Drop-In Childcare Attendance Forecasting

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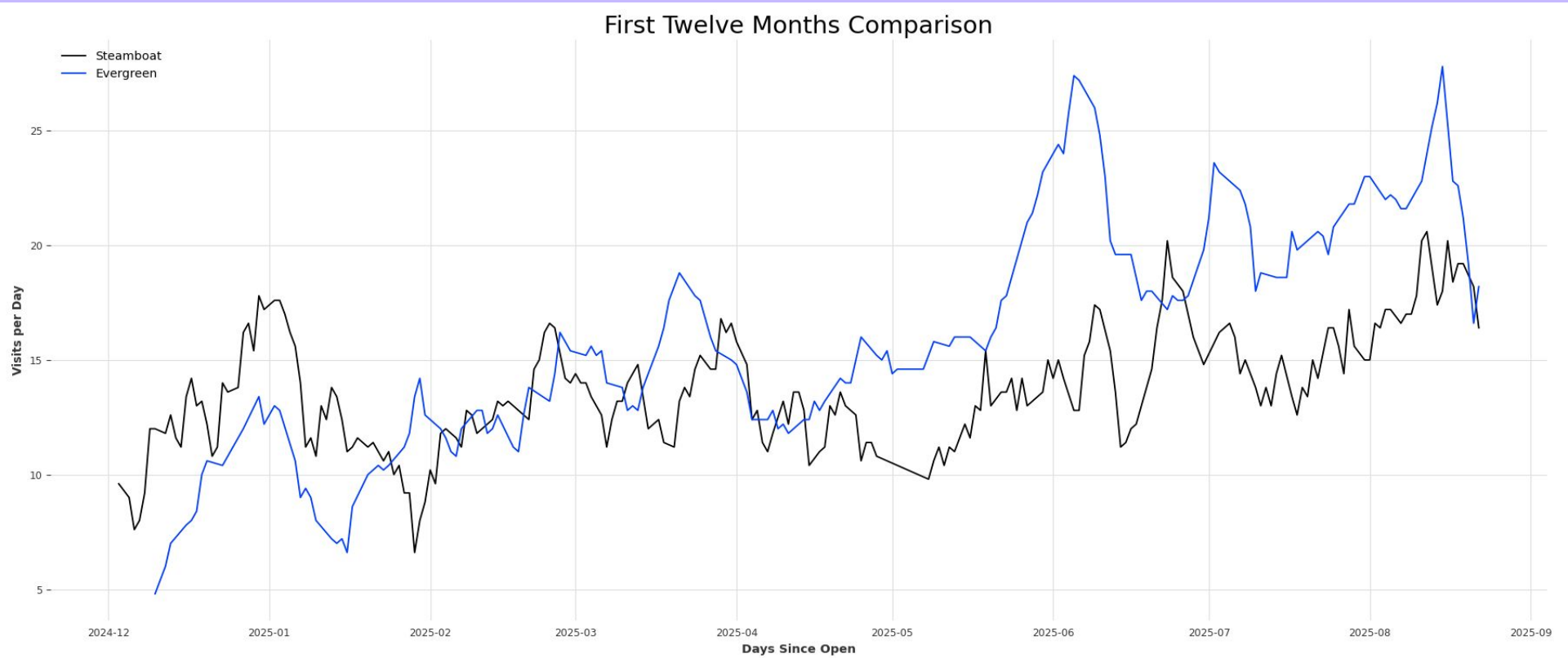
Objectives

- Forecast short- and medium-term attendance for a drop-in childcare center.
- Improve staffing, supplies, and cash-flow planning with data-driven insights

Data Sources

- Proprietary attendance data from franchise locations
- Holidays/Inservices
- Weather events
- No PII - attendance data only

EDA


First Twelve Months Comparison
Steamboat
Evergreen
Visits per Day
25
20
15
10
5
2024-12
2025-01
2025-02
2025-03
2025-04
2025-05
2025-06
2025-07
2025-08
2025-09
Days Since Open

Feature Engineering

Aggregation

- Calendar joins (center closures, inservices)
- Holidays
- Surrounding schools

Validation Splits

Leakage-safe validation splits by time (rolling window, no shuffling)

Models: Two Families

Statistical

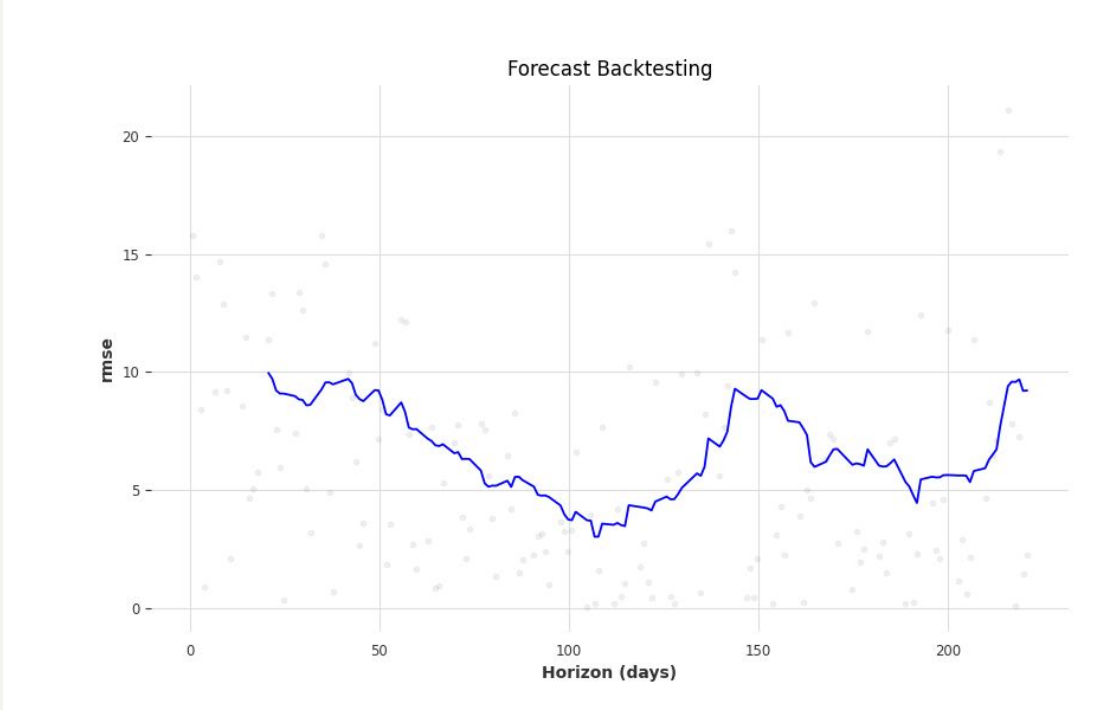
SARIMAX, Gradient Boosting

Interpretable, strong baseline

Prophet

Captures trends, seasonality, holidays quickly

Evaluation


Forecast Backtesting
rmse
20
15
10
5
0
0
50
100
150
200
Horizon (days)

Conclusions

Seasonality

Dependant on local school systems' years (not always the same dates/length)

Dependent on weather (snow/beach days)

Shocks

Outages due to:

- Illness
- Mechanical failures
- Weather emergencies

Future Work

Multi-site Hierarchical Model

Borrow strength/history across multiple locations

Real-time Weather Radar

Cost-Aware Optimizer

Convert forecasts into shift/supply recommendations

Questions?