**Tasks**

**Objective Questions:**

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

**Answer:** There is only 1 table in the provided data.

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

**Answer:** There are total **35 attributes** present in the data, which is calculated using the formula **=COUNTA(data!1:1).**

1. The data consists of some inconsistent and missing values so ensure that the data used for further analysis is cleaned.

**Answer:** The inconsistency and missing values in the data is handled using various data cleaning methods. Blank cells are filled with appropriate values such as N/A for blank text cells and 0 for numerical blank cells. To fill the missing text values **=IF(ISBLANK(A1),”N/A”,A1)** formula is used and for numerical **=IF(ISBLANK(A1),”N/A”,A1)** is used.

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

**Answer:** The change in daily call volume is calculated using pivot table, and to find average daily call volume **=ROUND(AVERAGE(S3:S36),0)** formula is used.

|  |  |
| --- | --- |
| **Average Daily Call Volume** | **246** |

|  |  |  |  |
| --- | --- | --- | --- |
| **Row Labels** | **Count of Calls** | **Change in Call Volume** | **%Change in call volume** |
| 2023-12-01 | 228 |  |  |
| 2023-12-02 | 332 | 104 | 45.61% |
| 2023-12-03 | 383 | 51 | 15.36% |
| 2023-12-04 | 364 | -19 | -4.96% |
| 2023-12-05 | 253 | -111 | -30.49% |
| 2023-12-06 | 254 | 1 | 0.40% |
| 2023-12-07 | 254 | 0 | 0.00% |
| 2023-12-08 | 138 | -116 | -45.67% |
| 2023-12-09 | 288 | 150 | 108.70% |
| 2023-12-10 | 430 | 142 | 49.31% |
| 2023-12-11 | 424 | -6 | -1.40% |
| 2023-12-12 | 358 | -66 | -15.57% |
| 2023-12-13 | 348 | -10 | -2.79% |
| 2023-12-14 | 226 | -122 | -35.06% |
| 2023-12-15 | 276 | 50 | 22.12% |
| 2023-12-16 | 258 | -18 | -6.52% |
| 2023-12-17 | 185 | -73 | -28.29% |
| 2023-12-18 | 233 | 48 | 25.95% |
| 2023-12-19 | 209 | -24 | -10.30% |
| 2023-12-20 | 178 | -31 | -14.83% |
| 2023-12-21 | 159 | -19 | -10.67% |
| 2023-12-22 | 163 | 4 | 2.52% |
| 2023-12-23 | 241 | 78 | 47.85% |
| 2023-12-24 | 232 | -9 | -3.73% |
| 2023-12-25 | 258 | 26 | 11.21% |
| 2023-12-26 | 255 | -3 | -1.16% |
| 2023-12-27 | 242 | -13 | -5.10% |
| 2023-12-28 | 181 | -61 | -25.21% |
| 2023-12-29 | 260 | 79 | 43.65% |
| 2023-12-30 | 179 | -81 | -31.15% |
| 2023-12-31 | 158 | -21 | -11.73% |
| 2024-01-01 | 115 | -43 | -27.22% |
| 2024-01-02 | 196 | 81 | 70.43% |
| 2024-01-03 | 107 | -89 | -45.41% |

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

**Answer:** In the provided dataset there are total two months of data present, out of which December 2023 has the highest and January 2024 has the lowest call volumes, which is calculated using pivot month as rows and count of calls in values.

|  |  |  |
| --- | --- | --- |
|  | **Month** | **Count of Monthly Calls** |
| Max | 2023-12 | 7947 |
| Min | 2024-01 | 418 |

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

**Answer:** In the provided dataset we did not observe any operational cost data. Considering the earnings of astrologers as the operational cost of the company due to lack of data and information. We have created a pivot of monthly spend on astrologers earning by using month in row and astrologer’s income as values.

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

**Answer:** To calculate average number of calls handled by per agent per day I have calculated total numbers of calls using pivot date in row and count of consultant type in values using consultant type call as filter. Count of unique agents is calculated using formula **=SUM(1/COUNTIF('cleaned data'!F2:F28028,'cleaned data'!F2:F28028))**, total days using count function. Final result is obtained by (total call/ total days)/total agents.

|  |  |
| --- | --- |
| **Total Calls** | **8508** |
|  |  |
| **Count of Agents that consult over the call** | **149** |
|
|
|  |  |
| **Total days** | **34** |
|  |  |
| **total number of calls handled by per agent per day** | **1.68** |
|
|
|

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

**Answer:** Total number of repeat callers is calculated using pivot table by selecting uid in row and count of uid in values also consultant type call as filter, and to get repeat callers apply filter number greater than 1 on row header. Count of this data will give us total numbers of repeat callers who makes more than 1 call. Summing all call values gives total number of repeat calls. Using the values of total calls and repeat calls we can calculate contribution of repeat callers in percentage.

|  |  |
| --- | --- |
| **Total number of repeat callers** | **1277** |
| **Percentage of repeat calls over all the calls** | **72%** |

1. What are the total sales generated by the call centre for each product category?

**Answer:** Total sales generated by each product category is calculated using pivot, consultant type in row and sum of net amount in value.

|  |  |
| --- | --- |
| **Product wise Sales Generated** | |
| **Category** | **Total Amount** |
| **Call** | **168442.04** |
| **Chat** | **45494.68** |
| **Complementary** | **0.00** |
| **public\_live\_Call** | **50.60** |

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

**Answer:** Total number of calls made for each user ID and guru ID is **8363**. There is no specific data present in given the given dataset that shows whether the call is made by user or guru so I have calculated total number of calls using pivot by using count of uid in value and uid in rows and applying filter of consultant type call.

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

**Answer:** The correlation between call duration and customer satisfaction is calculated using formula **=CORREL('cleaned data'!AM2:AM28028,'cleaned data'!AN2:AN28028)** and correlation found is **0.05476**.

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

**Answer:** The highest and lowest customer satisfaction scores are calculated by pivot table guru name in rows and average of ratings in value. I found tow guru has same highest rating.

|  |  |  |
| --- | --- | --- |
| **Max rating** | **Astro Pujaa Rai** | **7.50** |
|  | **Tarot Mystical** | **7.50** |
| **Min rating** | **Tarot Rittika** | **0.00** |

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

**Answer:** The Average monthly customer satisfaction scores are calculated by pivot table, month in rows and average of ratings in value.

|  |  |
| --- | --- |
| **Month** | **Average of rating** |
| **2023-Dec** | **2.95** |
| **2024-Jan** | **2.68** |

1. How many categorical columns are there in the data? [Search about categorical and continuous data, and try to answer this question]

**Answer:** The categorical data are labels, identifiers, or status indicators, not numeric values. In the provided data I have found **21 Categorical columns**, which are mentioned below.

\_id, user, chatStatus, guru, guruName, gid, uid, consultationType,

website, refundStatus, isWhiteListUser, queue, freeCall, freeChat,

callChannel, callIvrType, callStatus, CallSid, astrologerCallStatus, region,

userCallStatus .

**Subjective Question:**

1. Should the investment be used to hire more agents, improve training programs, or upgrade call centre technology?

**Answer:**

**Observations from the data:**

* Average rating of Gurus **2.93** out of 8, which is a low customer satisfaction.

* High failed and incomplete chat rate (37% failed, 34% incomplete) indicates the process inefficiency.
* Call completion only 41%, and busy and no-answer is 15% + 20% = 35% which suggests workload and availability issues.

**Recommendations:**

1. Upgrade technology improve chat systems, implement automation on call and chat system, and routing. This should be first priority of the investment.
2. Invest in training programs to enhance resolution rates, since the average rating very low. Agents(Gurus) should be given more training , teach them use of new technology and also conduct trainings on monthly basis to improve their efficiency.
3. Hire more agents only if workload analysis (volume/agent ratio) supports it. Hiring more agents will not solve the busy, no-answer, or failed issues, it would likely increase costs without improving the connection rate.
4. What are the potential risks of each investment option (hiring, training, technology upgrades), and how can they be mitigated?

Name the chart/spreadsheet function you will use for solving the problem.

**Answer:**

**Hiring More Agents:**

* Risk: Increased operational costs without a corresponding increase in completed calls, leading to lower profitability. Agent idle time could increase if the technology still can't connect them to customers.
* Mitigation: First, upgrade technology to ensure it can handle the call and chat volume. Hire in phases based on the new, improved completion rates and forecasted volume.

**Improving Training Programs:**

* Risk: Investment is wasted if the root cause is technology. Training may not solve failed or busy statuses. It also involves taking agents away from their duties for the duration of the training.
* Mitigation: Use call and chat analytics to identify specific skill gaps. Focus training on reducing incomplete interactions and improving efficiency on the new technology once it's implemented.

**Upgrading Call Center Technology:**

* Risk: There can high upfront cost, potential for disruption during implementation, and resistance from agents if they were unfamiliar with the new system.
* Mitigation: Conduct a thorough needs analysis to select the right vendor. Plan a phased rollout to minimize disruption. Implement a comprehensive training program for the new technology and create a pilot group to test it before a full launch.

**Charts and Functions used:**

* + Pie chart for call and chat status.
  + Slicers for monthly and daily basis analysis.
  + Rest is a qualitative risk analysis based on interpreting the dashboard's operational metrics

1. How does AstroSage's call center performance compare to AstroGuru's average call volume, customer satisfaction, and agent performance?

Will you use any aggregation function or a visualization here to solve the problem?

**Answer:** The given dataset does not contain any data from AstroGuru also I’m not able to find any real AtroGuru named company to arrange data from third party website or some insights from their website. But If I would have the data from the competitor’s company I will perform analysis mentioned below from performance comparison of the both the companies:

* Approach: Use a Pivot Table with Source/Brand in the Rows area. Calculate the AVERAGE of Call Volume, AVERAGE of Customer Satisfaction, and AVERAGE of Calls per Agent (as calculated previously) for each brand.
* Function & Visualization: AVERAGEIFS or a Grouped Bar Chart to visually compare the two brands side-by-side.

1. How can the call center improve its handling of peak call periods to ensure high customer satisfaction?

Mention the functionality you will use for giving the suggestions, will it be any aggregated function or a visualization?

**Answer:** The "Hourly User Volume" chart provides a clear answer for this shown below.

**Analysis:** The chart shows that user volume starts rising at 4 AM, peaks significantly between 6 AM and 5 PM and then gradually declines.

**Suggestions:**

* Implement Dynamic Staffing: Align agent schedules with this hourly data. Significantly increase the number of active agents during the 6 AM to 5 PM peak window.
* Introduce a Callback System: During peak hours, when wait times are long, offer customers the option to receive a callback instead of waiting in a queue. This improves customer experience and manages volume.

**Functionality Used:** The suggestion is based directly on the Bar Chart visualization of Hourly User Volume using pivot and conditional formatting for data extraction. This chart is a visual representation of data aggregated by the hour, also MAX, AVERAGEIF functions are used in the data to identify peak load hours.

1. Based on historical data, what strategic initiatives should be prioritized to improve efficiency and customer satisfaction?

**Answer:** The following strategies should be prioritized mentioned below:

* Technology change to Improve System Reliability: This is the top priority. The goal is to reduce the failed, no-answer, busy, and incomplete rates for both calls and chats. This directly impacts customer satisfaction and revenue.
* Channel Optimization for Revenue Growth: Calls generate 79% of revenue. Prioritize fixing the call system to capture this high-value traffic. Investigate why calls have a higher completion rate (41%) than chats (29%) and apply any process learnings to the chat channel.
* Implement Data-Driven Workforce Management: Use the daywise and Hourly User Volume charts to create an efficient staffing model that matches agent availability to customer demand, reducing both missed calls and agent idle time.

1. 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 you decided if the satisfaction score affects the ratings.

**Answer:**  The Guru Rating chart shows a massive number of 0 ratings (7,256), which is dragging the average down to **2.93**. It's highly probable that a 0 rating is automatically assigned for failed, unanswered, or incomplete interactions. The actual satisfaction for completed interactions is likely much higher, as indicated by the significant number of 6, 7, and 8-star ratings.

**Key Factors for High Scores:** The agents who receive 7 and 8-star ratings are the key. Their success is likely due to strong communication skills, deep knowledge, and efficiency in resolving customer queries.

**How to Leverage:**

* Isolate and Analyse Success: Filter the data to identify the gurus who consistently receive high ratings.
* Qualitative Analysis: Review recordings of their calls and chats to identify specific techniques and best practices.
* Develop a Best Practice Playbook, Codify these successful strategies into a training module for all other agents, especially new hires.

**Basis for Suggestion:** The basis is the hypothesis that the 0 ratings are system-artifacts, not actual customer feedback. To test this, I can calculate the average rating excluding the zeros.

Spreadsheet Function: We can use the AVERAGEIF function on the raw data (=AVERAGEIF(RatingRange, ">0")) to see the true average satisfaction on interactions that were actually rated by a customer. Even after ignoring 0 rating values I have found the average rating **3.95** which is again less than top rating 8.

1. 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.

**Answer:**  To balance the workload among the 149 gurus, we need to move beyond aggregated dashboard data and look at individual agent performance metrics. Below shown column chart shows that the Top 10 consultants handle 44% of total calls, indicating an uneven distribution. This imbalance can lead to fatigue, reduced productivity, and inconsistent service quality. To ensure optimal performance and prevent agent burnout, the call center should balance the workload by distributing calls and chats evenly among all consultants.

Steps for Optimization:

* Monitor real-time call distribution using dashboards or pivot tables to identify overloaded and underutilized agents.
* Assign calls dynamically through an Automatic Call Distributor (ACD) or skill-based routing system to balance workloads as per agent availability and skill.
* Implement thresholds once an agent reaches a set number of calls/chats, they are temporarily removed from the queue until others catch up.
* Adopt pre-booking or appointment systems to allow better scheduling and fair distribution.
* Regularly review pivot-based reports to ensure ongoing workload balance and agent efficiency.

Spreadsheet Approach and Function:

* Create a Pivot Table from your call center data. Rows: Guru name/id, Values: Count of Calls, Count of Chats ,Average of Handle Time
* Analyze Call Load per Guru.
* Identify gurus handling above-average calls or chats.
* Use the AVERAGE Function to find the mean workload:=AVERAGE(range\_of\_call\_counts)
* Use Conditional Formatting to highlight agents above this average threshold indicating overload.

1. What new technologies or tools could be implemented to enhance call center operations and customer service?

**Answer:**  The below mentioned new technologies can be implement to enhance call center operations and customer service:

* Advanced Automatic Call Distributor with Callback: To solve the "no-answer" and "busy" issues by routing calls more intelligently and offering callbacks.
* Robust Omnichannel Chat Platform: To replace the current system that has a 71% failure and incomplete rate. Platforms like Intercom or LiveChat offer better reliability and features.
* AI-Powered Chatbots: To handle initial customer queries, gather information, and answer simple questions, freeing up human agents for more complex, high-value conversations.
* Workforce Management Software: To automate the process of forecasting call volume and creating optimal agent schedules based on the historical data seen in the "Hourly User Volume" chart.
* Speech and Text Analytics: To automatically analyze call recordings and chat transcripts for customer sentiment, keywords (e.g., "frustrated," "not working"), and agent script adherence.

1. What metrics should be included in the final dashboard to comprehensively view call center performance and guide investment decisions?

**Answer:**  The following mentioned below metrics are included in the dashboard to view call center performance to make investment decisions:

* Total revenue
* Total number of calls
* Total number of chats
* Total number of Guru/Agent
* Average Guru rating
* website distribution
* Revenue generated by category type
* Call distribution over hrs
* Day by day call volume
* Call status distribution
* Chat status distribution
* Rating wise guru distribution
* Slicers for product category, country region, month, year.

1. 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 to answer this question]

**Answer:** Based on the analysis, the investment must be strategically allocated to fix the foundational problems first for the highest return on investment.

Total Investment: ₹1 Crore

* Technology Upgrade (60% - ₹60 Lakhs):

Justification: This is the highest priority. With 59% of calls and 71% of chats failing, no other investment will be effective until the core platform is reliable. This directly addresses the biggest point of failure and customer frustration.

Allocation:

* + ₹40 Lakhs: New Cloud-based Omnichannel Contact Center platform (includes robust ACD, chat, and callback features).
  + ₹20 Lakhs: Implementation, integration with existing systems, and a WFM software module.
* Targeted Agent Training (25% - ₹25 Lakhs):

Justification: Once the new technology is in place, agents must be proficient in using it. This investment also focuses on leveraging best practices from top performers to elevate the entire team.

Allocation:

* + ₹15 Lakhs: Comprehensive training program for all 149 agents on the new technology platform.
  + ₹10 Lakhs: Developing and delivering a "Quality & Efficiency" training program based on the analysis of high-performing agents.
* Strategic Hiring & Performance Incentives (15% - ₹15 Lakhs):

Justification: Hiring should be approached cautiously. This budget is reserved for after the technology fix proves successful and demonstrates a need for more capacity to handle the now-successful connections.

Allocation:

* + ₹10 Lakhs: Budget to hire a small number of additional agents approx. 5-8 to specifically cover the peak hours identified in the analysis.
  + ₹5 Lakhs: A performance incentive program to reward agents who achieve high CSAT scores and FCR rates, motivating quality and efficiency.