

# SKYHACK 2.0

**THEME:** *Call Center Optimization*

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Repository link: [GitHub](#)

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# Executive Summary

1. **93.24%** of total calls could potentially be resolved via IVR.
2. Factors Contributing to Extended Average Handle Time (AHT) include **High Call Volumes** and **Negative Average Sentiment**.
3. Recommendations for Optimizing Call Center Performance include Enhance IVR System, Proactive Customer Communications and Peak Hour Optimization.
4. To Predict Missing Call Reasons: Used TF-IDF for text vectorization and Random Forest for classification.

# Key Factors Contributing to Extended Average Handle Time (AHT):

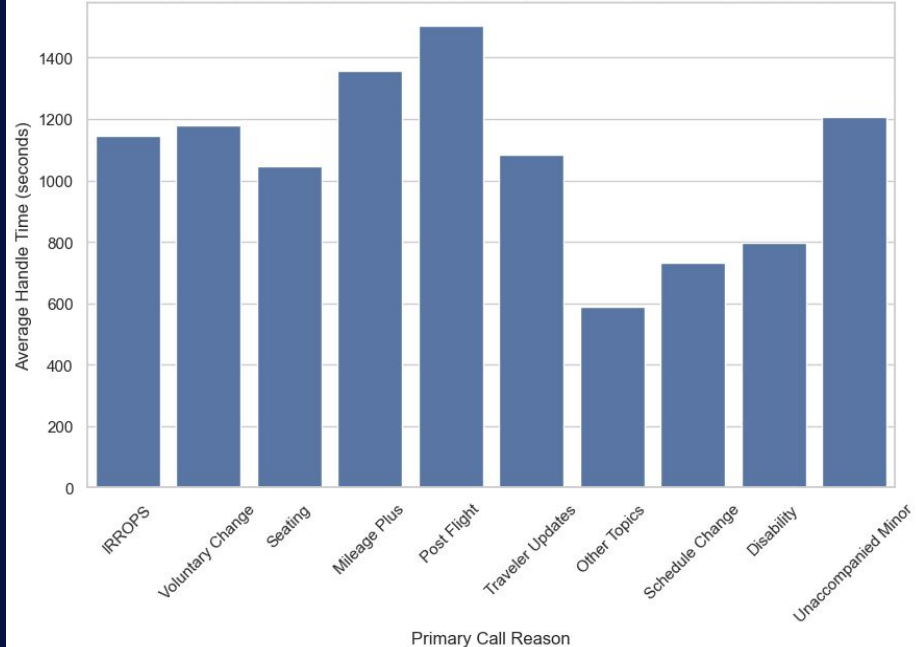
1. **High Call Volumes:** Calls with most frequent call reasons have longer handling times (AHT).

Average AHT for the 5 most frequent call reasons: 1245.91 seconds

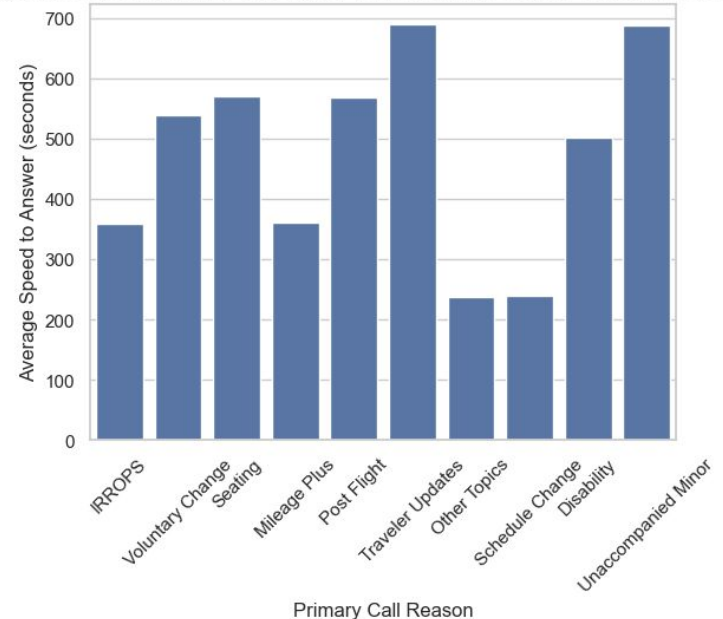
Average AHT for the 5 least frequent call reasons: 881.22 seconds

Percentage difference between the average AHTs: 41.39%

Average Handle Time (AHT) for 5 Most and Least Frequent Call Reasons

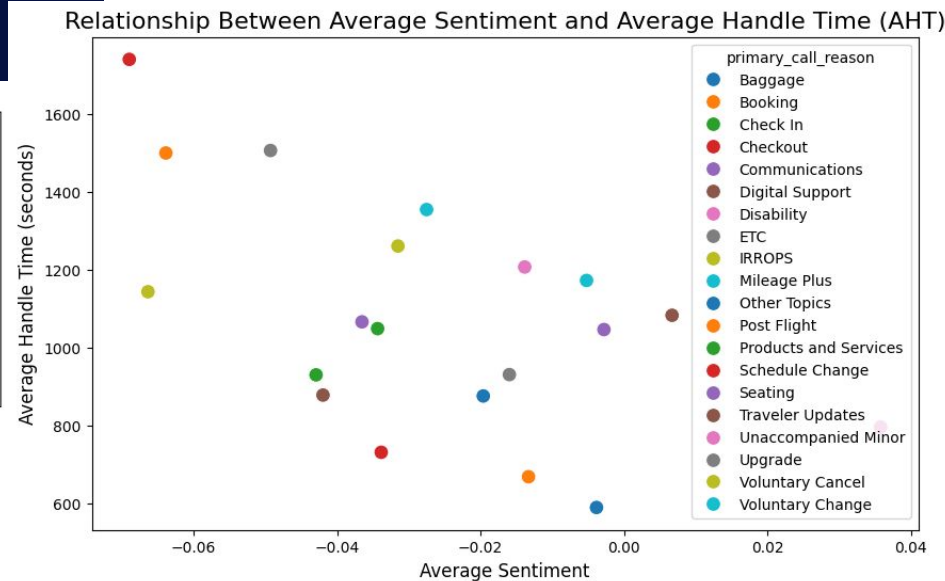
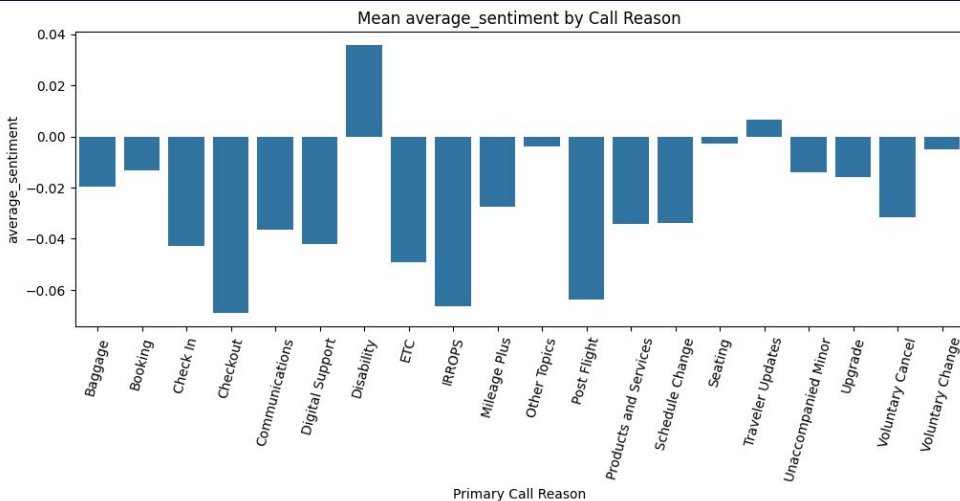
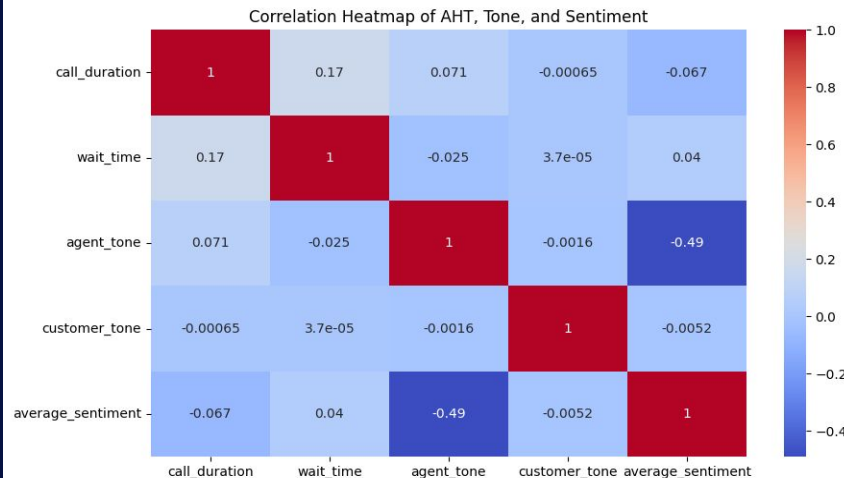


Average Speed to Answer (AST) for 5 Most and Least Frequent Call Reasons



## 2. Negative Average Sentiment: Calls with Average Negative Sentiment have longer handling times (AHT).

- Correlation matrix shows agent tone greatly affects average sentiment of the call.



## Key Findings for self solvable issues

- **Top Call Reasons by Volume:** IRROPS, Seating, and Mileage Plus accounted for a significant portion of calls.
- **Common Themes in Call Transcripts:** Terms like "flight", "agent", and "refund" appeared frequently across clusters, indicating frequent issues with flight changes and refunds.
- **Clustering Results:** Revealed key categories (flight changes, delays, baggage issues) that could be optimized through self-service.
- **93.24% of Calls Could be Solved via IVR.**



Topic 0:

```
['need', 'date', 'work', 'help', 'let', 'fee', 'customer', 'agent', 'change', 'flight']
```

## Topic 1:

```
['booked', 'refund', 'just', 'travel', 'credit', 'let', 'change', 'agent', 'customer', 'flight']
```

## Topic 2:

```
['delayed', 'like', 'sir', 'meeting', 'delay', 'let', 'tomorrow', 'customer', 'agent', 'flight']
```

### Topic 3:

```
['help', 'weather', 'time', 'let', 'check', 'seat', 'wanted', 'customer', 'agent', 'flight']
```

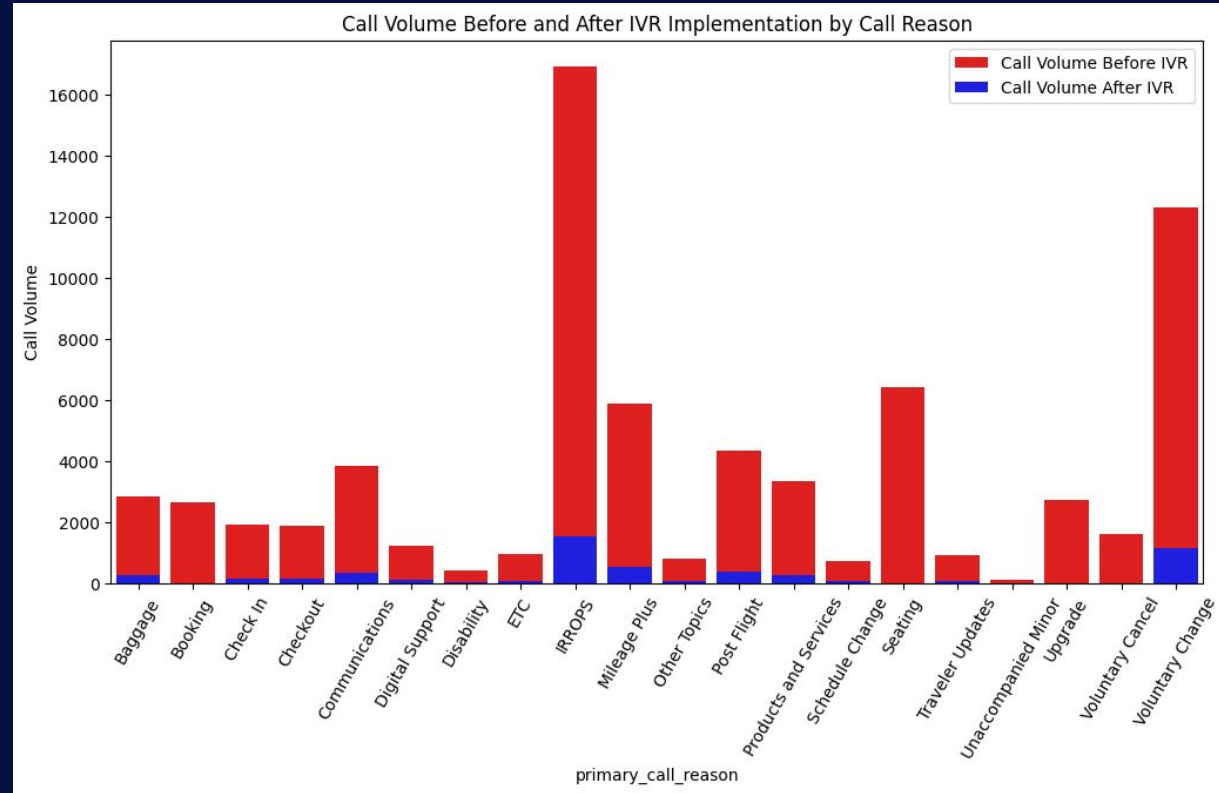
## Topic 4:

```
['let', 'united', 'delays', 'refund', 'voucher', 'experience', 'delay', 'flight', 'agent', 'customer']
```

Percentage of calls that could be solved via IVR: 93.24%

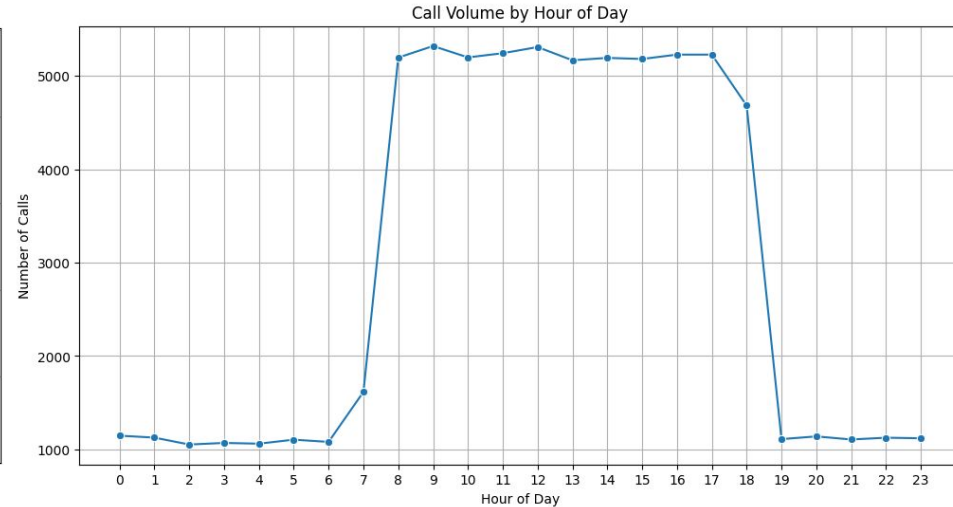
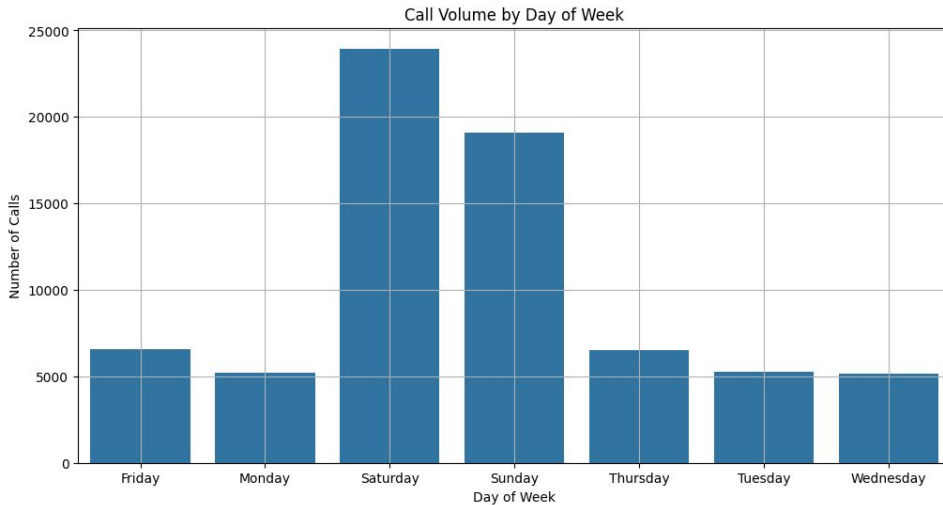
# Recommendations for Optimizing Call Center Performance

1. **Enhance IVR System** by providing self service options for Booking and Check-in, Flight Status and Baggage Tracking
2. **Proactive Customer Communications** for common issues (e.g., flight delays, cancellations) via text or email to reduce call volume.



### 3. Peak Hour Optimization and Agent Allocation:

- Ensure more agents are available during peak times, such as early morning and weekdays.
- **Flexible Scheduling:** Use part-time or on-call agents to accommodate surges in call volume.
- More agents during peak hours ensures quicker response times and faster resolution.





# Predicting Missing Call Reasons

- **Dataset Size:** 71,810 records
- **Missing Data:** 5,157 records with missing `primary_call_reason`, which we predicted using machine learning.
- **Clustering of Call Transcripts:** Grouped similar call types to identify common patterns and themes using NLP.
- **Predicting Missing Call Reasons:** Used TF-IDF for text vectorization and Random Forest for classification to predict missing `primary_call_reason`.
- Predicted call reasons are stored in `Test.csv`

