

United Airways

SKYHACK 2.0

Submission



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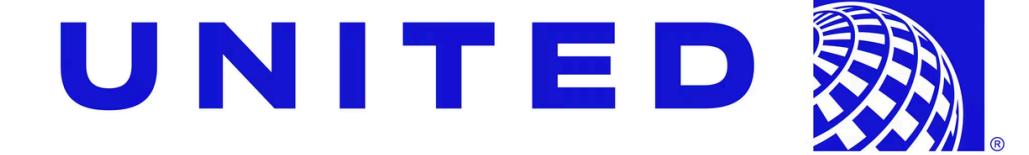
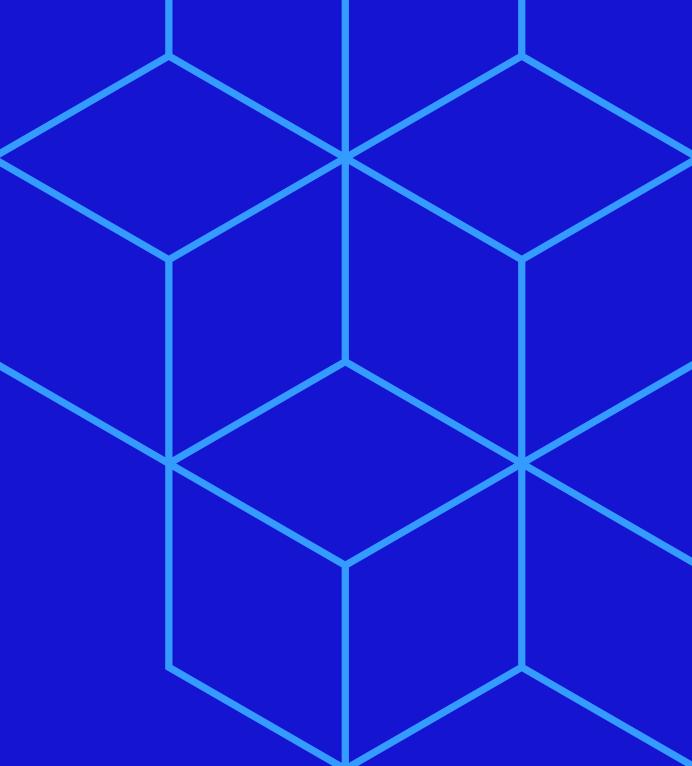
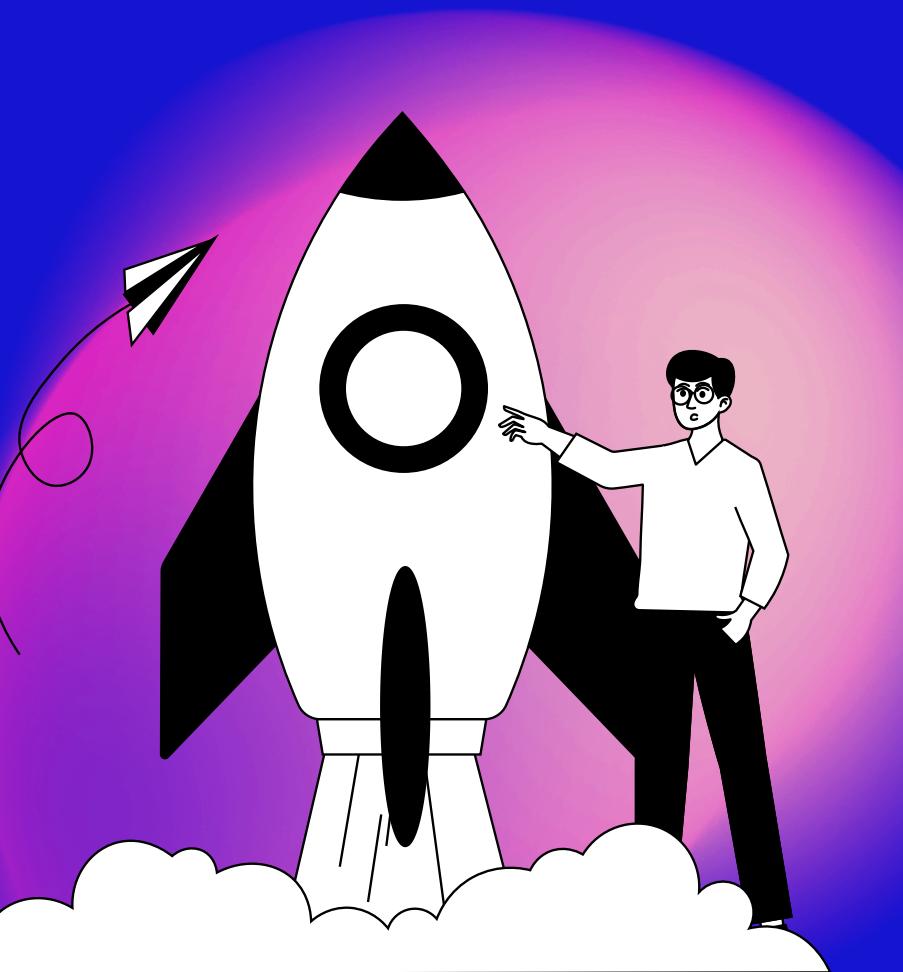


Table of Contents

- Problem Statement
- Deliverables to be Fulfilled
- Analyzing various relations
- Proposed Solutions
- Suggestions and Recommendations



Problem Statement



As United Airlines continues its journey to become the best airline in the history of aviation, it is crucial to provide world-class customer service, for which one of the key areas of focus is our call center operations. Call centers play a critical role in ensuring customer issues are resolved quickly and efficiently, but we face challenges in improving metrics such as

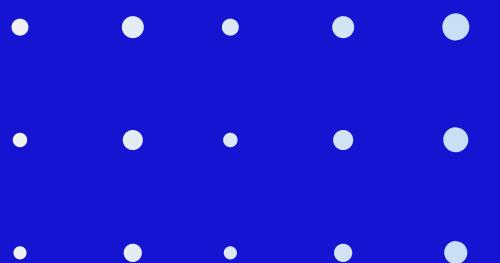
Average Handle Time (AHT) and Average Speed to Answer (AST).

Your task is to optimize these key call center metrics, helping reduce resolution times and providing faster, more efficient service to our customers. You are required to analyze our existing call center data to identify inefficiencies, determine the drivers of long AHT and AST, and suggest strategies to enhance customer satisfaction, reduce escalations, and improve overall operational efficiency.

Background

In today's competitive airline industry, providing efficient and reliable customer service is crucial for customer retention and loyalty. Our call center, which handles customer inquiries, complaints, and service requests, is an essential touchpoint for many of our passengers.

However, the growing demand and complexity of services have made it increasingly important to optimize the operations of this critical channel.





Average Handle Time (AHT) and Average Speed to Answer (AST) are essential metrics that significantly impact call center performance by shaping customer satisfaction and operational efficiency. AHT measures the total time agents spend on each call, from answering to disconnecting, and provides insights into where processes can be streamlined. Reducing AHT without sacrificing quality allows agents to handle more calls with existing resources, improving service levels and controlling costs. Meanwhile, AST tracks how quickly customers reach assistance through self-service tools like IVR systems. A lower AST minimizes customer wait times, enhancing their experience and reducing call abandonment, ultimately supporting a more efficient and customer-friendly operation.

United Airlines uses a mix of human agents and IVR systems to address customer needs. While IVR systems help automate simple tasks and reduce call volume for human agents, there's an opportunity to streamline this process and better allocate resources between self-service and agent-based resolutions.

AHT (Average Handle Time):

Time from when the agent picks up the call to when they hang up

Formula:

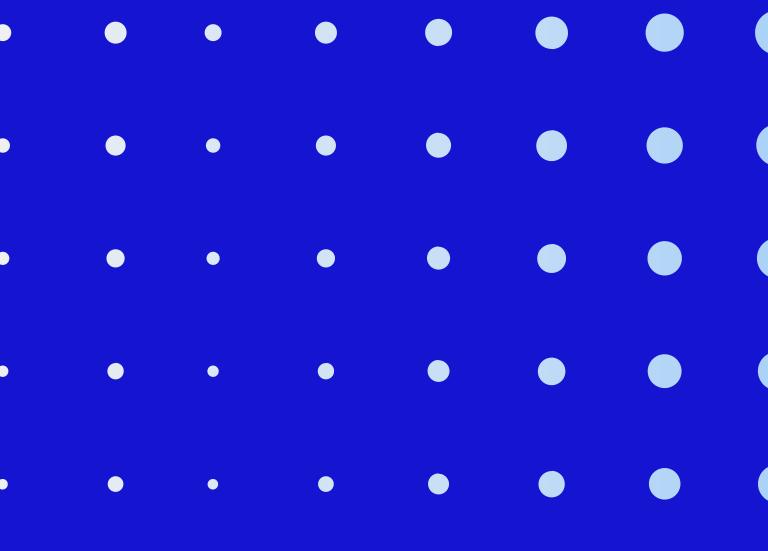
$$\text{AHT} = \text{Total Handle Time} / \text{Total Number of Calls}$$

AST (Average Speed to Answer):

Time spent by the customer in queue till the agent answers the call

Formula:

$$\text{AST} = \text{Total Waiting Time} / \text{Total Number of Calls}$$



Deliverables

01

Long Average Handle Time (AHT)

Problem: Extended AHT affects efficiency and customer satisfaction.

02

Reducing agent workload

Problem: Self-solvable issues escalate to agents, increasing workload.

03

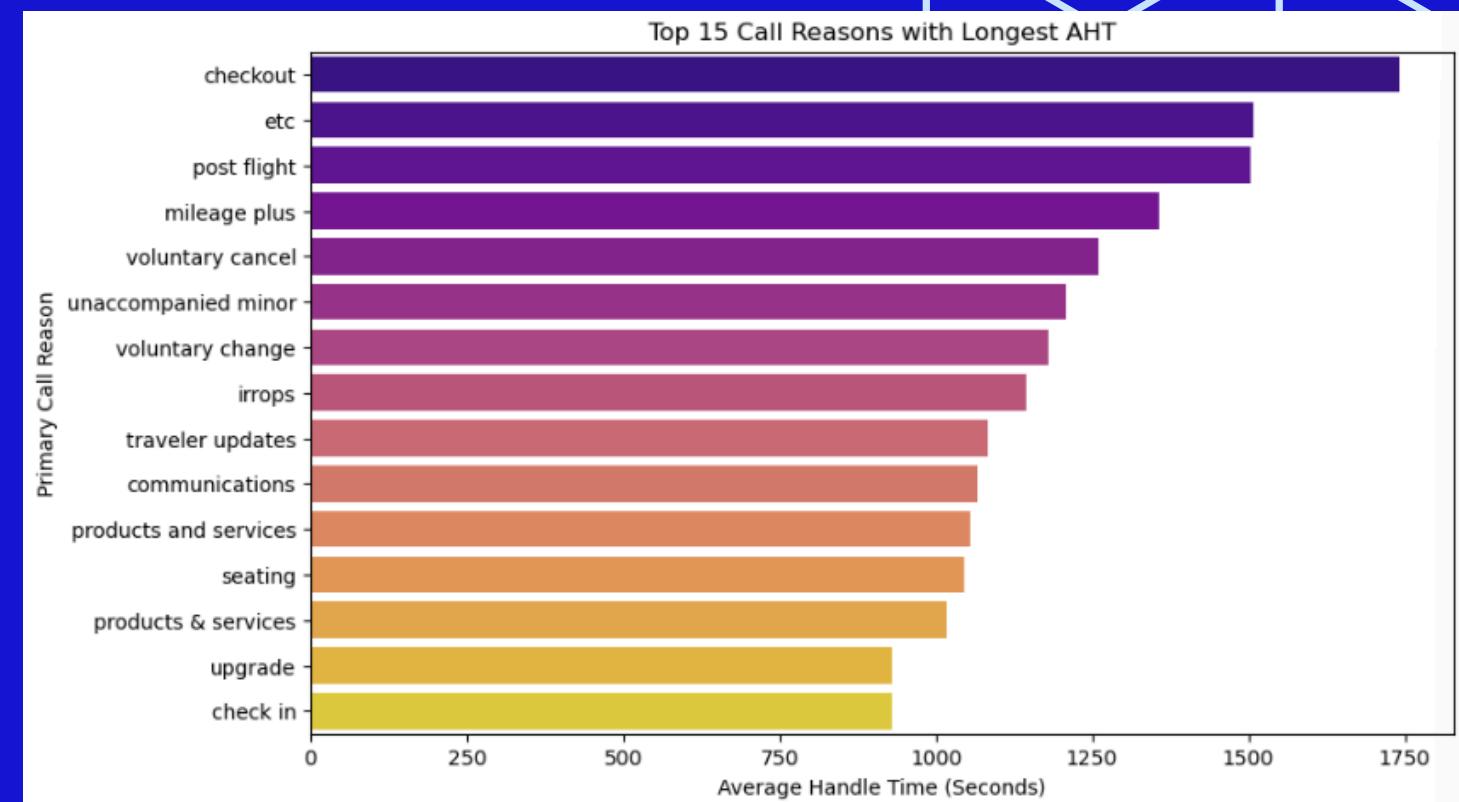
Understanding Primary Call Reasons to Improve Categorization:

Problem: Misclassification of calls leads to inefficiencies.

AHT Analysis

Top 15 Call Reasons with Longest AHT

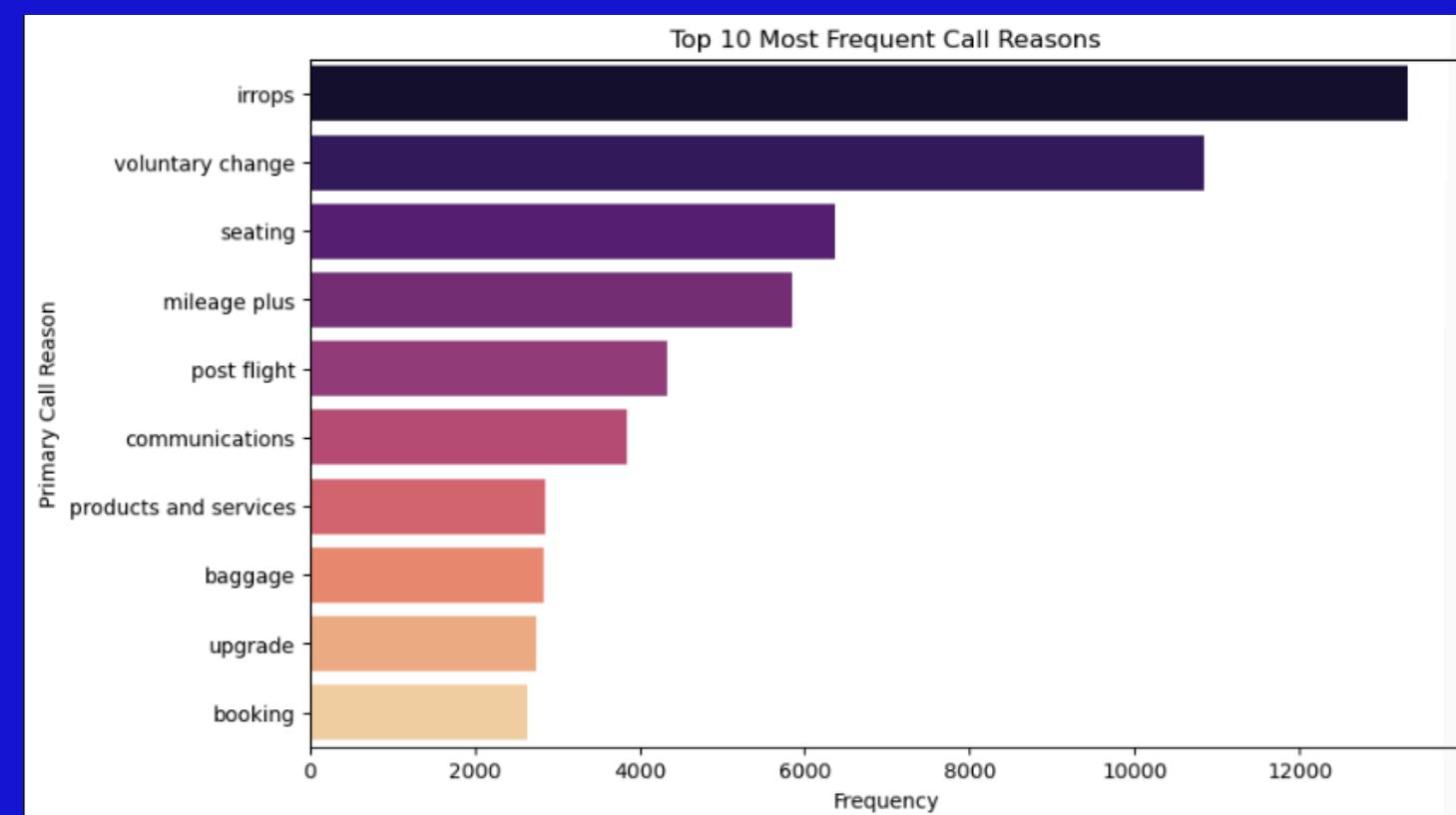
This bar graph lists call reasons associated with the longest AHT. Reasons like "checkout," "etc," and "post flight" have the highest AHT. Issues related to post-flight services, upgrades, and voluntary cancellations also have higher-than-average AHTs.

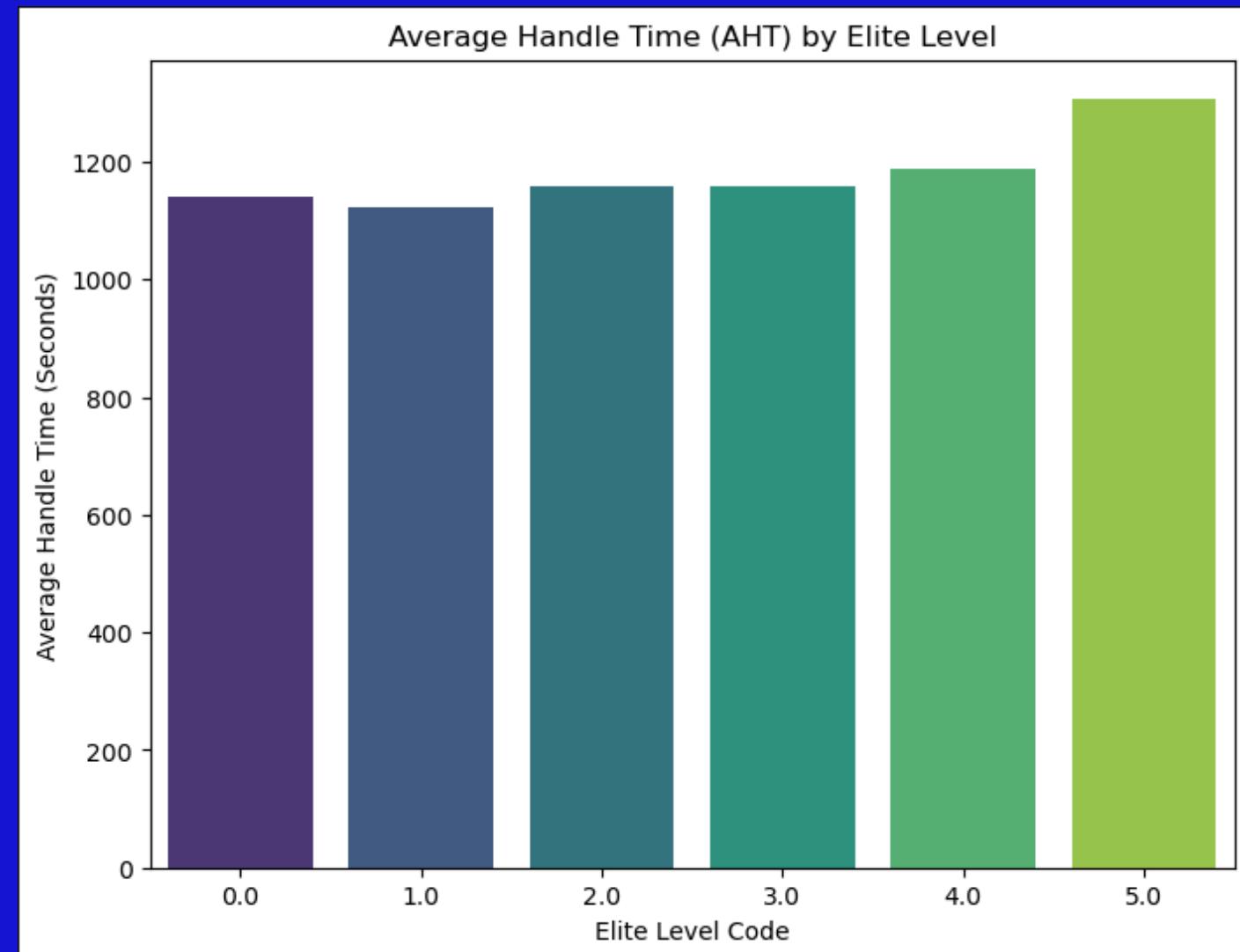


Reason Analysis

A bar chart showing the distribution of different primary call reasons.

"IRROPS" (irregular operations), "voluntary change," and "seating" are the most frequent call reasons. These are likely routine inquiries but appear to be frequent and, if not handled efficiently, could lead to operational bottlenecks.

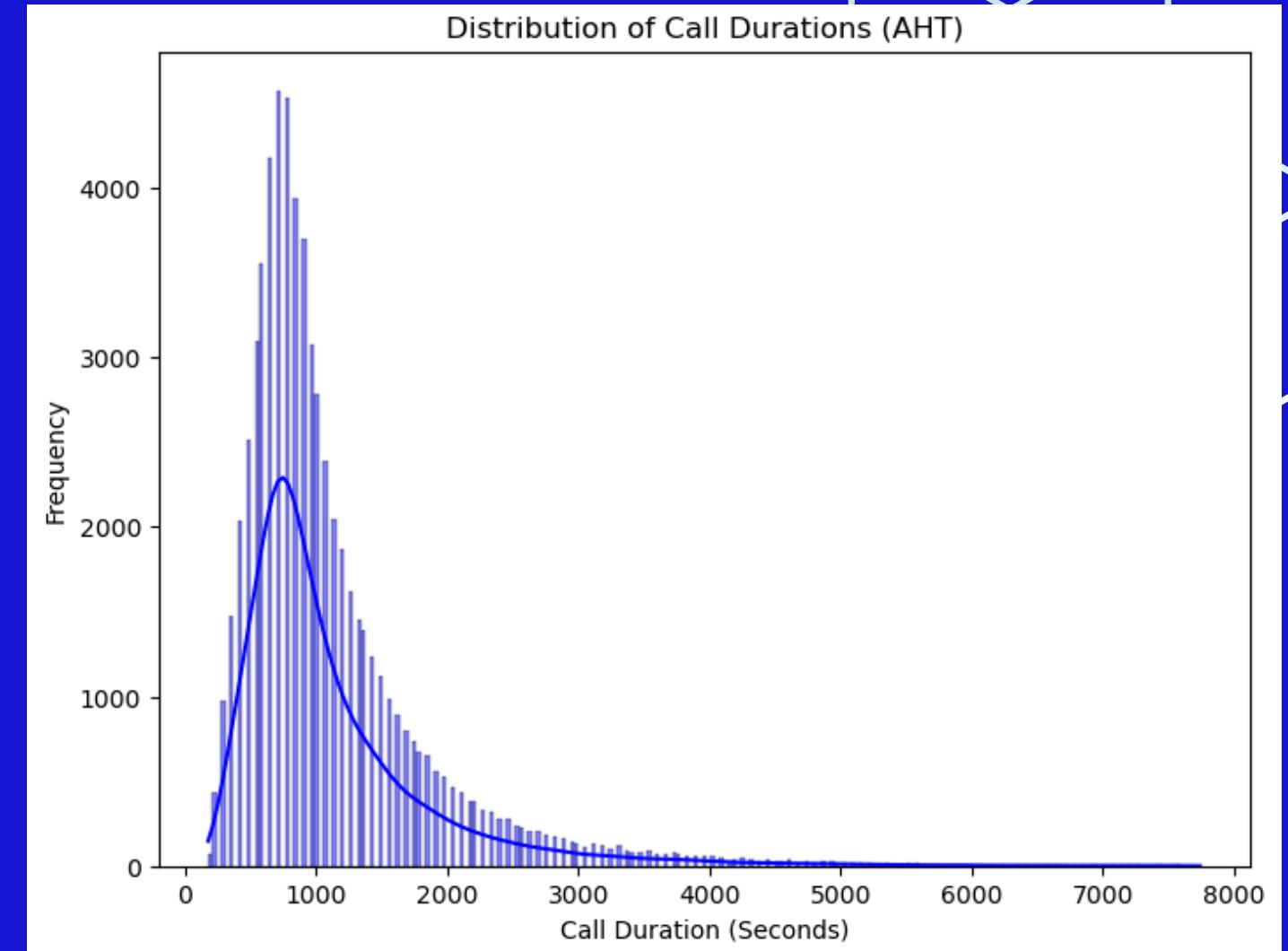




AHT by Customer Loyalty Code

Bar plot of AHT by Customer Elite Level

The bar graph shows the AHT for customers based on their elite level, ranging from 0.0 to 5.0. Customers with higher elite levels (like level 5.0) tend to have longer AHT, which could indicate that elite members either require more complex support or the agents spend more time ensuring satisfaction for high-status customers.



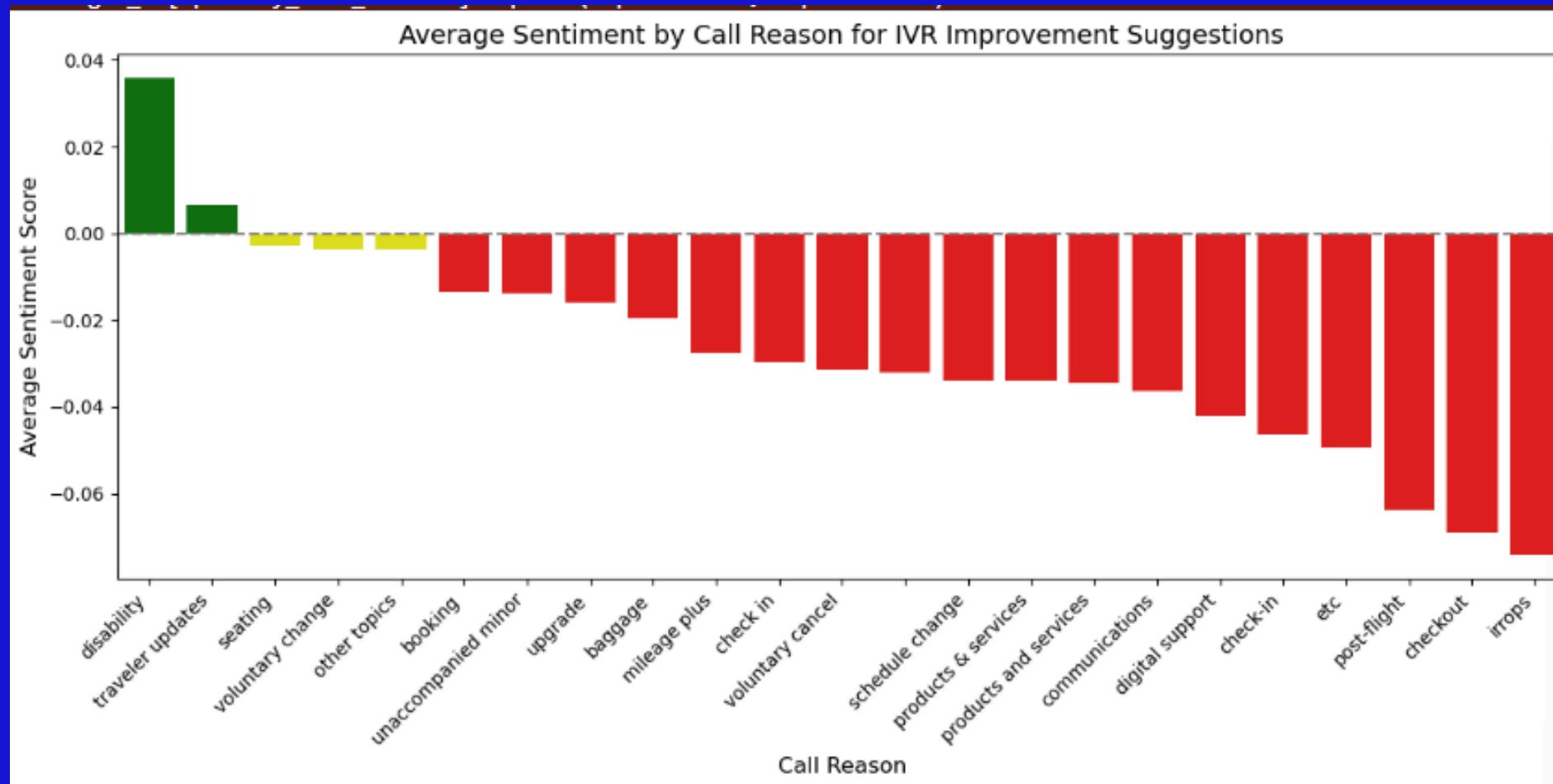
Distribution of Call Durations

Histogram of Call Durations (AHT)

This histogram highlights the distribution of call durations. Most calls seem to be concentrated around 500-1000 seconds, with a steep drop-off for longer durations. This suggests a typical call length, but outliers (longer calls) may need investigation.

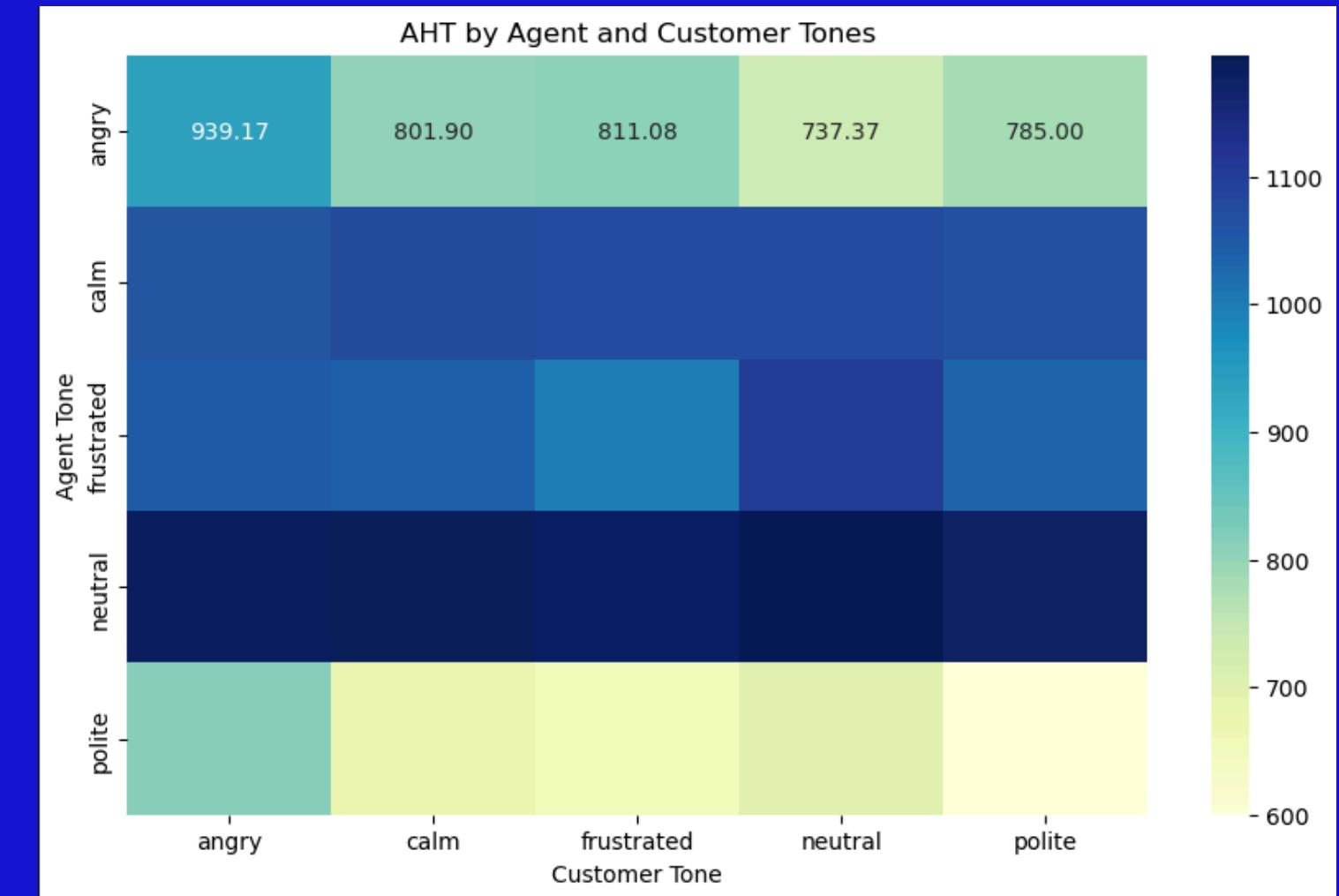
Sentiment by Reason Analysis

This bar plot illustrates the average sentiment score associated with different primary call reasons. Bars are colored based on sentiment values (red for negative, yellow for neutral, green for positive).



AHT by Sentiment Tones (Agent vs Customer)

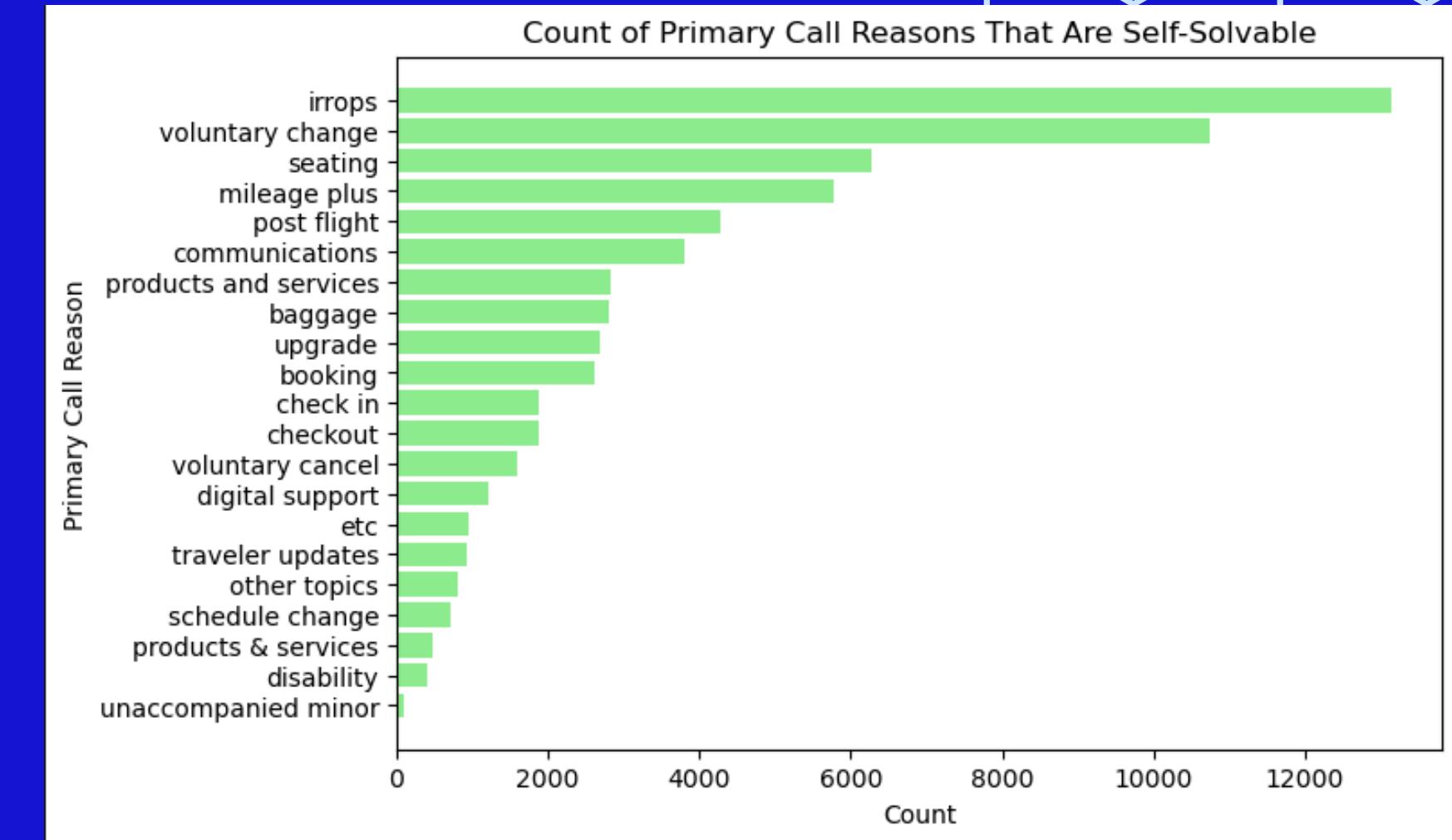
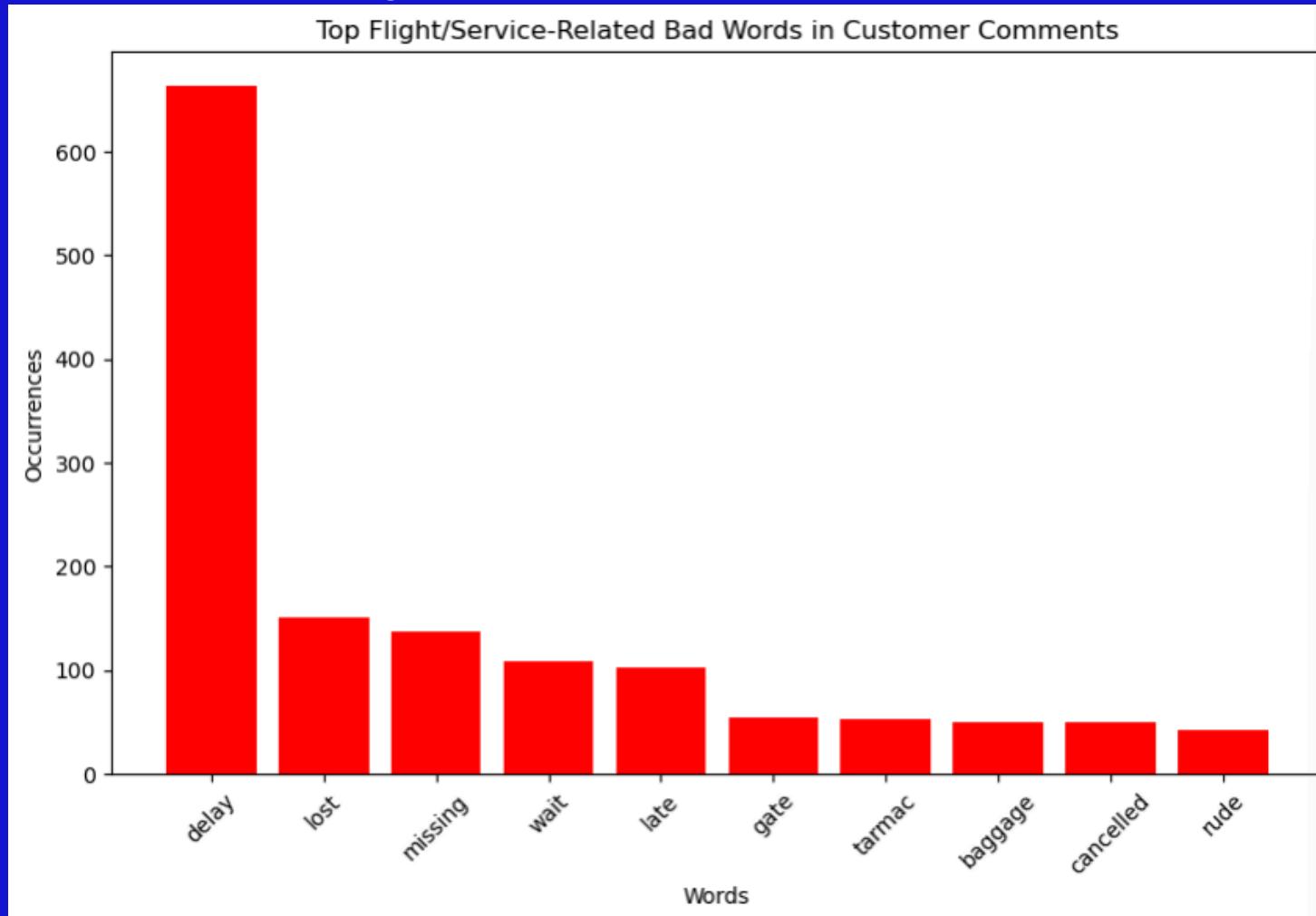
Heatmap of AHT by Agent and Customer Tone



Sentiment is negative for most call reasons, with "delay," "cancelled," and "irrops" being the most problematic. Issues related to disabilities and scheduling changes, however, generate more positive sentiment.

Calls where both agents and customers have neutral or polite tones tend to have lower AHT. However, calls involving angry customers or frustrated agents result in higher AHT.





Flight Related Bad Words in Customer Comments

Words like "delay," "lost," "missing," and "wait" are the most common bad words in customer comments, which highlight critical pain points related to flight delays, lost items, and extended waiting times.

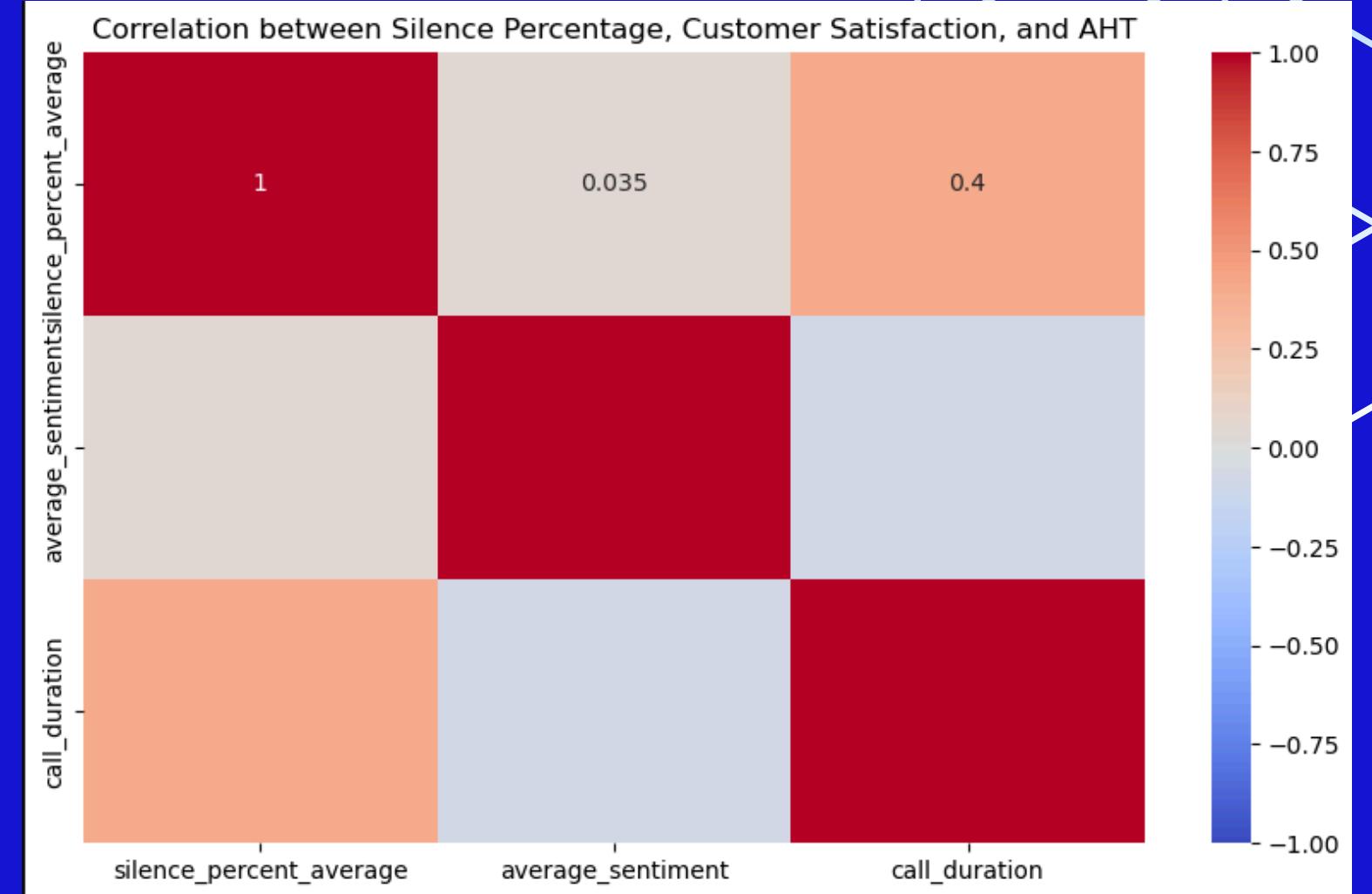
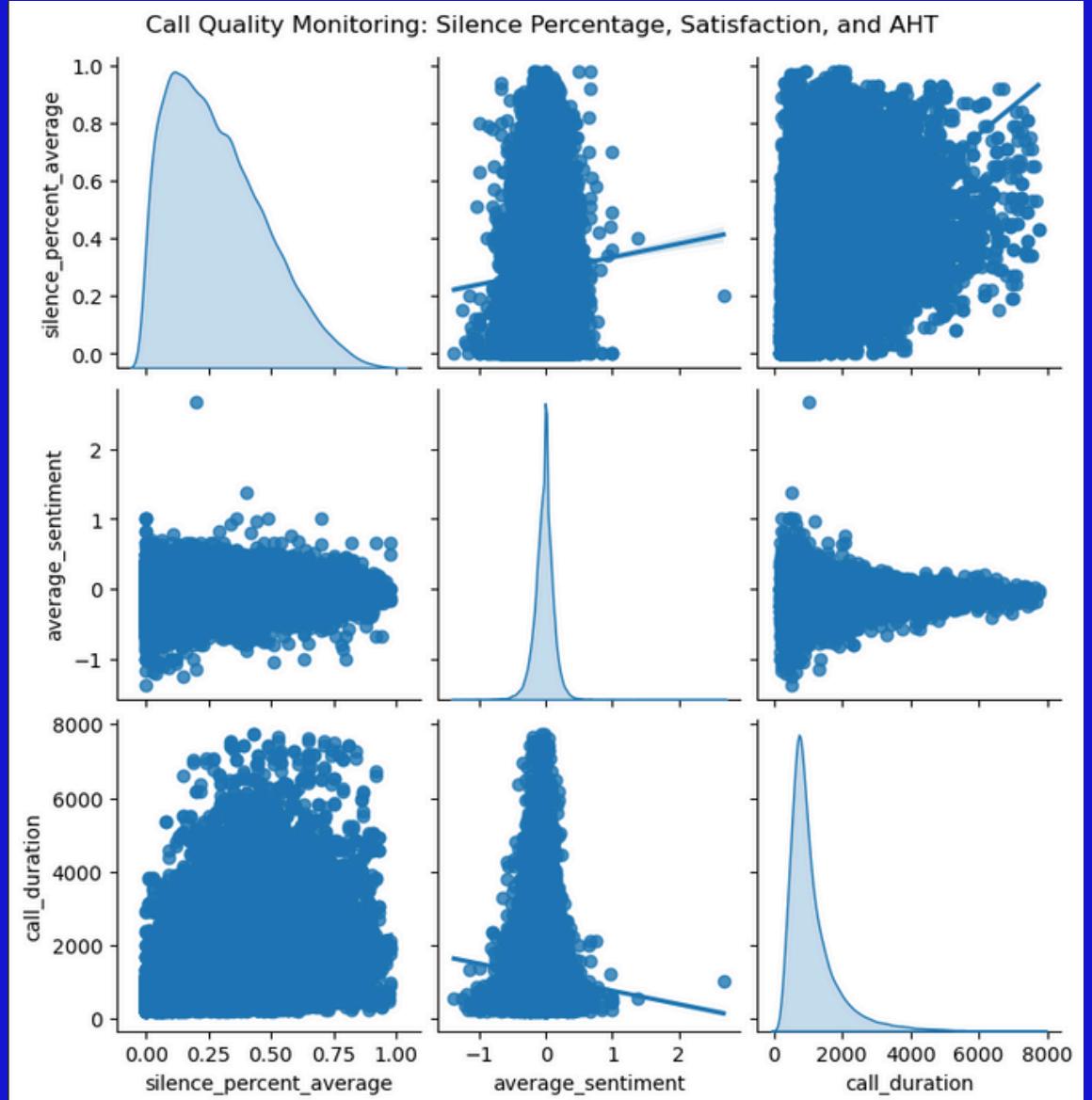
Count of Self Solvable Call Reasons

The most frequent self-solvable reasons are "irrops" (irregular operations), "voluntary change," and "seating." These could be addressed via better self-service options in the IVR system or online.

Call Quality Monitoring: Silence Percentage, Satisfaction, and AHT

Visualizes the relationships between silence percentage, customer satisfaction (sentiment score), and AHT. It can show trends or patterns between these metrics.

High silence percentages are observed in some calls, correlating with longer durations and lower customer sentiment, potentially causing frustration and dissatisfaction.



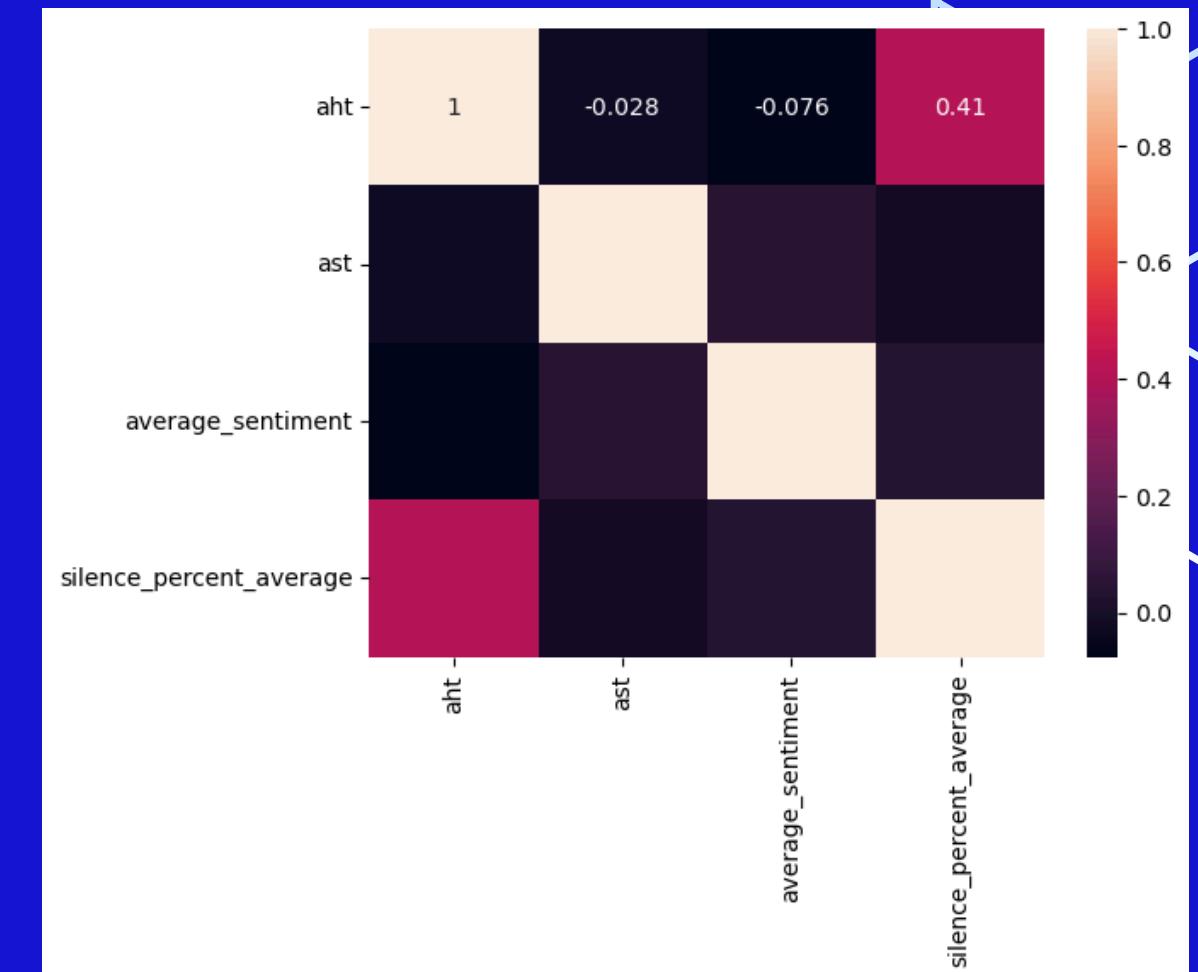
Correlation between Silence Percentage, Customer Satisfaction, and AHT

Correlation Heatmap: There is a moderate positive correlation between silence percentage and call duration (AHT). As silence percentage increases, AHT tends to rise, indicating inefficiency. Average sentiment shows a weak correlation with silence percentage, meaning silence alone doesn't heavily affect sentiment.

Heatmap of Average Sentiment, Silence Percentage, AHT and AST

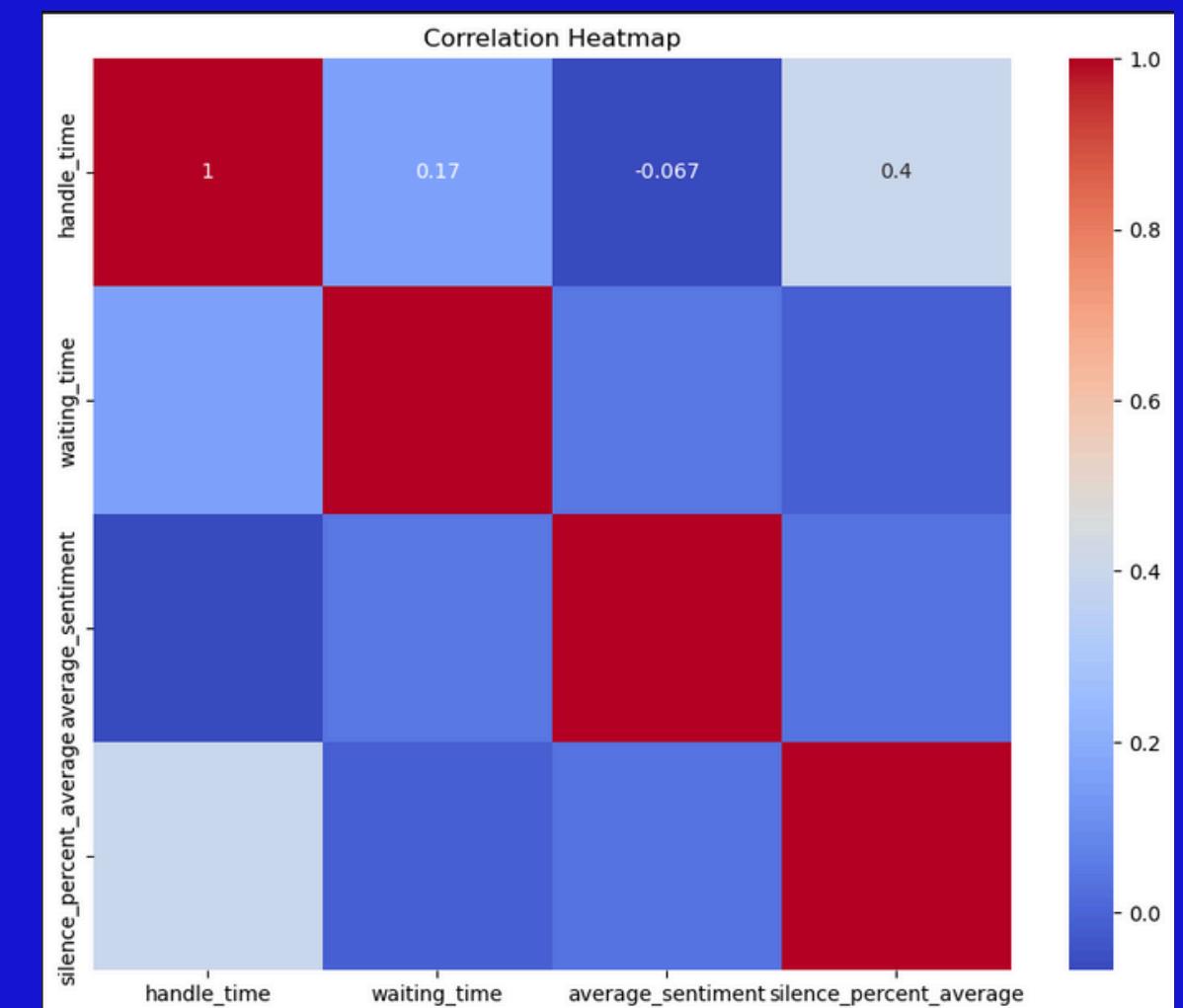
A heatmap demonstrating the correlation between AHT, AST, average sentiment, and silence percentage.

Notably, silence percentage has a moderate positive correlation with AHT, suggesting that calls with longer pauses tend to have longer handle times. AST and average sentiment show a weak correlation with AHT.

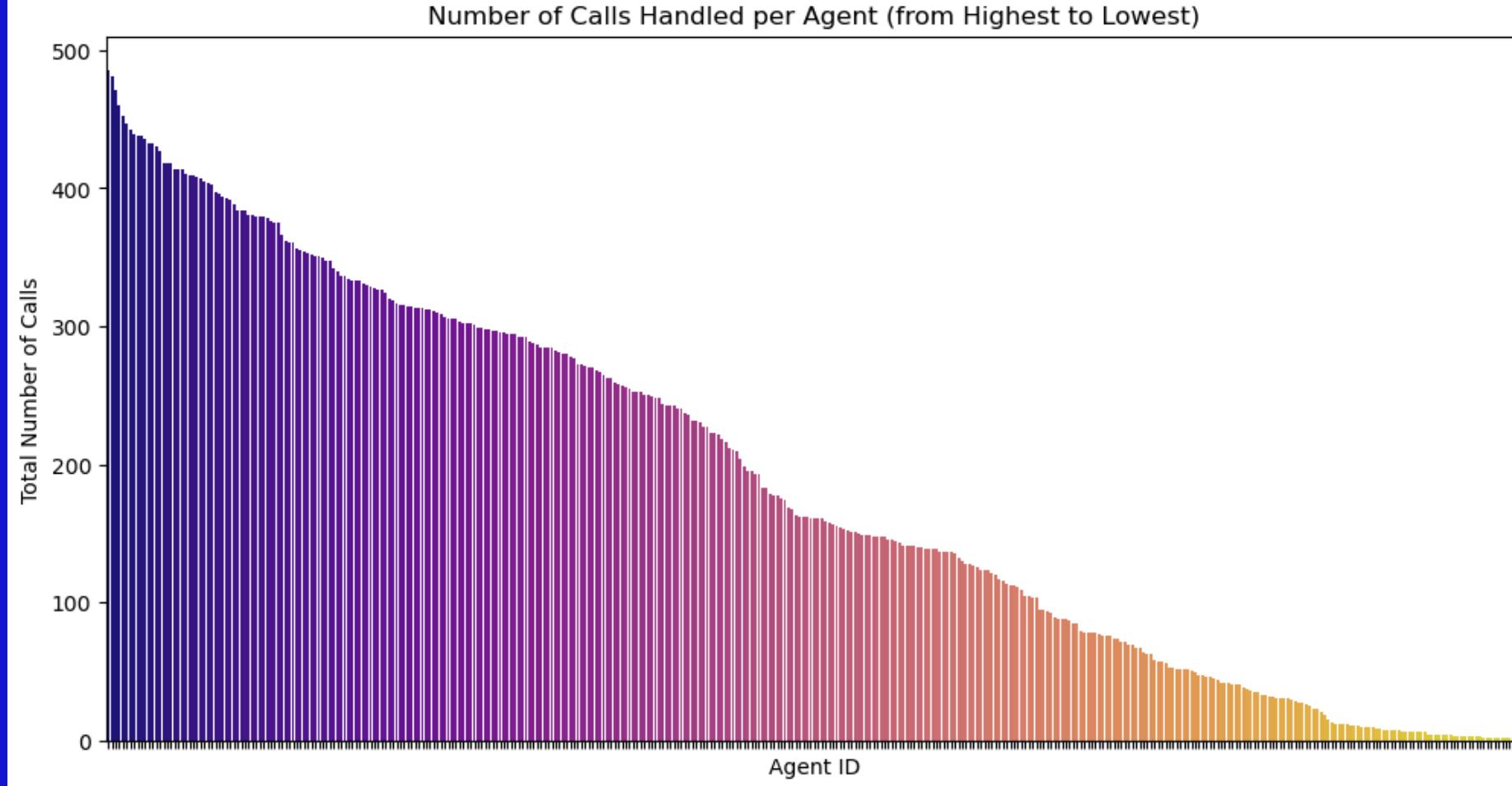


Heatmap of Average Sentiment, Silence Percentage, Handle Time and Waiting Time

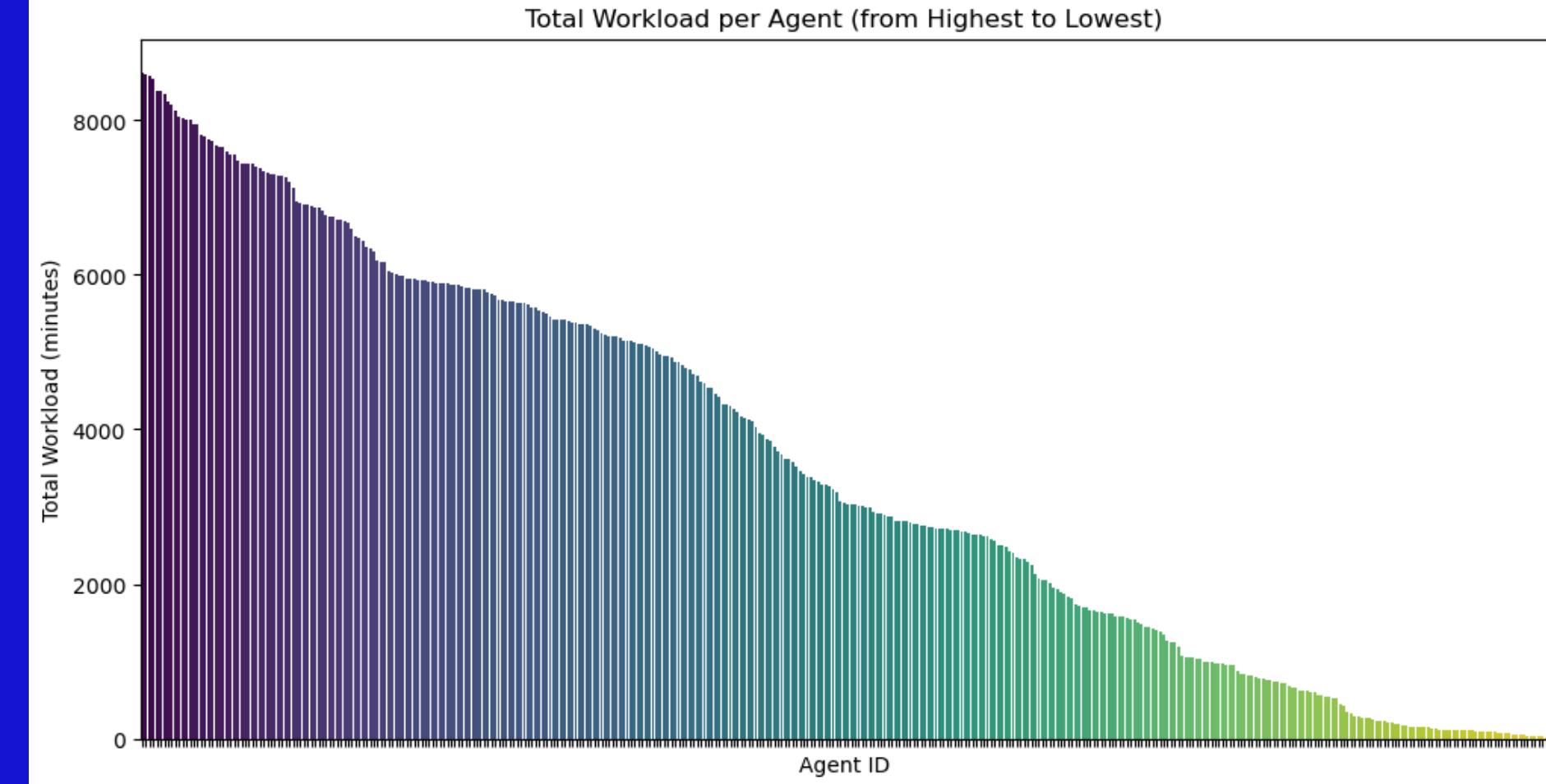
Similar to the previous heatmap, this one also shows a positive correlation between handle time and silence percentage, as well as a slight correlation with waiting time.



Number of Calls Handled per Agent (from Highest to Lowest)



Total Workload per Agent (from Highest to Lowest)



Number of calls handled per agent

The number of calls assigned to agents is not uniform with some agents attending very much more calls than some employees, so uniform calls distribution required.

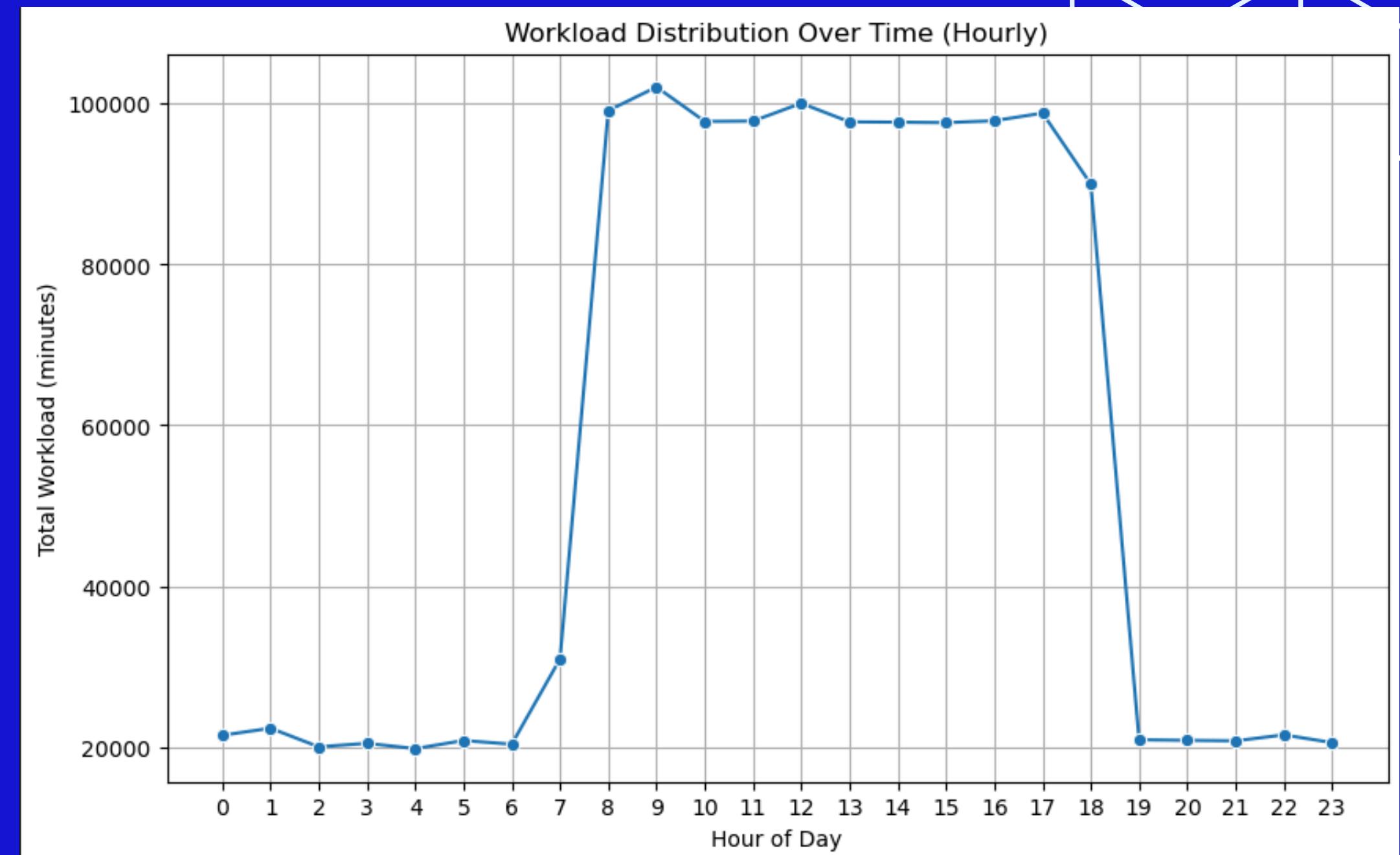
Workload Analysis per Agent

Similar to 1st graph The workload distribution is not uniform with some agents working very much more than some employs, so uniform workload distribution required



Workload Distribution over Time

By grouping calls by the hour of the day, we can see how busy the call center is at different times.



Summarizing our Analysis

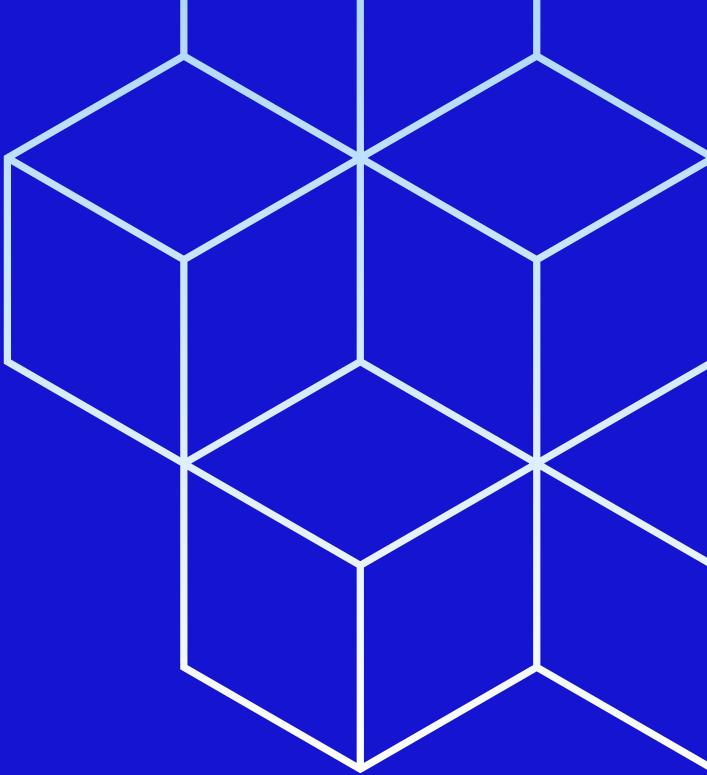
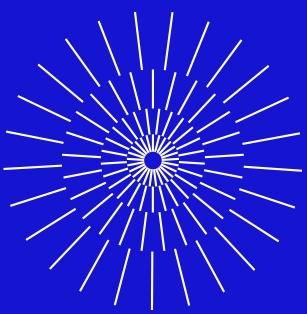
- **High Average Handle Time (AHT):** Reasons such as checkout exhibit the highest AHT. Issues related to post-flight services, upgrades, and voluntary cancellations also have elevated AHTs.
- **Frequent Call Reasons:** Common reasons for calls include "IRROPS" (irregular operations), "voluntary change," and "seating." These routine inquiries could lead to operational bottlenecks if not handled efficiently.
- **Elite Customers:** Customers with higher elite levels (e.g., level 5.0) tend to have longer AHT, suggesting they may require more complex support or that agents spend additional time ensuring their satisfaction.
- **Call Duration Patterns:** Most calls last between 500-1000 seconds, with a significant drop-off for longer calls, indicating a typical call length but warranting further investigation into outliers.
- **Workload Distribution among agents:** The number of calls assigned to agents is not uniform with some agents attending very much more calls than some employees, so uniform calls distribution required.



Summarizing our Analysis

- **Customer Comments:** Common negative terms in customer comments include "delay," "lost," "missing," and "wait," indicating critical pain points related to flight delays, lost items, and extended waiting times.
- **Self-Solvable Reasons:** The most frequent self-solvable issues are "IRROPS," "voluntary change," and "seating," suggesting opportunities for improved self-service options in the IVR system or online.
- **Silence Percentage:** High silence percentages correlate with longer call durations and lower customer sentiment, potentially leading to frustration. A positive correlation exists between silence percentage and AHT, indicating that longer pauses tend to increase handle times.
- **Correlations:** There is a weak correlation between average sentiment and silence percentage, indicating that silence alone does not significantly impact sentiment. Both AHT and silence percentage show a positive correlation, while average speed to answer (AST) and sentiment show weak correlations with AHT.





Proposed Solutions: Long Average Handle Time (AHT)

Solution 1: Implement performance-based training for agents to improve call-handling efficiency, focusing on complex call types like "checkout" and "post-flight." Airlines like

Delta reduced AHT by 12% with real-time agent prompts.

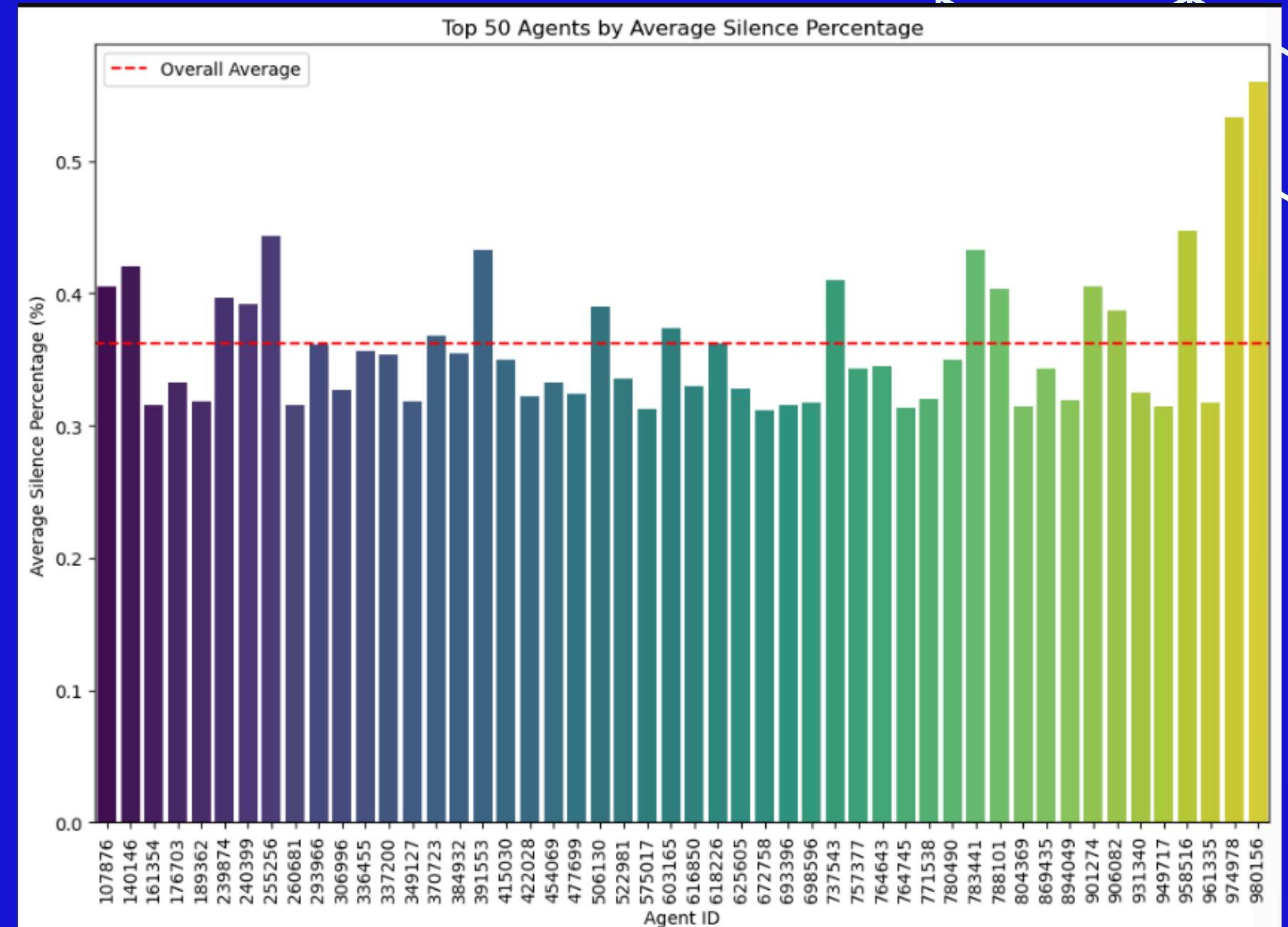
Solution 2: Use AI sentiment analysis to detect customer frustration and provide real-time suggestions for resolution, improving AHT during high-stress periods. United

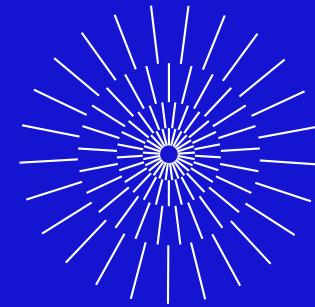
Airlines saw AHT reductions by utilizing Generative AI.

Solution 3: Employ skills-based routing for complex issues (for ex: frequent keywords like "delays") to direct calls to trained agents, reducing **AHT by 15% (as seen in Alaska Airlines).**

Proposed Solutions: Targeted Agent Specific Training

By analyzing the average silence percentage across different agents, we can identify outliers agents who consistently exhibit higher silence percentages. This suggests that these agents may struggle with call handling, leading to inefficiencies. Providing targeted training sessions for these agents can enhance their problem-solving skills, improve communication, and ultimately reduce silence durations. Additionally, regular monitoring of their performance post-training can help assess the effectiveness of the training initiatives and ensure continuous improvement in call handling efficiency.





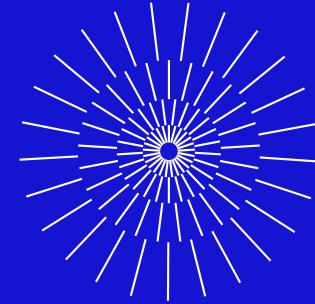
Proposed Solutions: Reducing Agent Workload with IVR Improvements

Solution 1: Enhance the IVR system by offering solutions for recurring issues like "voluntary changes" and "seating." **Southwest Airlines** reduced call volume by **25% by adding seat change options to its IVR.**

Solution 2: Proactively send notifications for common issues like flight delays or cancellations.

JetBlue reduced call volume by 18% by notifying customers via the app.

Solution 3: Analyze call transcripts to identify phrases that lead to unnecessary escalations and adjust IVR flows to resolve them without agent involvement.



Proposed Solutions: Understanding Primary Call Reasons for Better Categorization

Solution 1: Use NLP to analyze call transcripts and identify recurring keywords for call reasons, automating call tagging and improving routing efficiency for example:

British Airways reduced misrouted calls by 20% using NLP.

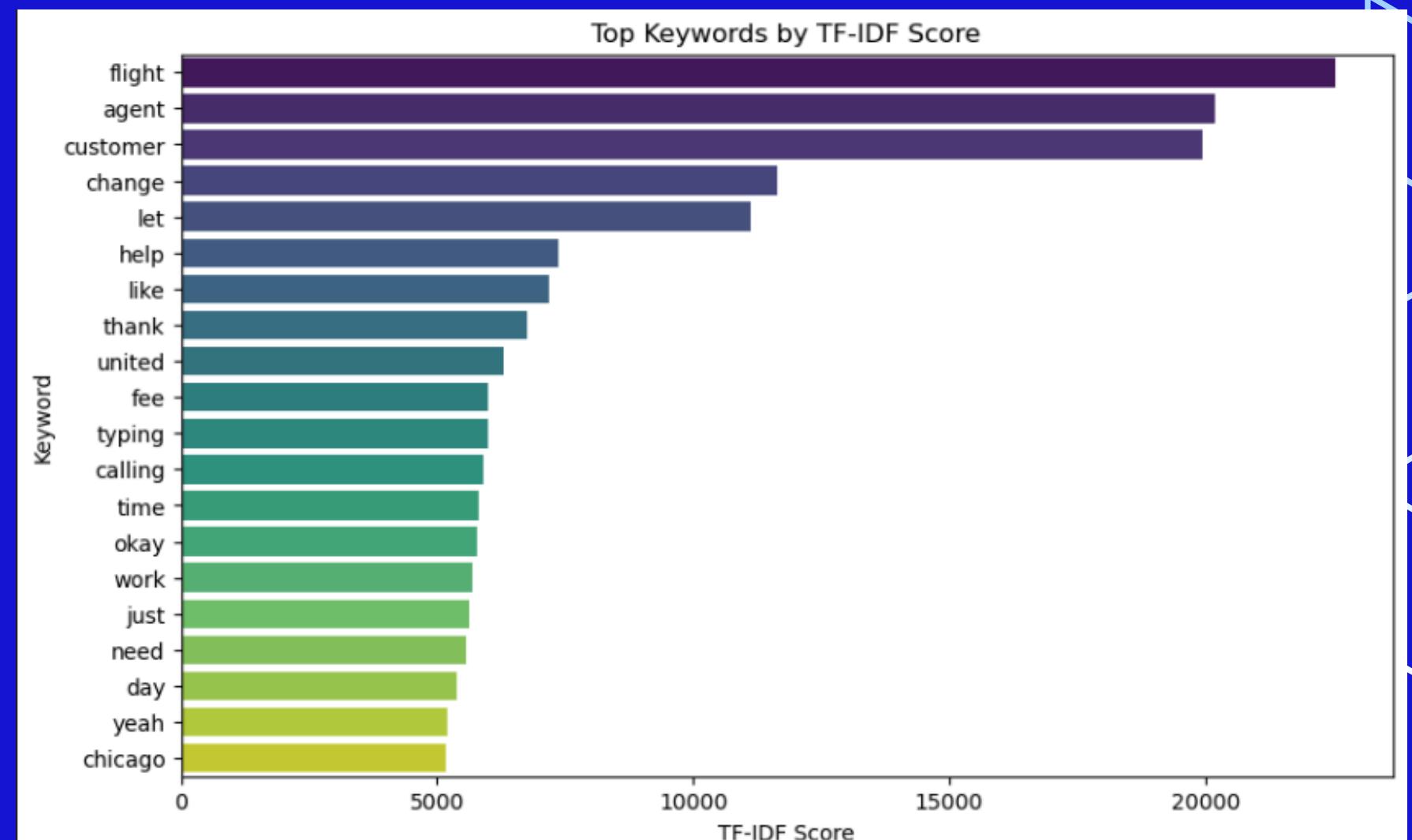
Solution 2: Implement machine learning models to predict and categorize incoming calls based on historical data, ensuring calls are directed to the right agents or IVR options, as demonstrated by ***Lufthansa's 15% improvement in resolution rates.***

Proposed Solutions: NLP to analyze call transcripts

Keyword Extraction by TF-IDF Score

This bar plot shows the most significant keywords extracted from the call transcripts based on their TF-IDF scores.

- Common keywords such as "flight," "agent," "customer," and "change" dominate the list, indicating these topics are frequently discussed.
- Other keywords like "let," "help," and "fee" suggest frequent inquiries related to assistance, policies, or fees.
- These top keywords give insight into the most pressing customer issues, but they may also cause the model to overfit on a few specific call types.



Solution: A more domain-specific feature extraction could help in better distinguishing between call reasons. For example, identifying bigram or trigram phrases (e.g., "change flight," "upgrade request") might help capture more context in customer calls and improve classification.

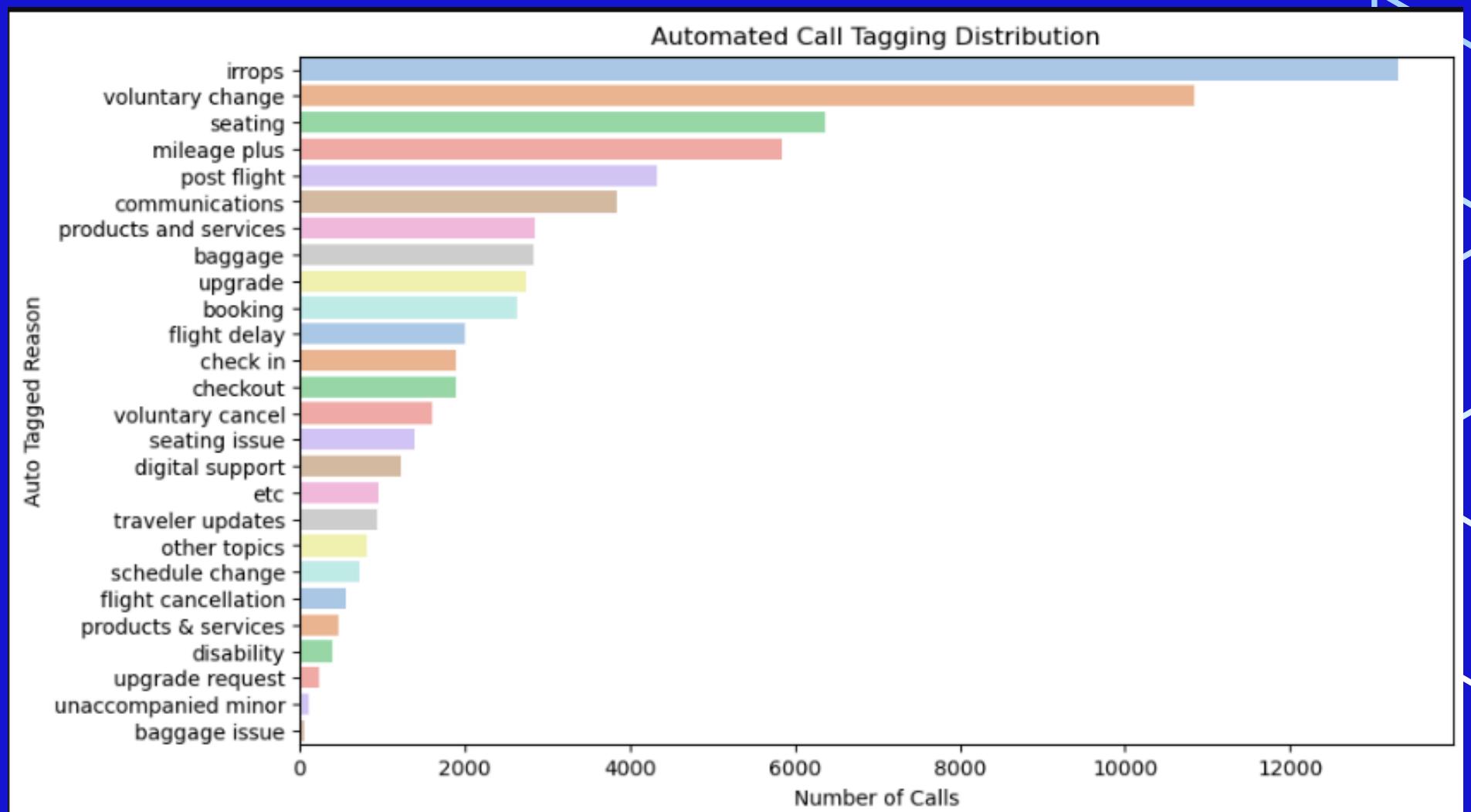


Proposed Solutions: NLP to analyze call transcripts

Automated Call Tagging Distribution

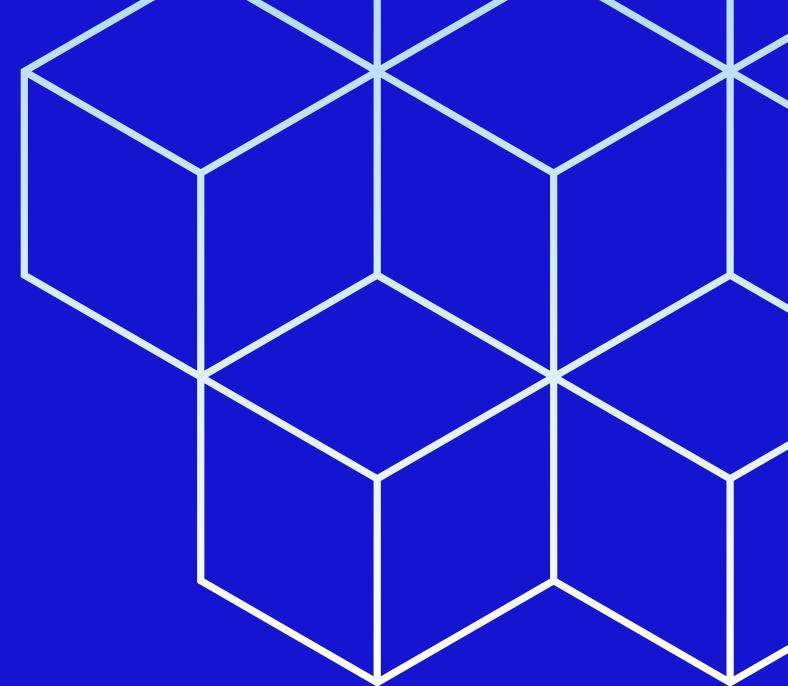
This count plot illustrates how frequently each primary call reason was identified, helping to visualize the effectiveness of the automated tagging system.

- Certain call reasons, like "irregular operations (irrops)," "voluntary change," and "seating," dominate the number of calls.
- On the other hand, less frequent issues like "baggage issues," "unaccompanied minors," and "disability" are underrepresented.



General Recommendations

1. **Agent Training:** Training agents to remain calm and neutral, regardless of customer tone, will help manage calls more effectively and reduce AHT. Focus on reducing silence and improving communication skills to handle calls more efficiently, which will lower both AHT and AST. **Special training** for handling **elite customers** or offering more self-service options.
2. **Self-Solution Focus:** Implement more **self-service options** for frequently mentioned issues like "irrops" and "voluntary changes" to reduce call volumes and decrease AST.
3. **Sentiment Monitoring:** Prioritizing improvement in handling negative sentiment-inducing issues, like delays and cancellations, will improve overall customer satisfaction and reduce repeat calls, impacting AHT positively.
4. Address top issues that were discovered in customer call transcripts by improving **baggage handling**, offering **better communication during delays**, and enhancing the service response during long wait periods.
5. Distribute workload equally among all employees.
6. Focusing specifically on top call reasons with Longest AHT and improving agents' ability to resolve these issues efficiently can reduce AHT. Automation through IVR or better knowledge bases could help with specific areas like "checkout" or "post-flight."



Thank You!



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UNITED 