Call Service Efficiency Analysis

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Abstract

This project aims to analyze a call service operation to determine its current efficiency and to find ways of improving it. Utilizing a dataset comprising 17 attributes, I performed comprehensive data preprocessing to ensure data quality, followed by exploratory data analysis (EDA) where various visualizations were created to view the data from various perspectives with the intention of uncovering underlying patterns and relationships.

After discovering these trends and relationships, I was able to understand the current state of the operation and identified means of improving its performance.

This entire process has been documented in this report alongside key details, insights and actionable recommendation, so that the concerned individuals may be able to understand the operations of this call service better and improve upon it.

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Introduction

The competitive landscape of business continually seeks methods to enhance performance and satisfy customers. Only by continuous monitoring and evaluation of one's performance can an organization learn from mistakes and become better.

This project addresses the need of improving the efficacy of service being provided by a Call Service Operation. By analyzing historical call data, I aim to identify patterns and factors that influence service efficiency. The database provided contained 12 tables but only 17 attributes drawn from 2 different tables were deemed useful for analysis.

The goal of this project is to find key insights from the data to understand the workings of the Call Service Operation and then provide appropriate suggestions for improving its performance.

In the following sections, I will detail the methodologies employed in data loading, profiling, preprocessing, and exploratory data analysis processes. I will also discuss my key findings and insights gleaned from the analysis, and provide my recommendations before concluding this project.

Methodology

The methodology of this project is structured into several key components, each of which plays a vital role.

1. Data Loading:

   Initially, a database of 12 tables was provided among which contents of only two tables were joined together to get all the data required data.

2. Data Profiling:

   Before jumping to clean the data, it must first be profile to understand the structures and properties of data. Descriptive statistics are calculated to understand the data better and discover flaw or logical inconsistency in the data.

3. Data Preprocessing:

   Then the dataset is cleaned to ensure accuracy, consistency, relevancy and completeness. This process included checking for duplicates, handling missing values by imputation, converting data into correct formats, standardization, and addressing outliers that could skew the results. The goal was to create a clean and reliable dataset for analysis.

4. Exploratory Data Analysis (EDA):

   EDA was conducted to gain insights into the dataset's characteristics and uncover any underlying patterns. This included univariate analysis to understand individual feature distributions, bivariate analysis to explore relationships with the target variable, and correlation analysis to identify multicollinearity among features. All of these were done alongside supporting visualizations which helped view the data from different perspectives to further reveal hidden details.

5. Formulating actionable recommendations:

   The insights gained from EDA process was used to formulate suggestions which could improve the performance of the Call Service operation.

6. Documentation:

   Finally, all of these details were documented in this report for ease of readers.

Insights drawn from EDA

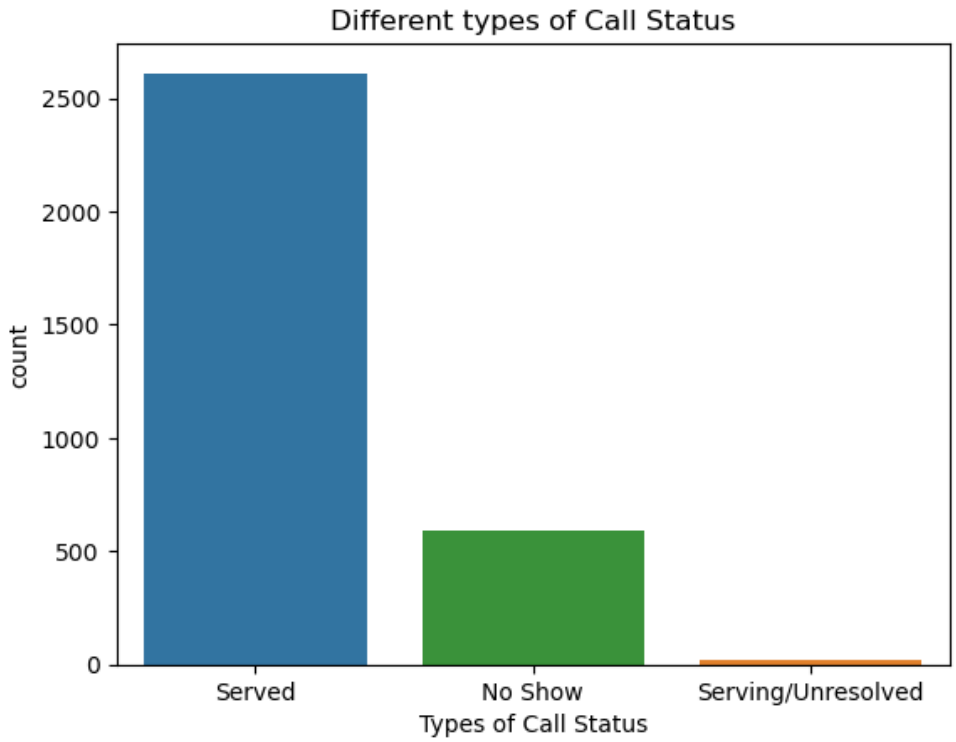
I drew the following insights from exploratory data analysis:

Key Indicators of Service Efficiency:

There are two key factors which can be considered to be direct indicators of service efficiency. They are:

1. Call Status:

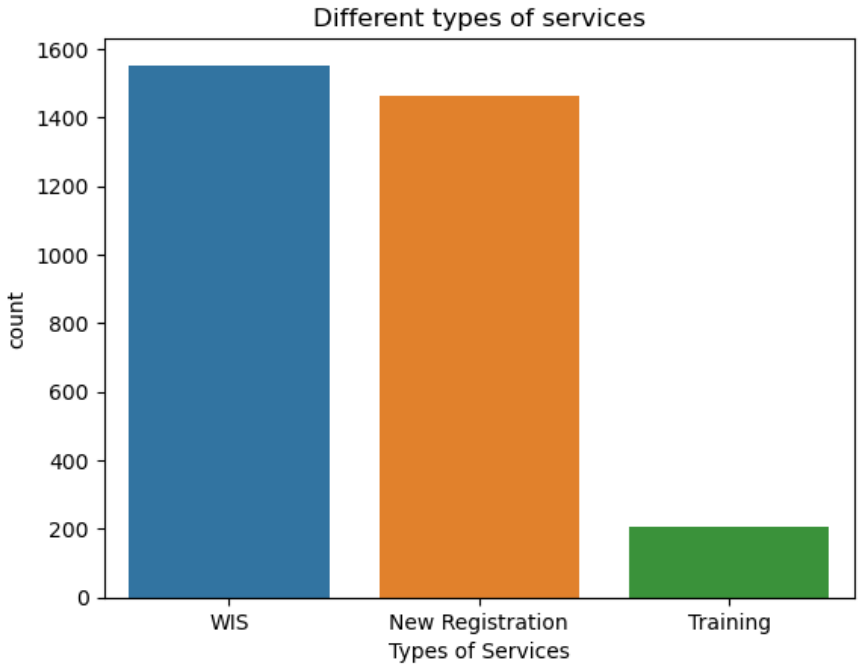
   This attribute tells us if proper service was given when a call was received or not. This is how service efficiency is measured and all other attributes will be measured against the call_status_id attribute. There are three types of status assigned to each call, they are shown below:



   We can see that the vast majority of calls were properly served, a minority of calls were dropped because the clients didn't show up and a negligible number of calls were unresolved.

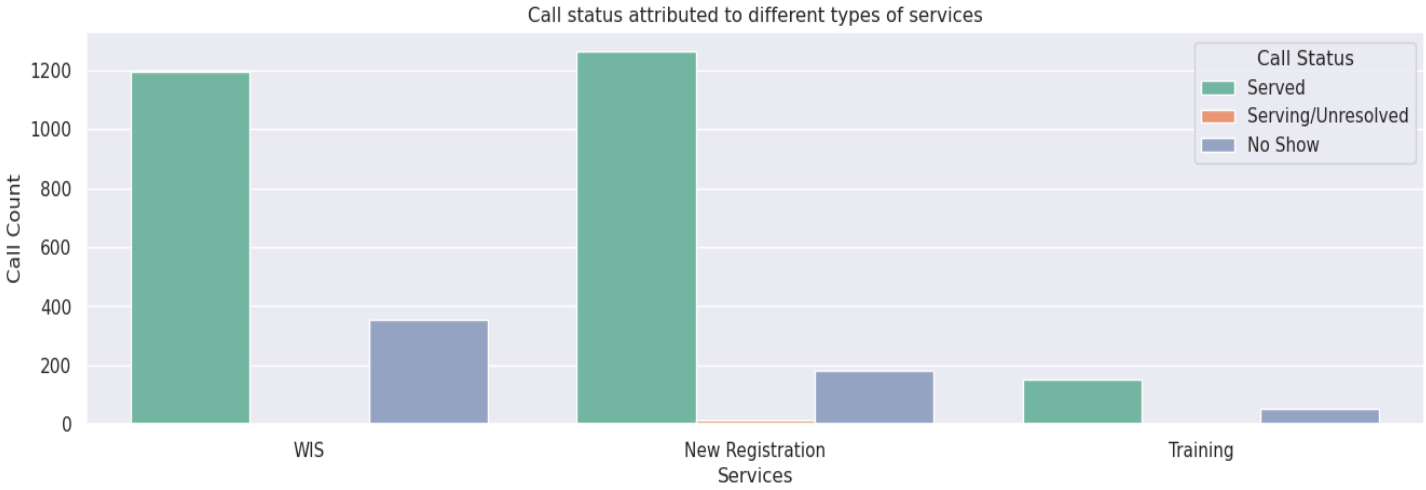
2. Services:

   This attribute represents the various types of services offered by the operation. So, when we are trying to measure efficiency of the call service, we are also determining the efficiency in providing these specific types of services too.



This plot shows that training service is requested the least whereas most people call requesting for WIS primarily and then New Registration.

Relation between Service and Call Status:



From this diagram we can see that:

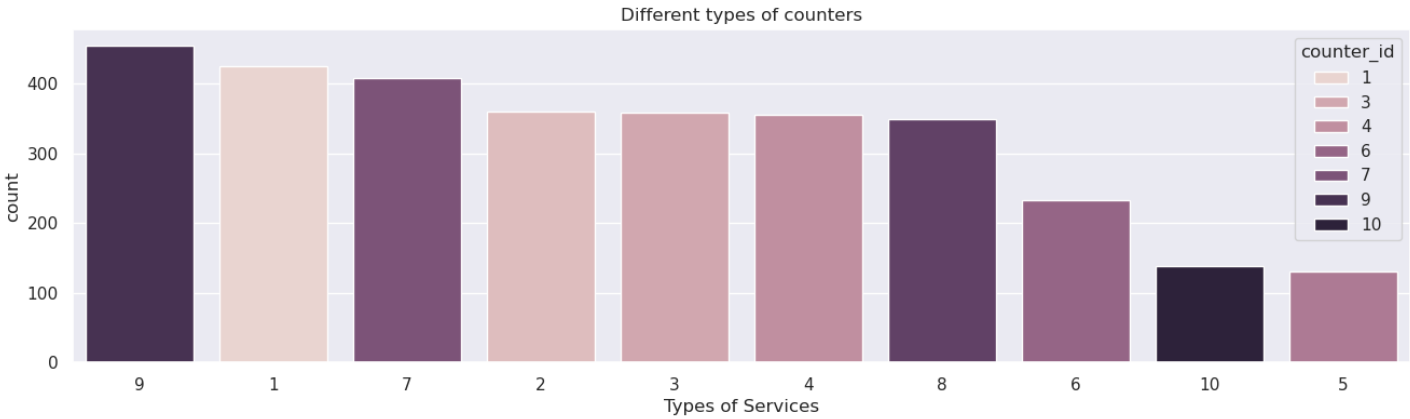
- While higher number of calls are made for WIS compared to for New Registration, the calls for New Registration have been properly solved more often i.e. lesser No show cases.
- Unresolved cases are concentrated in New Registration service
- A higher proportion of clients don't show up for training calls compared to the other service types.

Other important attributes:

1. Counters:

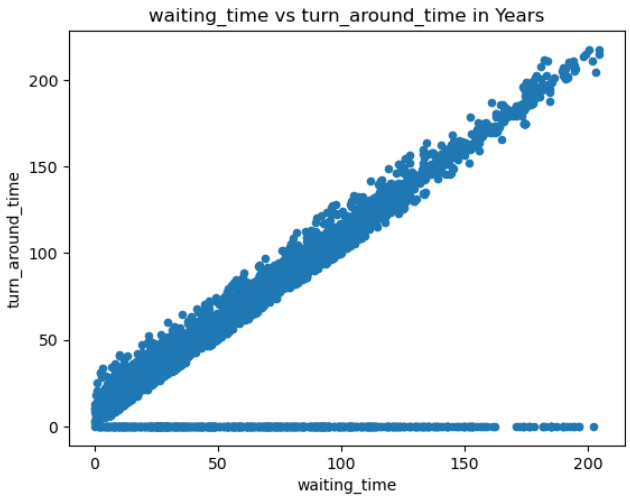
   Most used counter is 9th counter.

   Least used counter is 5th counter.

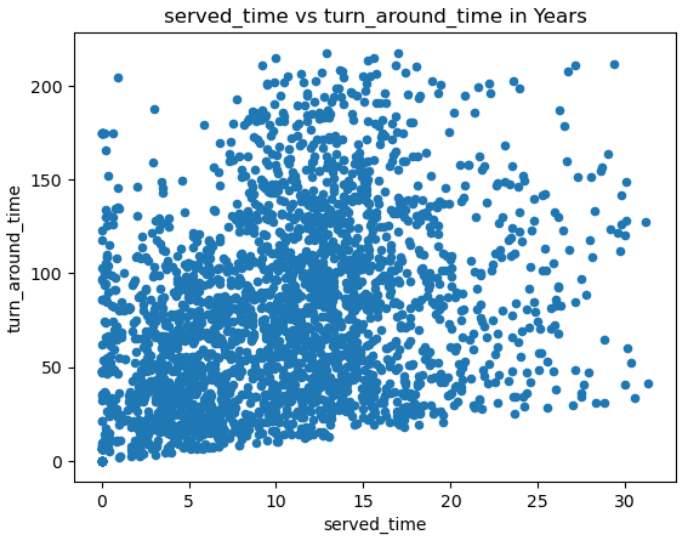


2. Waiting time:

   Among waiting_time, served_time and turn_around_time, waiting_time is the most important because it heavily contributes to turn_around_time. The turn_around_time is the sum of waiting_time and served_time, so they obviously have significant positive relation but the reason waiting_time contributes so much more to turn_around_time compared to served_time is due to its astronomically greater average value. So, waiting_time can also be used in place of turn_around_time.



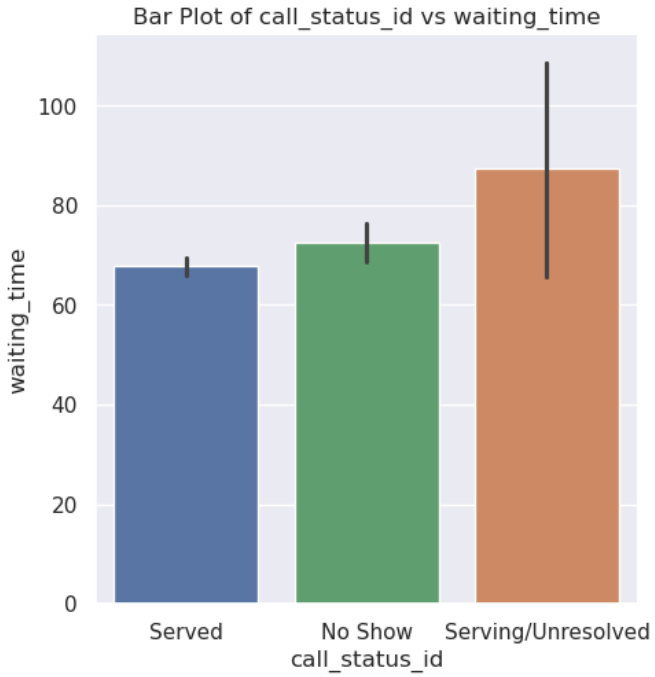
The scatter chart clearly shows a strong positive correlation between the waiting_time and turn_around_time. The horizontal line can be ignored as it's due to the empty turn_around_time which weren't recorded.



The scatter chart reflects the weak positive relation between the `served_time` and `turn_around_time`.

Besides this, waiting_time and served_time themselves have a very weak linear relation.

Relation between Waiting time and Call Status

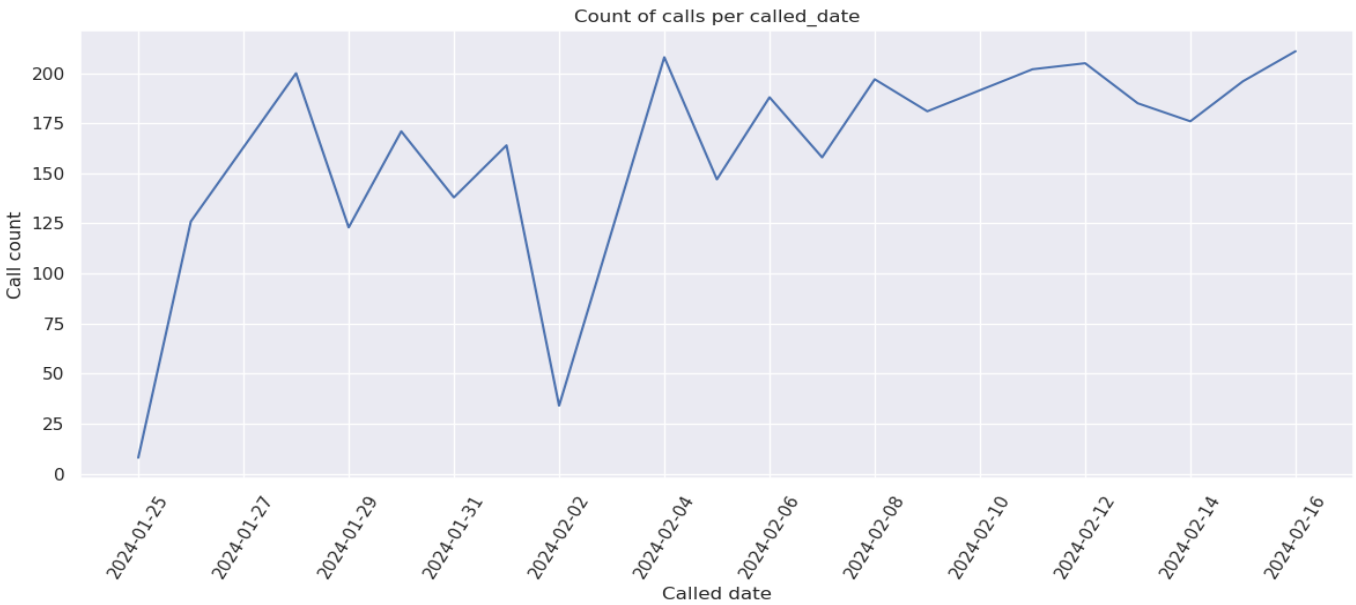


From the figure we can see that as waiting time increases the probability of the call being well served decreases.

Relation between Waiting time and Service

The waiting time for various services may be negatively related to the number of calls made for the service and vice-versa. This can be seen by comparing the figure shown in the Service attribute section and the one given below:

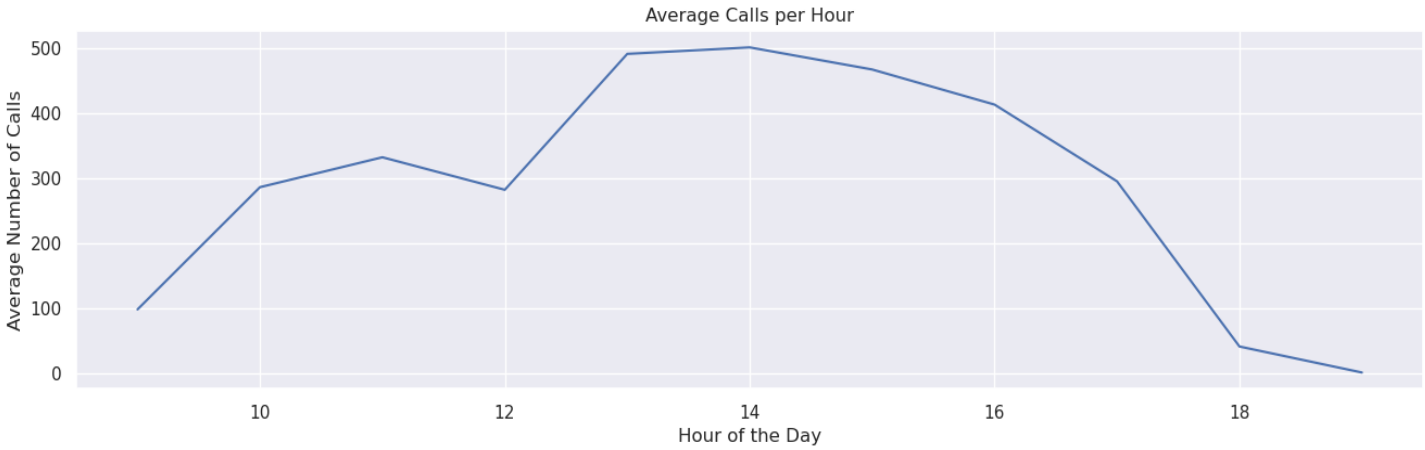
3. Called date:



We can see that number of calls were on a rise on the month of February with calls reaching its peak on the last recoded day. This suggests that the number of calls will only increase as more days go by.

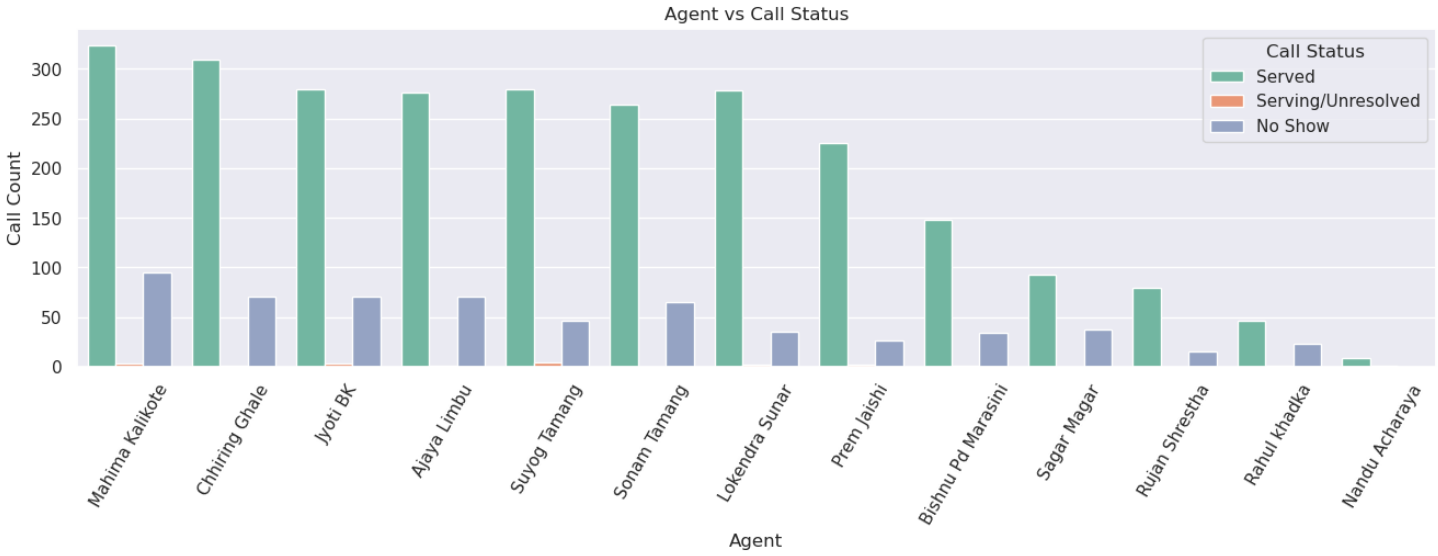
4. Hour of day:

Number of incoming calls seems to peak at 2PM each day in average.



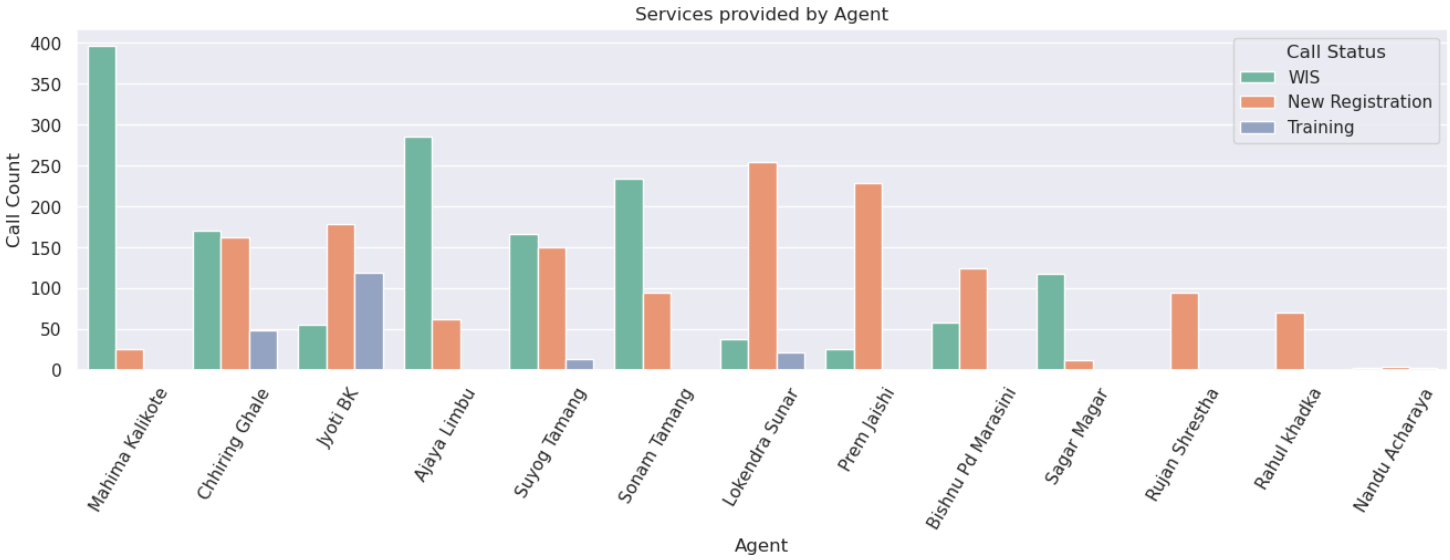
5. Agent (User):

Best Agent



While Mahima Kalikote takes the greatest number of calls, the no show calls and unresolved calls attributed to her/him are also very high. So, Chhiring Ghale is the best agent as s/he takes almost the same number of calls and also has low no show and unresolved calls attributed to them.

Relation between Agent performance and Service



We already know New Registration service are more likely to be properly served, so Chhiring Ghales tendency of providing WIS and New Registration services in almost equal distribution is most likely the reason for the low number no show. This can also be seen in case of other agents like Lokendra Sunar, Prem Jaishi, etc.

Recommendations

For increasing the productivity of the Call Service Operation, I would recommend taking the following steps.

1. Shift traffic to under-utilized counters i.e. 5, 10 and 6. This will help reduce waiting time by evenly distributing the load among the counters.
2. Reduce the waiting time increase number of well served calls. It will also increase the number of calls i.e. attract more customers.
3. Shift focus away from Training services as it has a high proportion of cases where clients will not show up. It also has a very long waiting time which will negatively impact customer's experience.
4. As number of calls seem to be growing with each passing day, expand the operation by hiring more agents.
5. 2 PM is peak hour so start ramping up performance from 12 PM and reduce performance from 4 PM. The 4-hour time window between 12 PM and 4 PM must be prioritized.
6. Tell agents to learn from the best and promote agents to equally provide WIS and New Registration services to minimize no show cases.

Conclusion

In conclusion, after loading, profiling, cleaning, and analyzing the data to find key details and insights regarding the workings of this Call Service operation, appropriate actionable suggestions were given with the intention of improving the productivity of the operation.