ABC Call Volume Trend Analysis

Final Project:-4

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Dataset Overview:-

The dataset provides details about the calls received by various agents like call duration, date and time of the call etc.

- there are 117989 rows and 13 columns.
- Agent name is a categorical column containing names of the agents attending the phone call.
- Agent Id column contains the agent id and they also contain a lo of null values.
- Customer column contains the contact number of the customer.
- Queue time contains the seconds customer has waited before the agent has picked the call.
- **Date_& Time, Time & Time _Bucket**
- are used for time intelligence.
- Duration and Call seconds contains the duration of the call.
- Call Status and Wrapped are also categorical columns.
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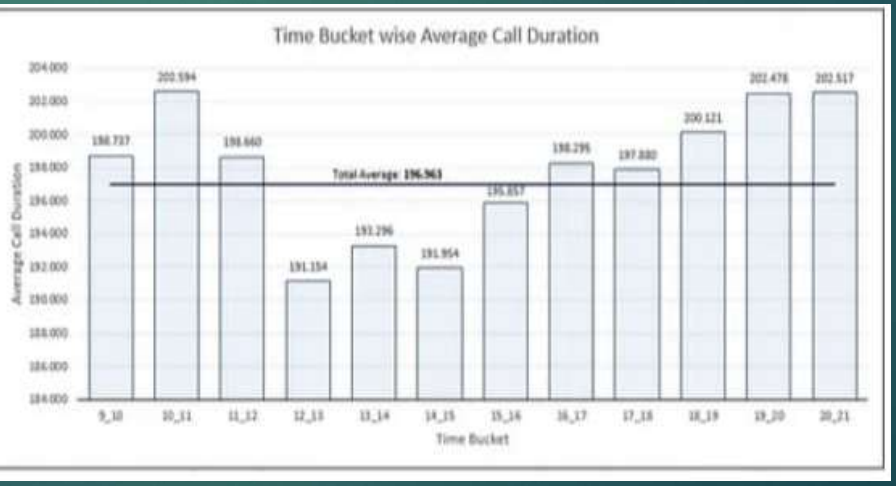
- **Data Cleaning:-**
- The agent Name and Agent Id has null values.
- The columns Ringing and IVR duration are not used since ringing has only one variable and IVR duration is not of any use to our analysis.

1) Average Call Duration:-

- The overall **Average Call Duration** is **196.963 seconds**.
- We can observe that the **Average Call Duration** first peaks in the **morning hours** before dropping to below average value during the **lunch hours** and then again increasing to above average value.

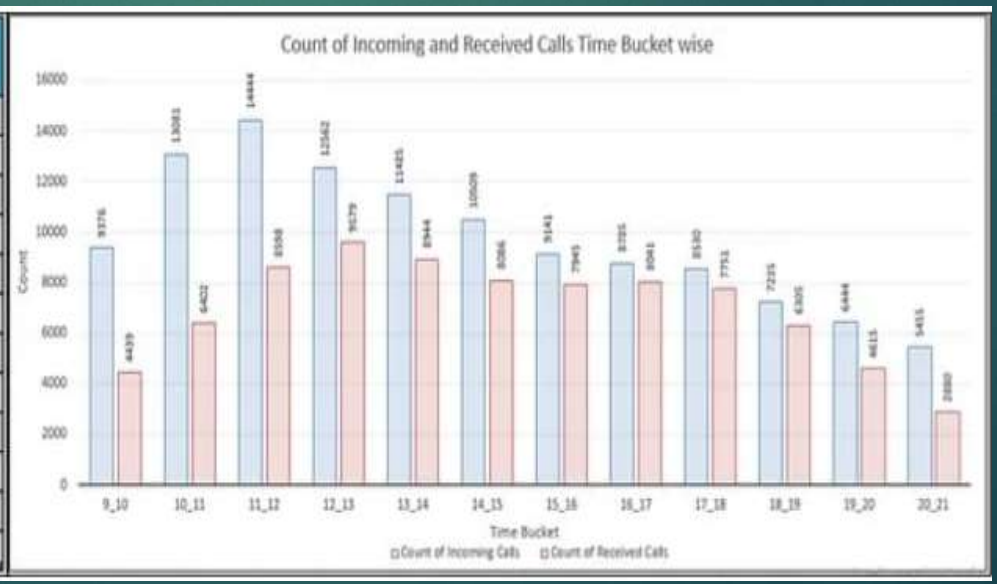
Call_Status_Mod	received	
Row Labels	Average of Call Duration (s)	Average of Total Call Duration
9_10	198.737	196.963
10_11	202.594	196.963
11_12	198.660	196.963
12_13	191.154	196.963
13_14	193.296	196.963
14_15	191.954	196.963
15_16	195.857	196.963
16_17	198.295	196.963
17_18	197.880	196.963
18_19	200.121	196.963
19_20	202.478	196.963
20_21	202.517	196.963



2): Call Volume Analysis:

- We can observe that the number of **received** calls received **first increases** with time **before dropping down**.
- We can also observe that the number of **abandoned** calls are **very high** in the **morning hours** and as the day progresses, the number of **abandoned calls reduces**.

Time Bucket	Count of Incoming Calls	Count of Received Calls
9_10	9376	4439
10_11	13081	6402
11_12	14444	8598
12_13	12562	9579
13_14	11485	8944
14_15	10509	8086
15_16	9141	7945
16_17	8785	8041
17_18	8530	7751
18_19	7235	6305
19_20	6444	4615
20_21	5455	2880



3) Manpower Planning:

- We can observe that to maintain a maximum of **10% abandon rate**, we need to **increase** the availability of agents in the **morning hours** by a **large margin** as in these hours, the number of incoming calls are quite high and the number of agents available currently are quite low.
- During **afternoon hours** and during **late evening hours**, we need to **increase** the availability of agents by a **slight margin** to maintain a maximum of **10% abandon rate**.

Time Bucket	Daily Average of Number of Agents Available	Number of Agents Required
9_10	18	34
10_11	24	44
11_12	34	51
12_13	38	45
13_14	37	43
14_15	37	43
15_16	36	37
16_17	37	36
17_18	36	36
18_19	29	30
19_20	19	24
20_21	12	20

4) Night Shift Manpower Planning:

- From the above heatmap, we can observe that for day of the week, **Monday** requires the **most number of agents** in **individual time buckets** as well as for the **overall day** as it is starting of the week.
- For rest of the days, agent requirement remains **more or less the same** with **Saturday's** and **Sunday's** requirement on the **lower side** as they are weekends.
- For individual time buckets, **the most number of agents required** is in the **morning hours** from **9 A.M to 1 P.M** and the **least number of agents required** is at **night hours** from **12 A.M to 5 P.M**.

	Required Number of Distinct Agents									
	Minimum									
Time Bucket	9_10	10_11	11_12	12_13	13_14	14_15	15_16	16_17	17_18	18_19
Monday	98	136	117	117	102	90	63	56	51	46
Tuesday	37	46	53	50	44	45	47	43	46	36
Wednesday	40	50	57	51	45	41	39	36	37	32
Thursday	37	47	55	44	44	44	41	43	36	30
Friday	28	42	54	36	39	33	30	34	32	27
Saturday	24	35	47	41	34	34	33	32	32	26
Sunday	27	50	41	30	32	26	26	26	27	26

- **Description:-**
- A Customer Experience (CX) team plays a crucial role in a company. They analyze customer feedback and data, derive insights from it, and share these insights with the rest of the organization. This team is responsible for a wide range of tasks, including managing customer experience programs, handling internal communications, mapping customer journeys, and managing customer data, among others.
- In the current era, several AI-powered tools are being used to enhance customer experience. These include Interactive Voice Response (IVR), Robotic Process Automation (RPA), Predictive Analytics, and Intelligent Routing.
- One of the key roles in a CX team is that of the customer service representative, also known as a call center agent. These agents handle various types of support, including email, inbound, outbound, and social media support.
- Inbound customer support, which is the focus of this project, involves handling incoming calls from existing or prospective customers. The goal is to attract, engage, and delight customers, turning them into loyal advocates for the business.

- In this project, we will be diving into the world of Customer Experience (CX) analytics, specifically focusing on the inbound calling team of a company. We are provided with a dataset that spans 23 days and includes various details such as the agent's name and ID, the queue time (how long a customer had to wait before connecting with an agent), the time of the call, the duration of the call, and the call status (whether it was abandoned, answered, or transferred). We will be using our analytical skills to understand the trends in the call volume of the CX team and derive valuable insights from it.
- **Approach:-**
- Check the data for consistencies.
- Create a table in Excel.
- Create extra columns if required.
- Create Pivot Tables and charts.
- Submit a report to the management team to make decisions using the insights.

Tech Stack Used:-

- **Python 3.10.9** — Programming language used for Data Pre-processing.
- **Jupyter Notebook 6.5.2 —** Interactive platform to write and execute codes in various programming languages (in this case Python).
- **Microsoft Excel 2023** — A spreadsheet editor software used mainly by professionals to enter data in table format, perform computations, plot graphs etc.

- **Results:-**
- This project, helped me in understanding the importance of **Data Analytics** in **Customer Experience Analysis** as it provides valuable insights which helps in making **Data-Driven Decisions**.
- In this project I was able to get insights like call abandon rates, distribution of call duration, number of calls, agents, how to create a manpower plan so as to decrease abandon calls etc. I also got experience in Data Preprocessing like Data Cleaning, handling Outliers, Feature Engineering etc. in this project. I can now **communicate** the insights to relevant stakeholders as per the requirements.