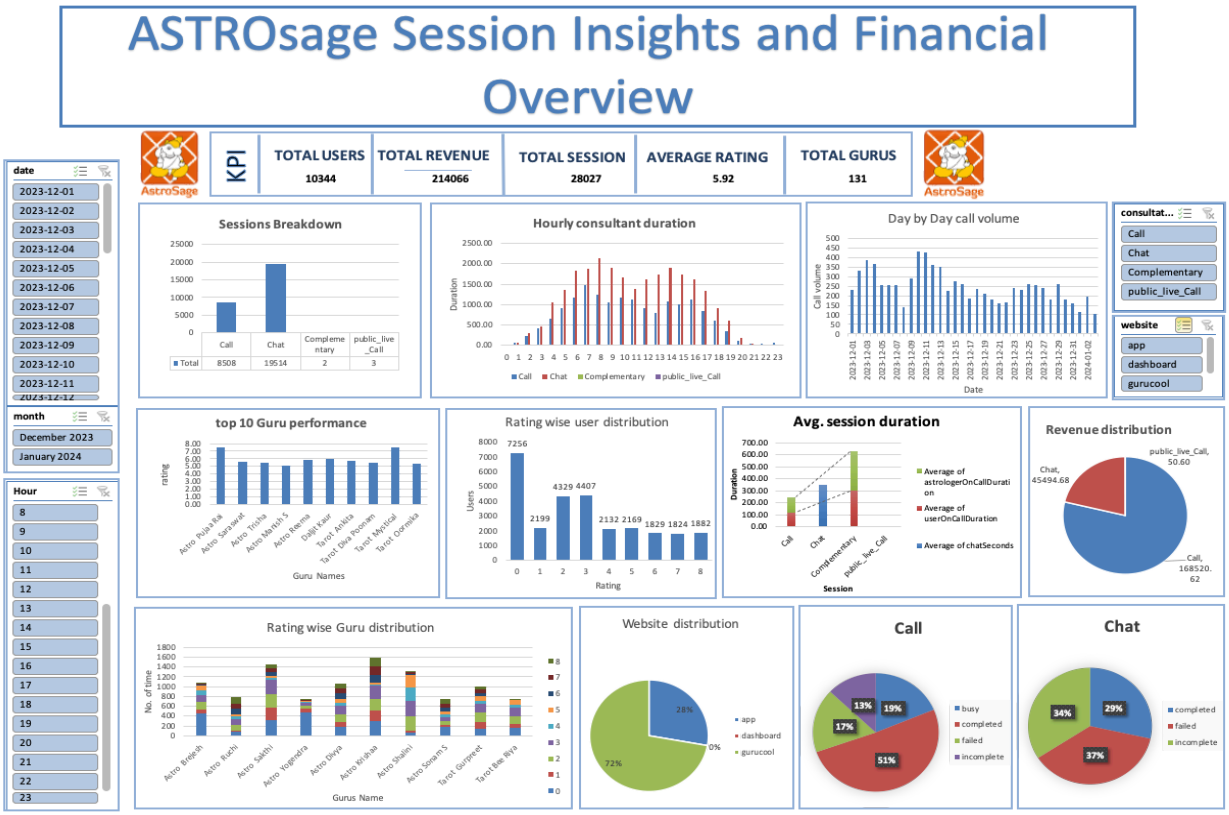
Recommendations:

- **Implement AI-based chatbots to handle routine inquiries and free up human agents for complex tasks.**
- **Invest in predictive analytics tools to anticipate peak hours and improve agent allocation based on historical data.**
- **Explore real-time performance monitoring dashboards to assess agent productivity and customer satisfaction in real time.**

9-: What metrics should be included in the final dashboard to provide a comprehensive view of call center performance and guide investment decisions?

Ans-: Approach:

- **Use key performance metrics such as rating, astrologersEarnings, chatSeconds, and, customer satisfaction, and efficiency.**
- **Build interactive visualizations (charts, graphs) to monitor performance in real time.**



Insights:

- **Key metrics like Average Handle Time (AHT), CSAT, agent productivity (earnings and session durations), and Refund Rate provide a comprehensive view of performance.**
- **Queue times and peak period trends give actionable insights for optimizing resource allocation.**

Recommendations:

- **Include the following metrics in the dashboard:**
    - **Average Handle Time (AHT): Measures call/chat efficiency.**
    - **Customer Satisfaction (CSAT): Based on session ratings.**
    - **Agent Productivity: Derived from astrologersEarnings and call/chat durations.**
    - **Session Completion Rate: Based on callStatus and chatStatus.**

10-: How would you allocate a 1 crore rupee investment to optimize operational efficiency, enhance customer satisfaction, and boost profitability, and what analysis-based recommendations would you offer to support this?
[you have to give bullet pointers in order to answer this question]

Ans-: Investment Allocation of 1 Crore Rupees

- **Approach:**
    - **Analyze past performance using call/chat data, agent performance, and peak periods to determine where investment will yield the highest ROI.**
- **Insights:**
    - **Significant investments in hiring and training can improve agent efficiency and customer satisfaction, while technology upgrades like AI chatbots can reduce workloads for human agents.**
    - **Call routing will significantly boost satisfaction and productivity.**
- **Recommendations:**
    - **Hiring & Training (40%): Invest in hiring additional agents and providing training to improve agent performance and reduce workload.**
    - **Technology Upgrades (30%): Implement AI chatbots to handle routine inquiries and predictive analytics to optimize agent allocation during peak times.**
    - **Customer Feedback & Monitoring Systems (20%): Develop tools to capture real-time feedback and monitor agent performance, allowing for immediate interventions.**
    - **Operational Efficiency (10%): Invest in optimizing call routing systems to ensure efficient use of agent time and reduce queue times.**