

# **Optimizing Gym Utilization and Client Satisfaction**

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# Introduction

In this analysis, we explored gym utilization patterns at GoodLife Fitness using historical data.

Our goal is to identify key trends and factors affecting gym attendance to develop data-driven strategies that optimize facility usage, enhance client satisfaction, and ultimately boost profitability

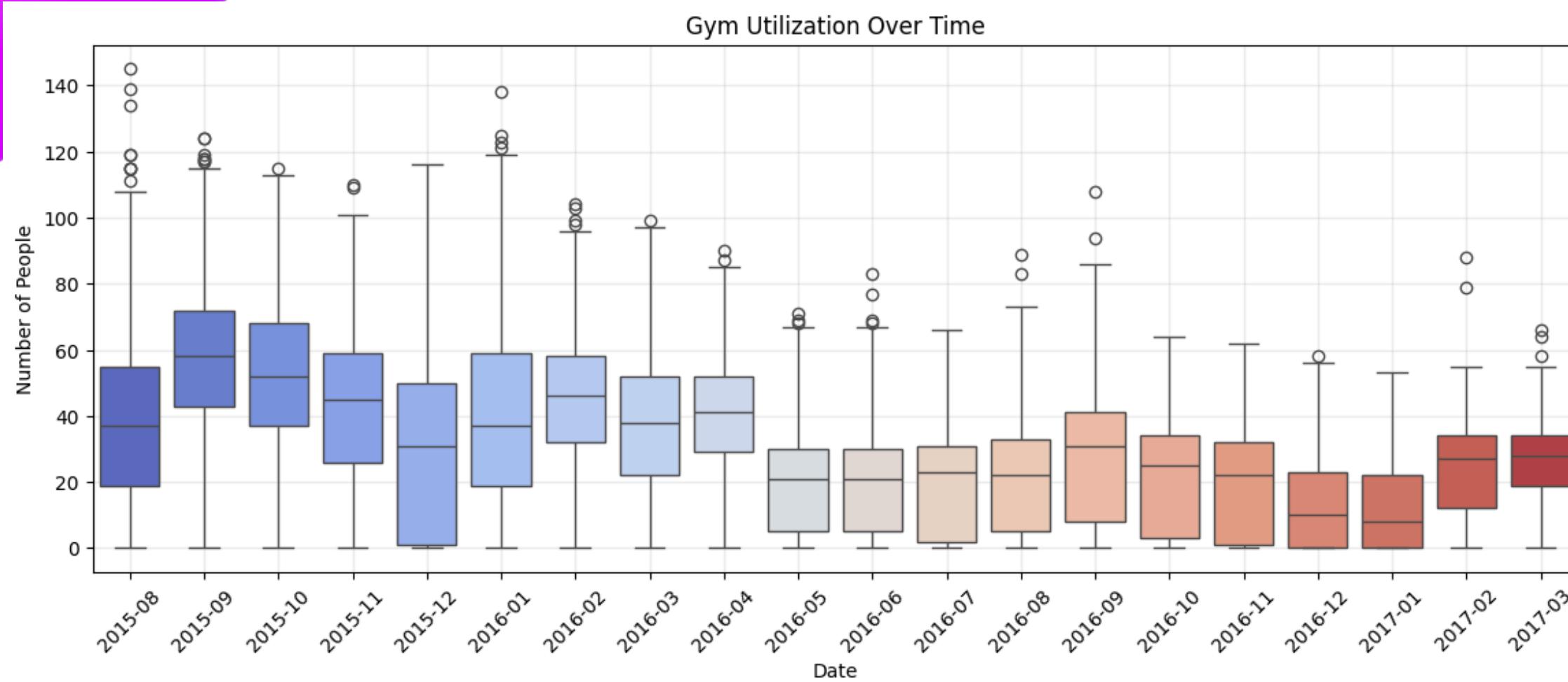
# Dataset overview

We utilized a dataset containing 62,000 records of gym attendance at GoodLife Fitness, captured from 2015 to 2017.

- **Number of People:** The target variable representing gym occupancy.
- **Date and Time:** Information about the specific date and time of each record.
- **Day of Week, Month, Hour:** Temporal features to understand daily, weekly, and monthly patterns.
- **Is Weekend, Is Holiday:** Indicators of weekends and holidays.
- **Temperature:** External factor affecting gym attendance in Fahrenheit.
- **Is Start of Semester:** Impact of academic cycles on gym utilization.

This data allows us to analyze trends and identify factors that influence gym usage, aiding in better resource management and customer experience.

# Gym utilization over time



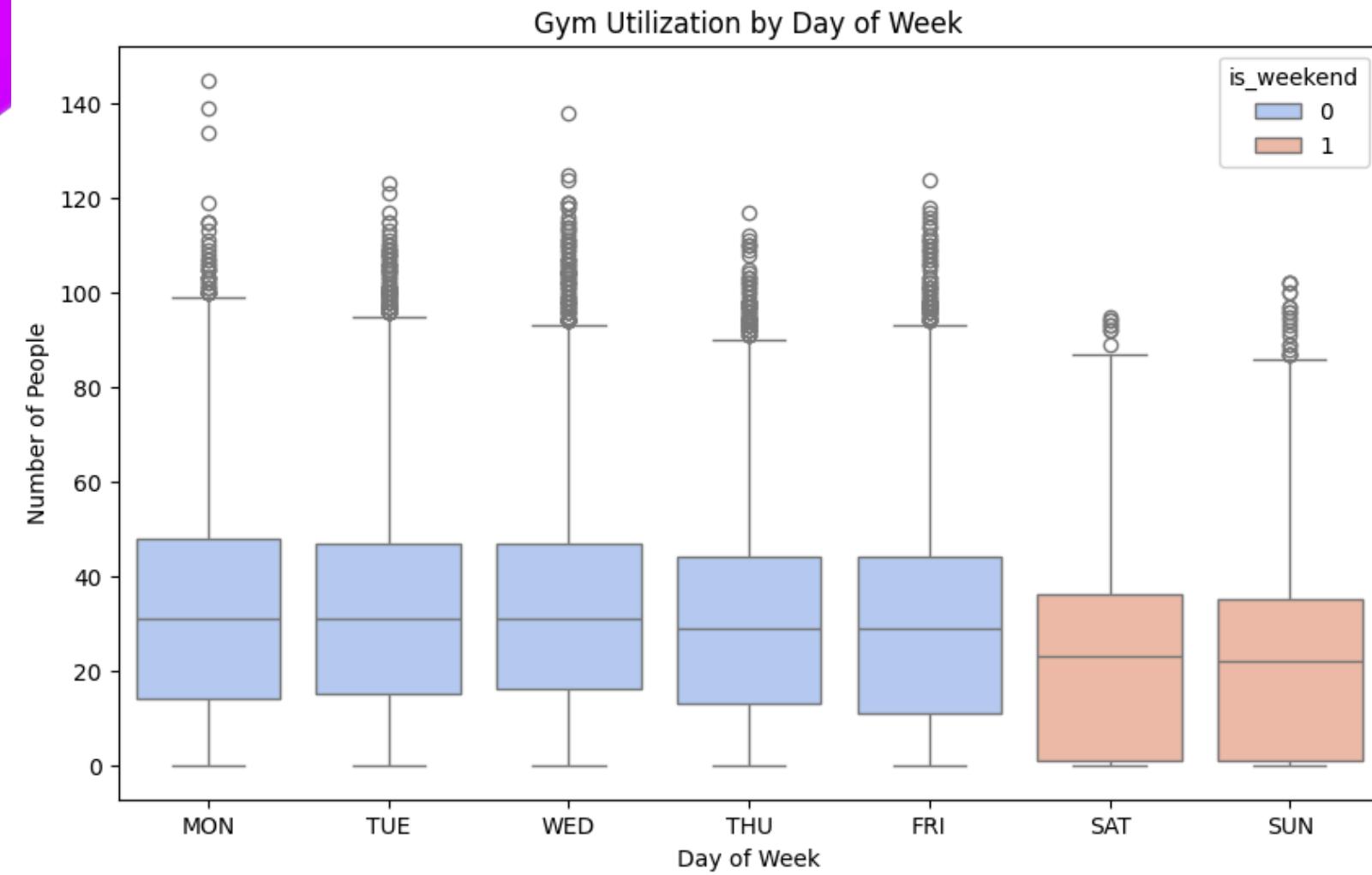
## Findings

- Overall Decline: Gym usage dropped from 2015 to 2017.
- Seasonal Patterns: Usage fluctuates seasonally, with decreasing peaks.
- Variation: High usage periods still occur, but overall trends are down.

## Possible Reasons for Decline

- Competition: New gyms may offer better options.
- Customer Satisfaction: Problems with facilities or services may drive members away.

# Utilization vs Day of the week



## Findings

- Weekday Consistency: Gym usage is steady from Monday to Friday, with similar activity levels and variability.
- Lower Weekend Usage: Weekend gym visits are slightly lower, with less variability.
- Monday Peak: Mondays see a notable peak in usage, higher than other weekdays.

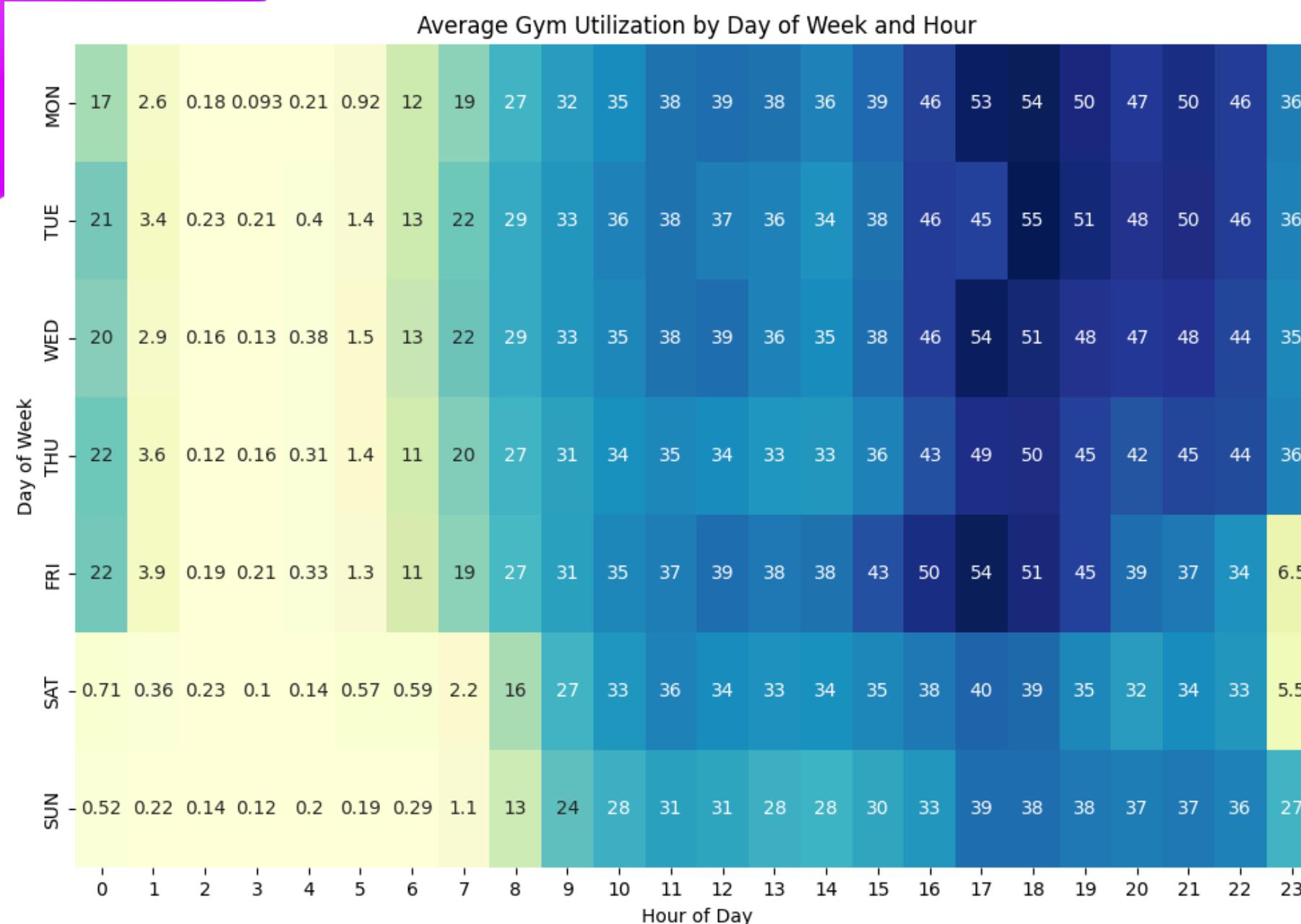
## Possible Reasons for Trends

1. Routine Workouts: Consistent weekday usage reflects regular member routines.
2. Weekend Alternatives: Lower weekend visits may be due to other activities or leisure.
3. Monday Motivation: Higher Monday usage likely stems from members starting the week with new fitness goals.

## Actionable Insights

- Weekday Staffing: Keep consistent staffing during weekdays due to steady usage.
- Boost Weekend Visits: Introduce special classes or promotions to increase weekend attendance.
- Monday Strategy: Ensure adequate resources for the Monday peak and consider special promotions to leverage this trend.

# Day of week vs Hour of the day



## Actionable Insights

Adjust Staffing: Ensure enough staff during peak hours (4 PM to 8 PM) and reduce during low hours (2 AM to 6 AM).

Targeted Marketing: Create promotions or classes during peak times to attract more members.

## Findings

- Peak Utilization: The gym is busiest from 4 PM to 8 PM, the most popular time for workouts.
- Low Early Morning Activity: Minimal usage occurs from 2 AM to 6 AM, indicating low demand.
- Weekend Trends: Weekends see lower overall usage, with peak hours shifting to 8 AM to 12 PM.
- Friday and Saturday Nights: Usage drops from 10 PM to 12 AM, likely due to social activities.

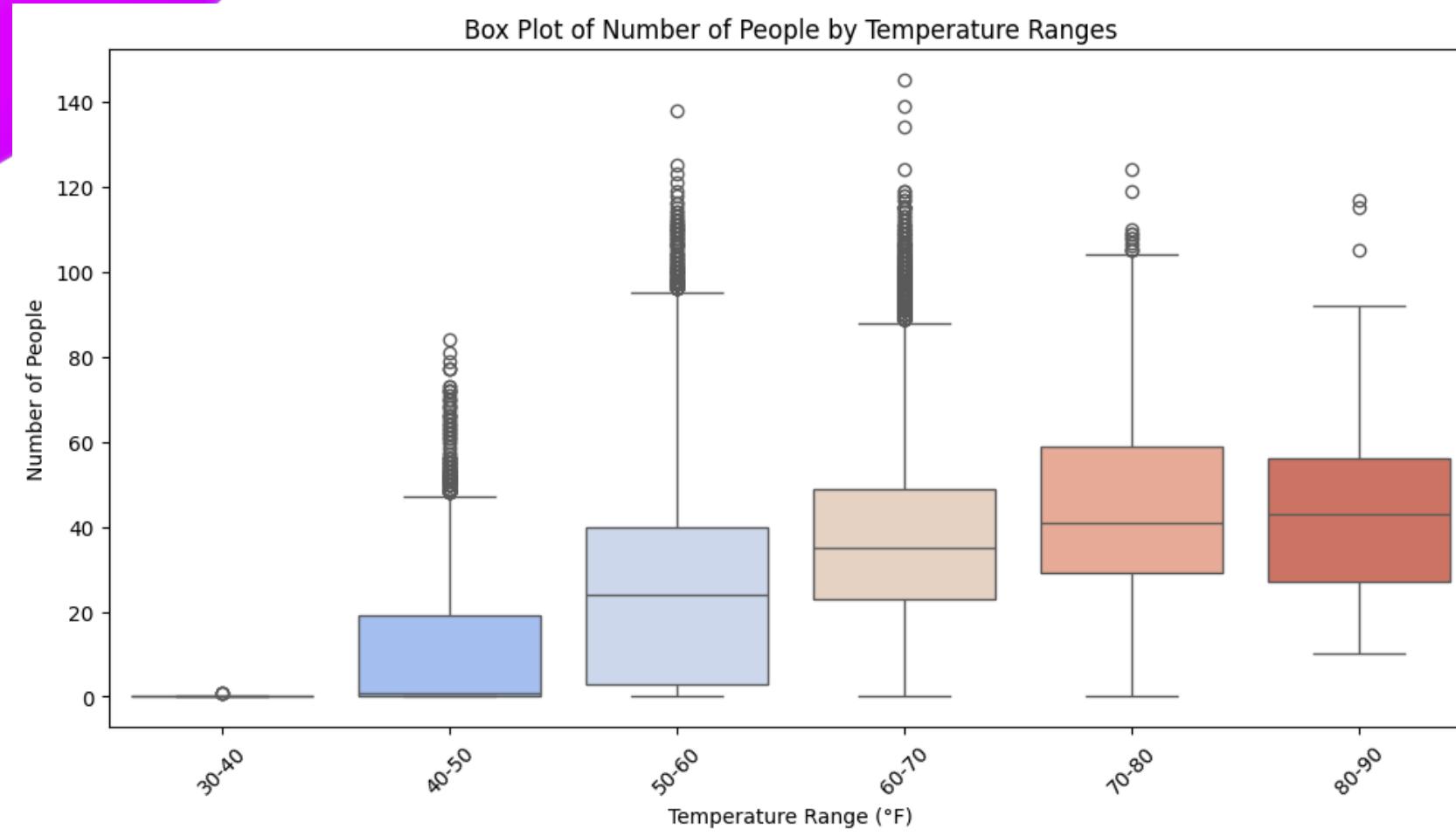
## Possible Reasons for Trends

Work Schedules: Many prefer evening workouts after work.

Weekend Behavior: Outdoor activities and social events may reduce gym visits on weekends.

Social Activities: Late-night socializing on weekends likely impacts gym attendance.

# Utilization vs Temperature



## Actionable Insights

- Maintain Comfort: Keep indoor temperatures around 60-70°F to boost attendance.
- Mitigate Heat Impact: Offer cooling options or incentives to encourage visits during hot weather.

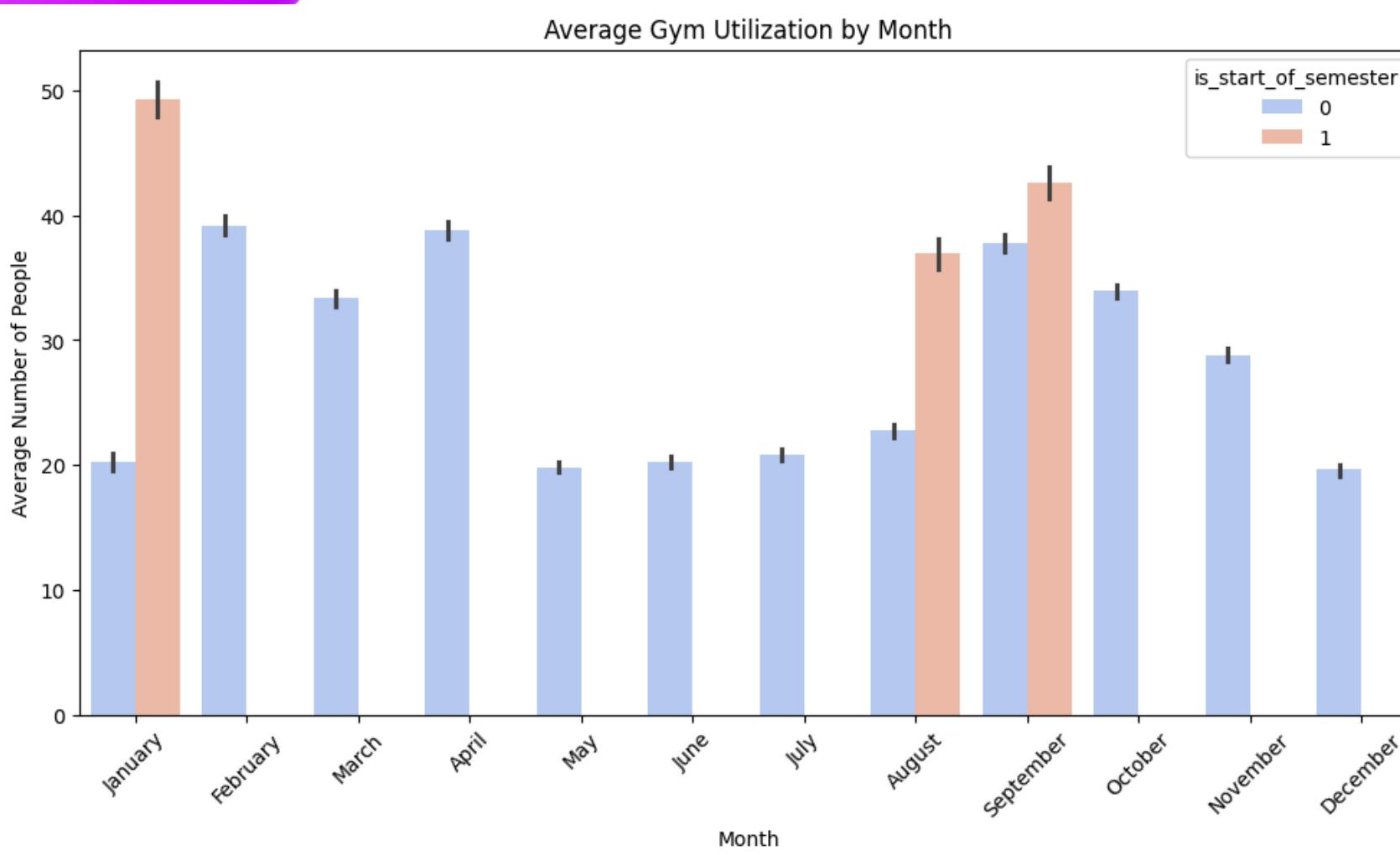
## Findings

- Temperature and Utilization: Gym usage increases with rising temperatures, peaking at 60-70°F.
- Optimal Range: The 60-70°F range sees the highest average gym attendance.
- Decline in Heat: Usage drops when temperatures exceed 80°F, possibly due to discomfort.

## Possible Reasons for Trends

1. Comfort Levels: Moderate temperatures (60-70°F) are more comfortable for workouts.
2. Heat Sensitivity: High temperatures (80-90°F) may cause discomfort, reducing gym visits.
3. Seasonal Patterns: Seasonal changes might influence workout habits, with less motivation during hot weather.

# Utilization vs Month



## Possible Reasons for Trends

- New Year Motivation: Increased fitness motivation in January from resolutions and the academic calendar.
- Summer Activities: Lower attendance in summer months due to vacations and outdoor priorities.
- Back-to-School Effect: Renewed focus on fitness in August and September as routines normalize.
- Holiday Distractions: Decreased gym visits in December due to travel and holiday activities.

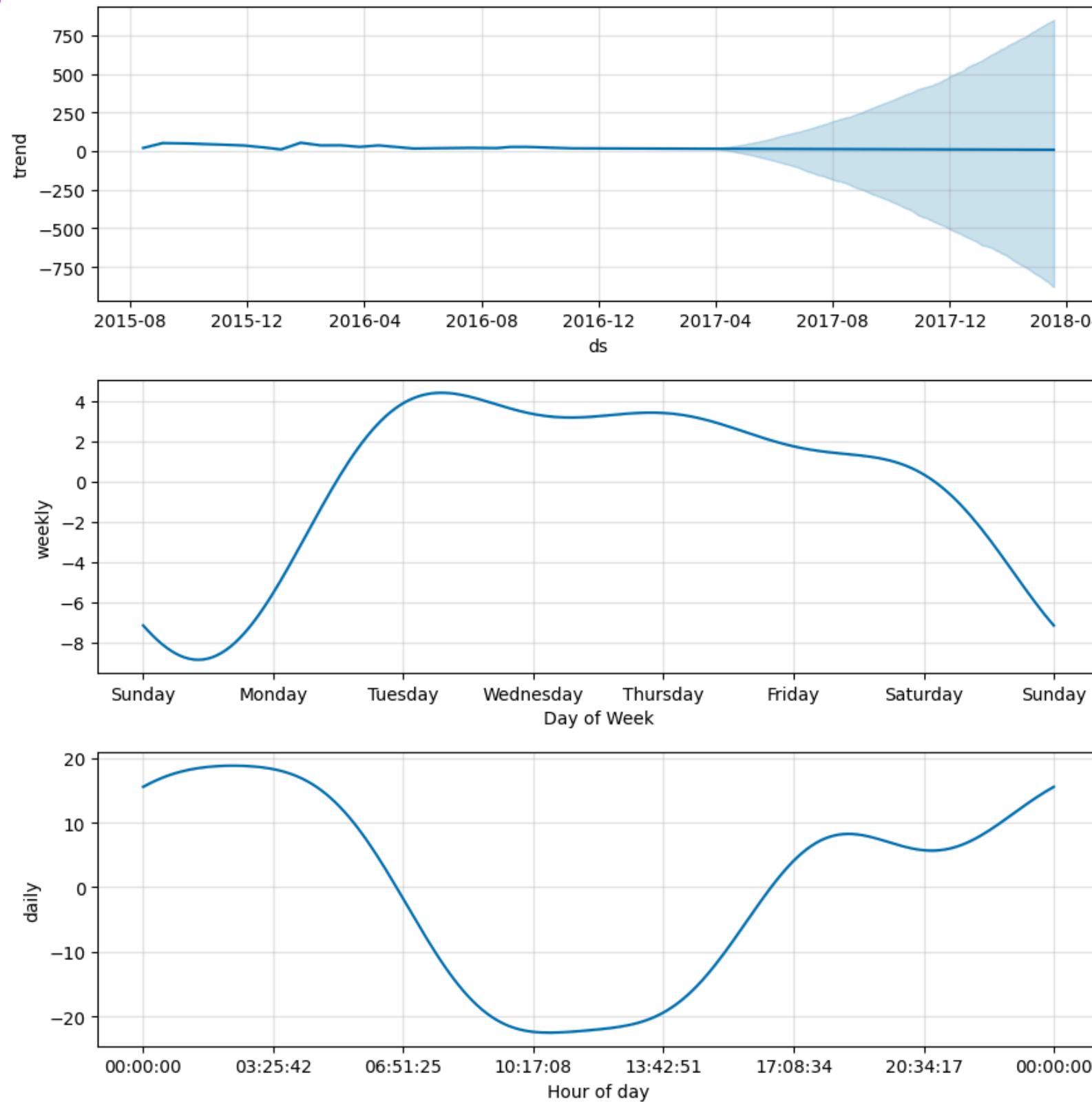
## Findings

- Peak in January: Highest gym attendance occurs in January, likely due to New Year resolutions and the start of the school semester.
- Drop from May to July: Utilization falls significantly during these months, possibly due to summer vacations and outdoor activities.
- Rise in August and September: Attendance increases again as routines return with the new school semester.
- Decline in December: Gym usage dips in December due to holiday distractions and travel.

## Actionable Insights

- Adjust Resources: Plan staffing and resources according to these seasonal trends to enhance service and member engagement.

# Forecasting utilization



The Prophet model forecasts future gym usage trends using historical data, highlighting trends and seasonality.

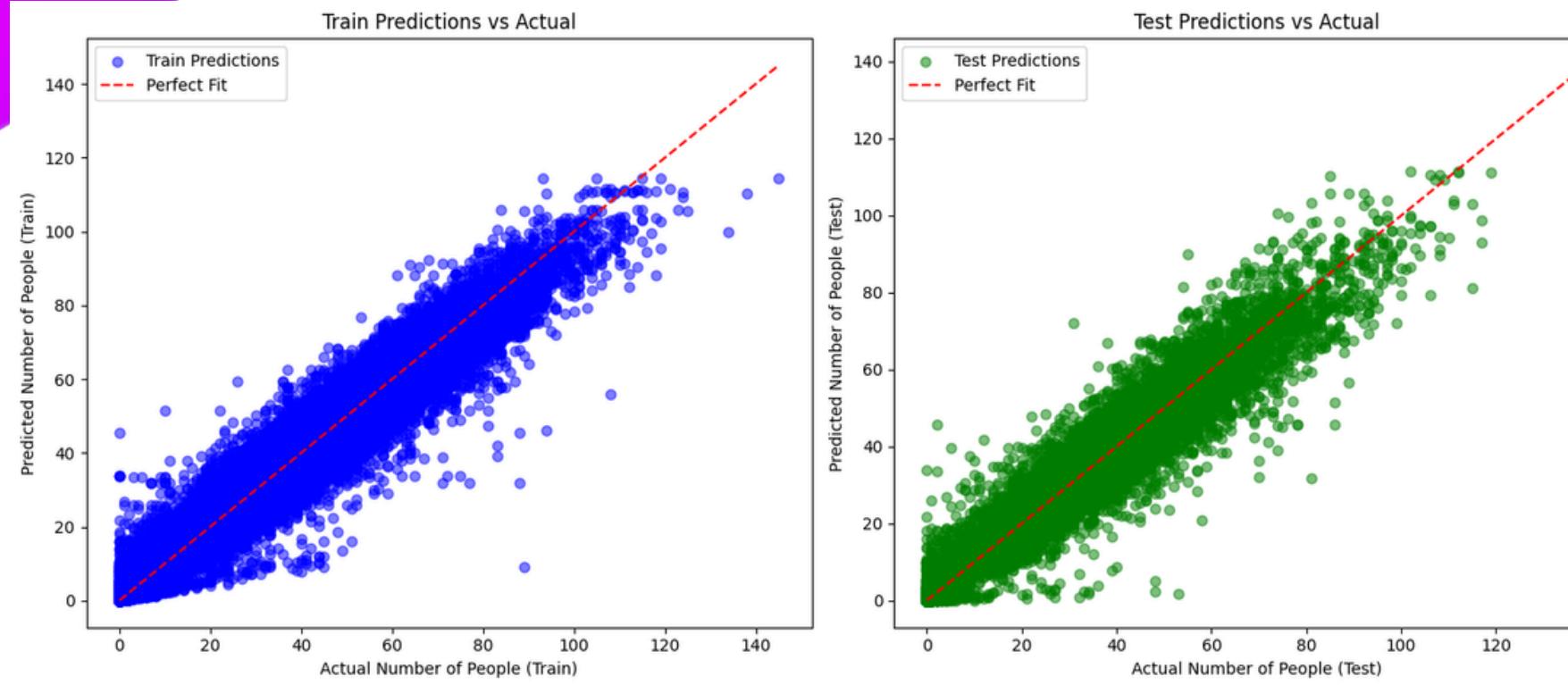
## Findings

- **Trend Plot:** Shows long-term changes in gym usage. An upward trend indicates growing popularity, while a downward trend suggests a decline.
- **Seasonality Plot:** Displays weekly patterns, identifying days with higher or lower usage.

## Benefits for GoodLife

- **Demand Planning:** Forecasts help manage staffing, optimize equipment, and schedule maintenance during low-use periods.
- **Marketing Strategies:** Understanding trends allows for targeted promotions, especially during low-utilization months.
- **Facility Management:** Anticipating busy times aids in crowd management, improving member experience.

# Predicting utilization



A Random Forest Regressor predicts gym attendance using features like :

`['day_of_week', 'hour', 'temperature', 'month',  
'is_weekend', 'is_holiday', 'is_start_of_semester']`.

## Benefits for GoodLife

- **Predictive Insights:** Provides accurate forecasts for better resource management and operational adjustments.
- **Personalized Offers:** Enables tailored promotions based on factors like weather and day of the week.
- **Resource Allocation:** Helps optimize staff scheduling and facility hours based on predicted attendance.

## Performance Metrics:

MSE: 39.16

MAE: 4.26

RMSE: 6.26

R<sup>2</sup> Score: 0.92

Explained Variance: 0.92



**Thank you**