



NVR Capstone MSBA

NVR HOMES DATA ANALYSIS

William and Mary MSBA Graduate Students Capstone Project
Nicole, Bek, Jotham, Brendon





NVR Capstone MSBA

Meet the Team!



BEK FRISBY-SMITH



BRENDON MATSIKINYA



NICOLE SELLERS



JOTHAM ZVIKONYAUKWA

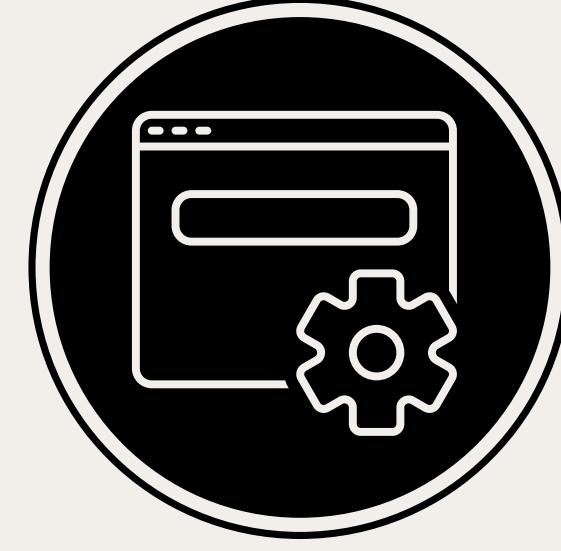
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INTRODUCTION TO
PROJECT



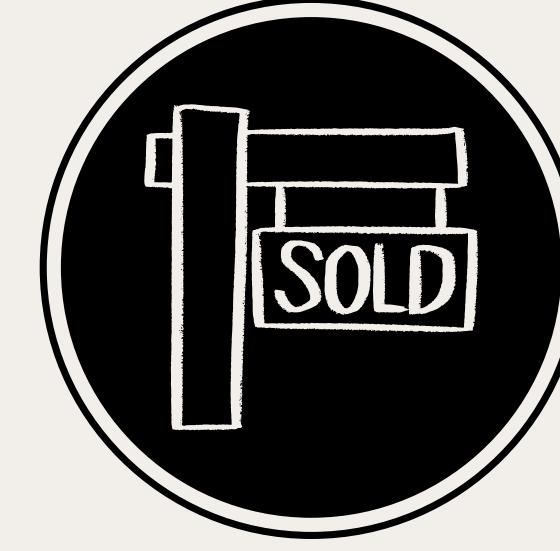
DATA & INSIGHTS



TECHNICAL
APPROACH



DASHBOARD
DEMO



CLOSING REMARKS



Introduction to Project

Problem Statement and Goals to be Addressed



Introduction and Goals

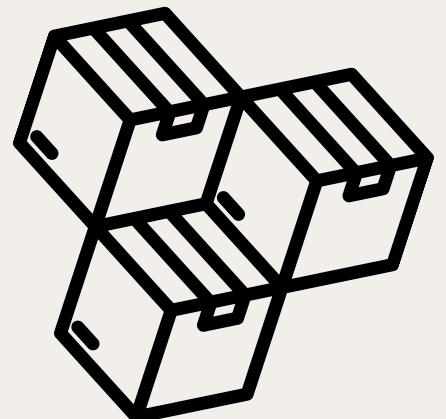


**“Over 578,000
homeowners have trusted
NVR, Inc. for their families
and their future.”**

NVR, Inc Website



“How do specific products, geographic areas, vendors, or other factors impact both quality and spending?”





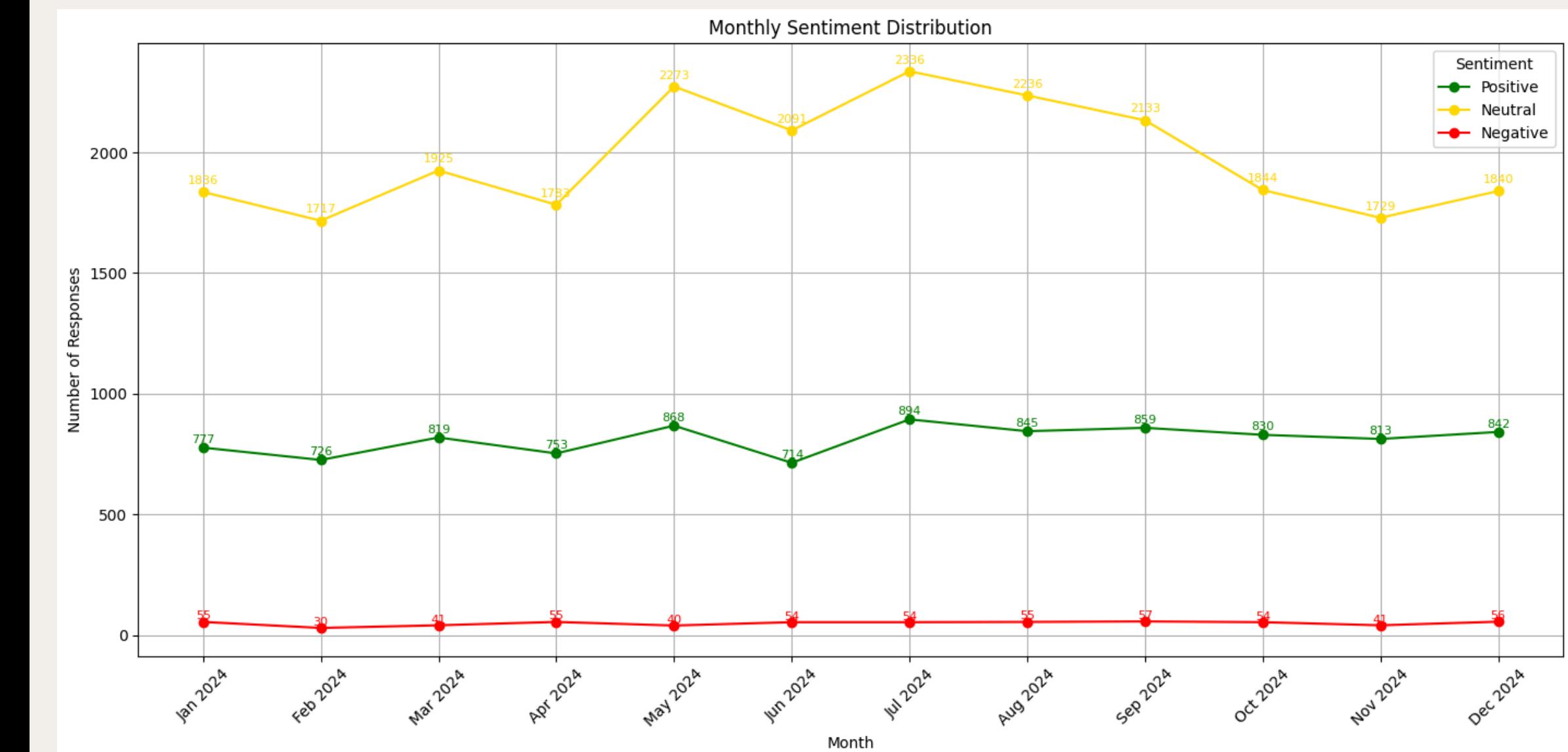
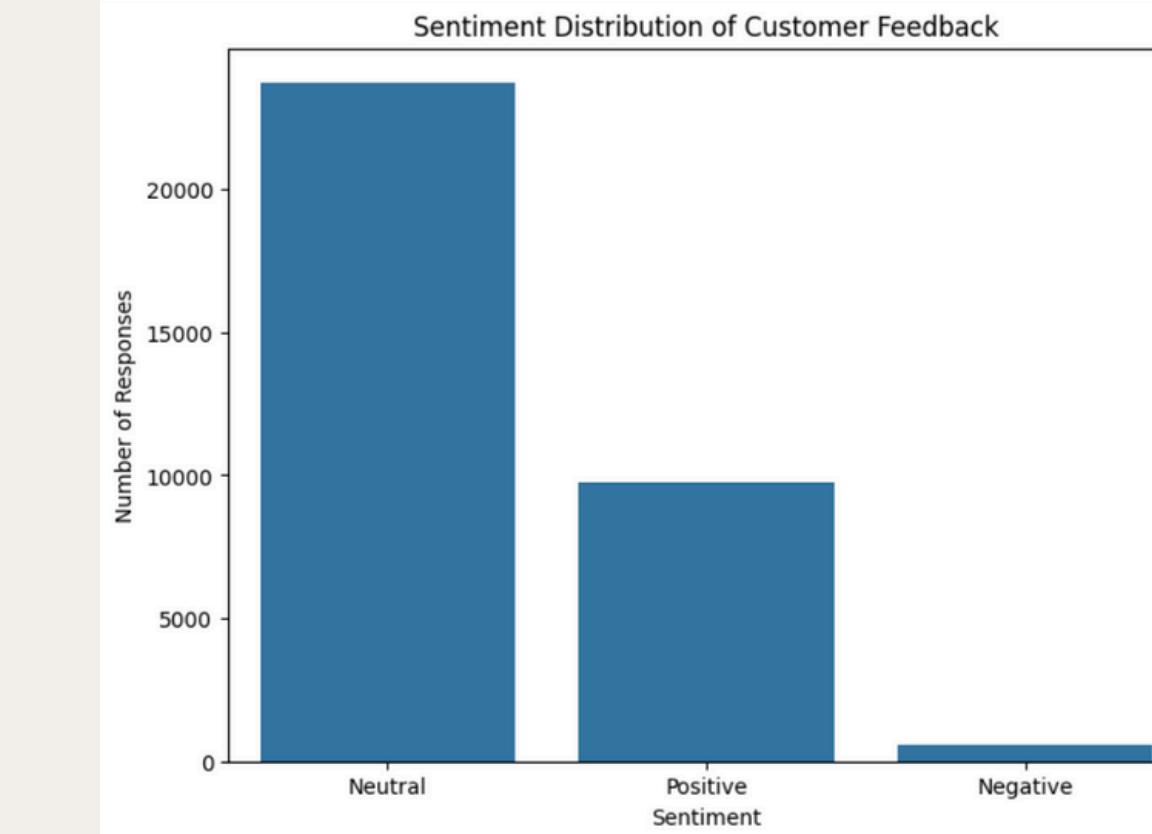
Data & Insights

Customer Sentiment Analysis, Quick Stats, and Ticket Volume Over Time



Customer Sentiment Analysis

- TextBlob analyzed feedback sentiment.
- Results were mostly neutral and steady.
- Focus shifted to product quality and spend.





Quick Stats

Top 5 Products with most tickets:

COLUMBIA - 23408

HUDSON - 17723

LEHIGH - 15794

GRAND CAYMAN - 11350

CEDAR - 10393

Top 5 Community Codes with most tickets:

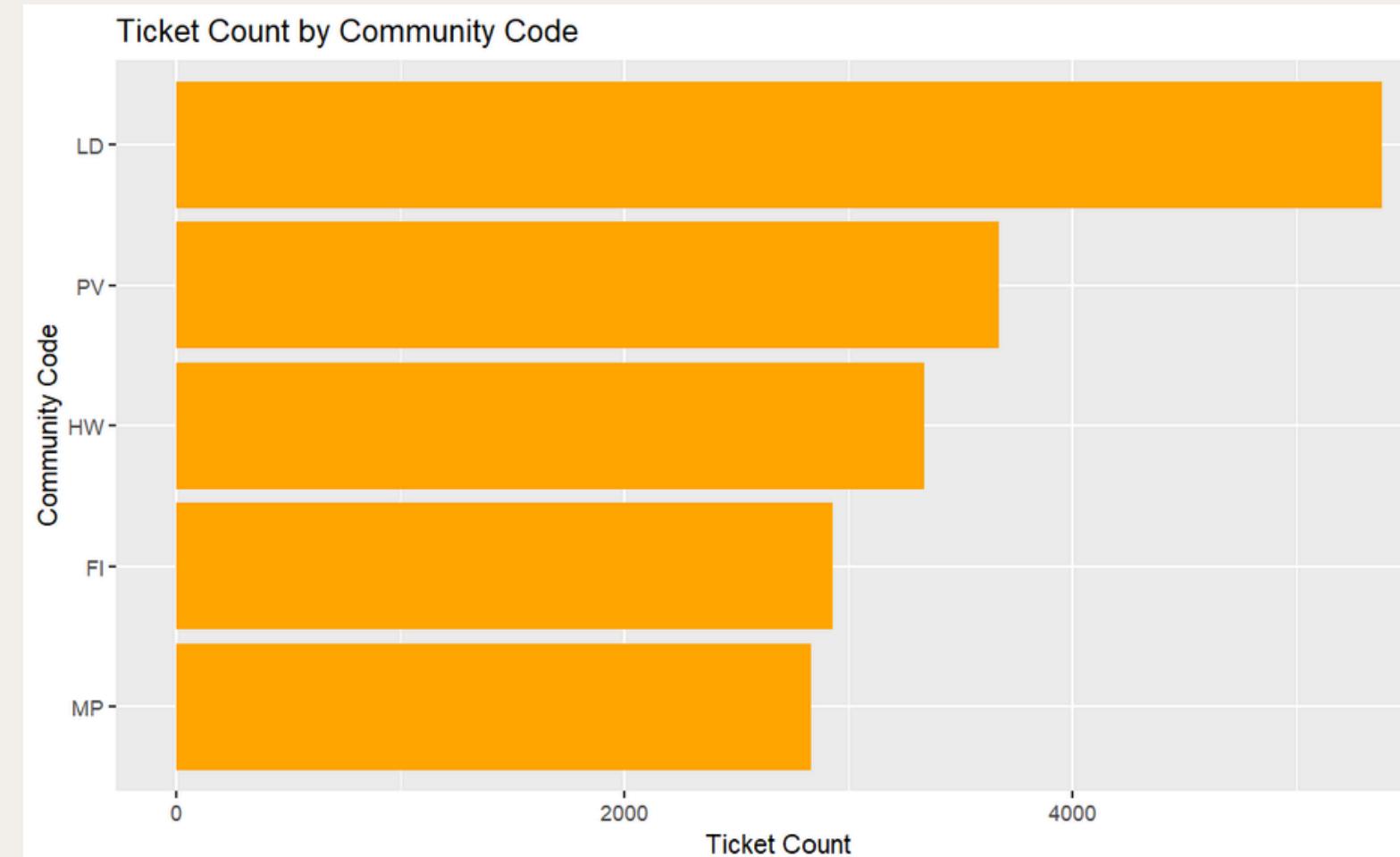
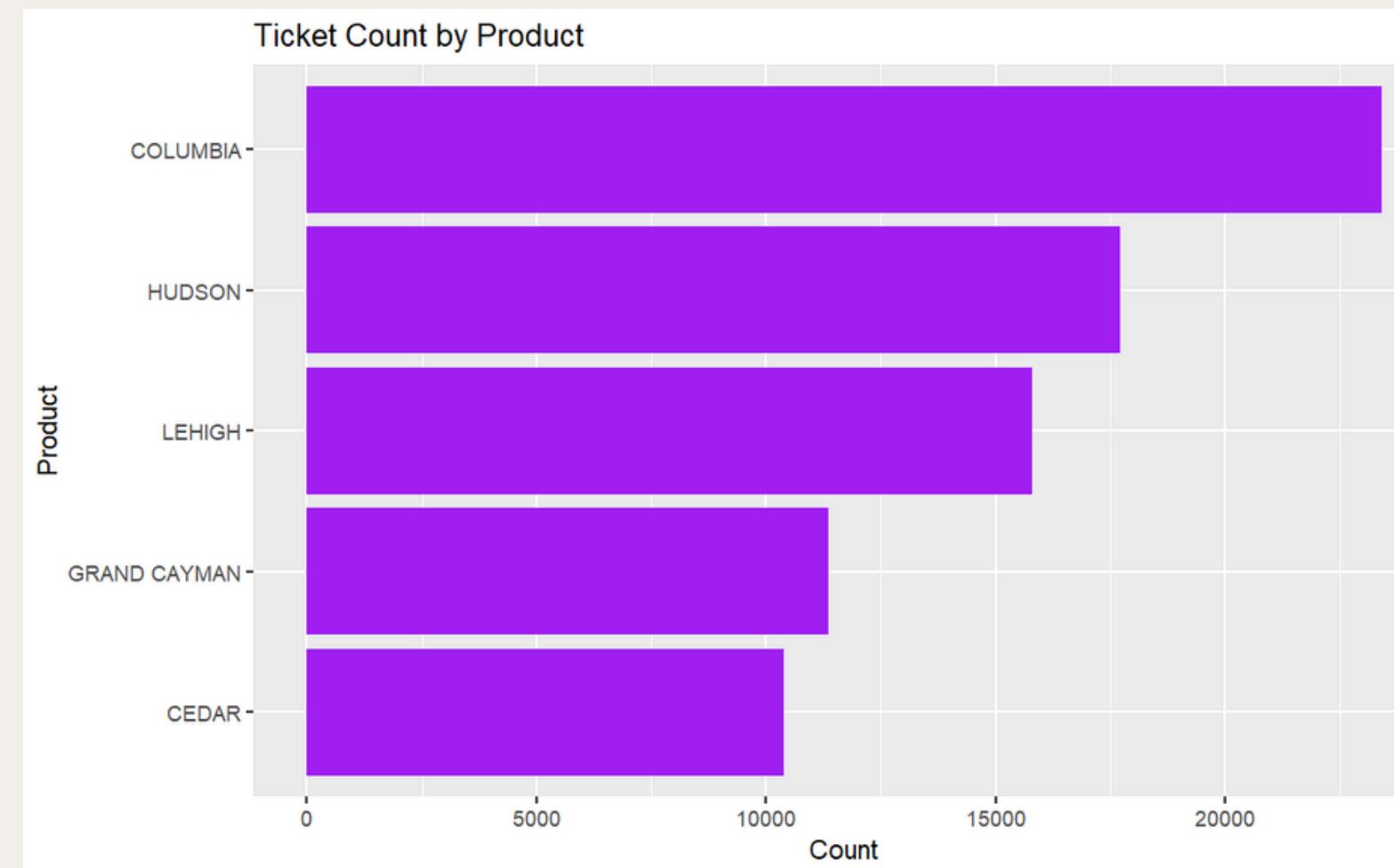
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PV - 3672

HW - 3337

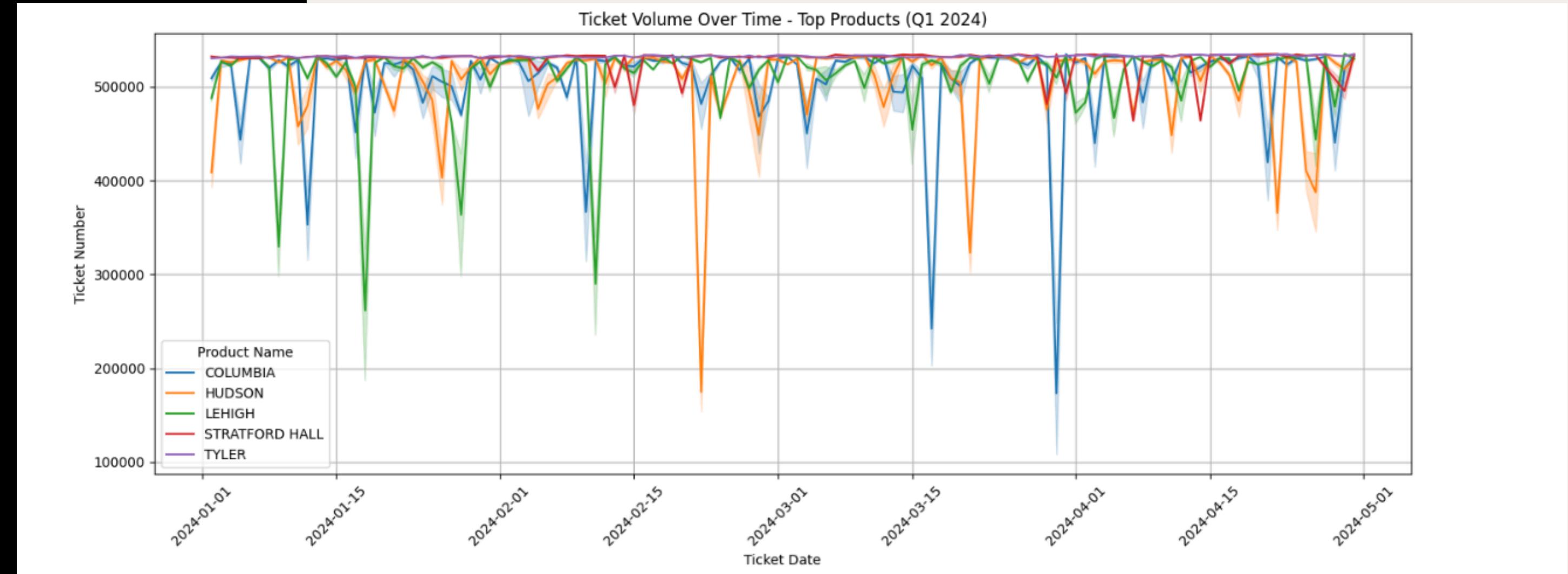
FI - 2931

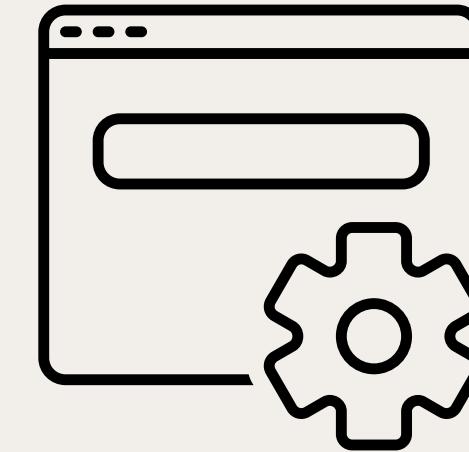
MP - 2831





Ticket Volume Over Time



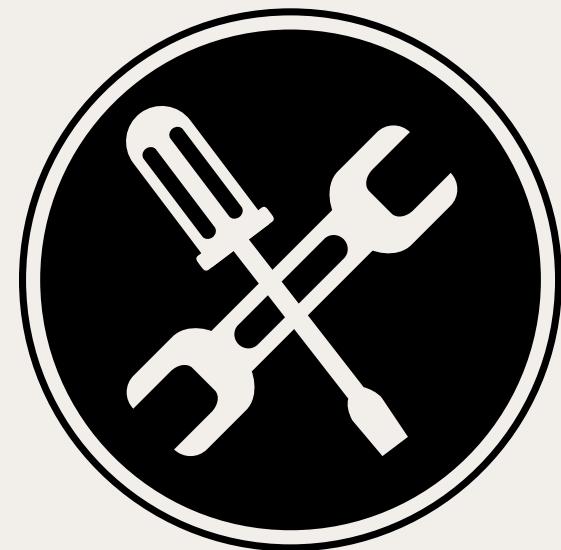


Technical Approach

Data Ingestion → Feature Engineering → Threshold Calculation → Anomaly Flagging
→ Scoring → Label Assignment (final_alert) → Model Training (Random Forest) →
Evaluation & Outputs



Model Breakdown



FOUNDATIONAL METRICS

Invoice line amounts, ticket counts, average spend per ticket, spending fluctuations



Z-SCORES & THRESHOLDS

Benchmarking and highlighting unusually high values



ANOMALY FLAGS

Elevated ticket volume, excessive spending, an unjustified spend



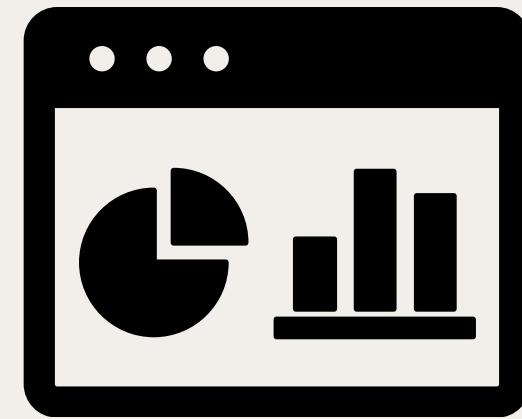
Model Breakdown



MODEL TRAINING



MODEL OUTPUT & INSIGHTS



Dashboard Demo

A Walkthrough of the Dashboard



Dashboard Demo

Performance

TOTAL UNIQUE PRODUCTS: 5 | AVERAGE Z SCORE: 0.03 | TOTAL TICKETS: 1000 | TOTAL SPENDING: \$264,431

Top Nonperforming Products
Performance metrics across regions and vendors.

Search products... Export CSV View Table Chart

test_sample_1000 (1).csv Update Existing Products

Ticket Number	Region	Product Type	Invoice Amount	Risk Status	Spending Z-Score
891	* Region Gulf Coast	Product ADDISON	\$3,149	⚠ Attention Issue detected	▲ 5.02
1555	* Region Gulf Coast	Product ADDISON	\$3,149	⚠ Attention Issue detected	▲ 3.74
1814	* Region Gulf Coast	Product ADDISON	\$1,279	⚠ Attention Issue detected	▲ 2.89
1793	* Region Gulf Coast	Product MERION - LEVEL ENTRY	\$600	⚠ Attention Issue detected	■ 0.32
1706	* Region Gulf Coast	Product ADDISON	\$500	⚠ Attention Issue detected	■ 0.19
1622	* Region Gulf Coast	Product ABBOT RANCH	\$475	⚠ Attention Issue detected	■ 0.24
524762	* Region Gulf Coast	Product ABBOT RANCH	\$7,132	⚠ Attention Issue detected	▲ 10.45
532683	* Region Gulf Coast	Product ADDISON	\$4,464	⚠ Attention Issue detected	▲ 5.76
534860	* Region Gulf Coast	Product ADDISON	\$4,253	⚠ Attention Issue detected	▲ 4.60
526252	* Region Gulf Coast	Product ADDISON	\$3,580	⚠ Attention Issue detected	▲ 8.51

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Product ADDISON
Ticket: 891 - Region: Gulf Coast Performance ID: #891

INVOICE AMOUNT: \$3,149 | SPENDING Z-SCORE: 5.01962579 * Above normal range | SPEND PER TICKET: \$4 | RISK STATUS: Attention Needed

⚠ This product has an issue detected related to higher than normal spending.

Rolling Spend Average: \$937



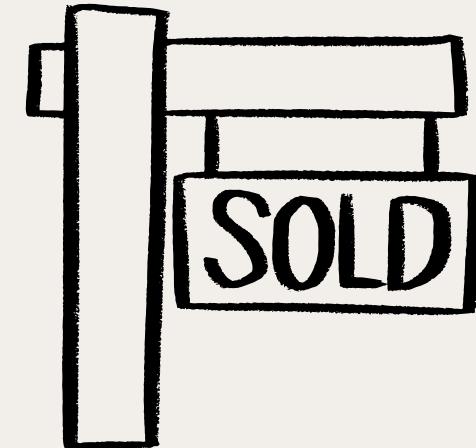
Future Improvements



**TRACK MONTHLY
PERFORMANCE TRENDS**



**AUTOMATE DATA
INGESTION & REPORTING**



Closing Remarks

A Final Wrap-Up and Conclusion



Why this is Important for NVR?



CLARITY



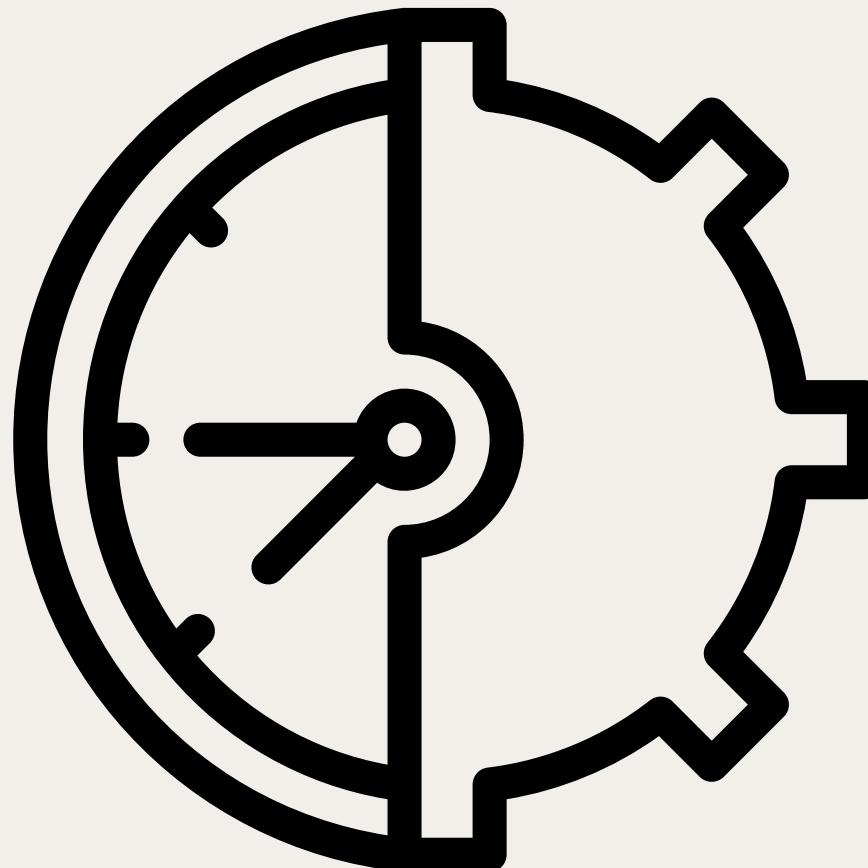
SPEED



ACCESS



Conclusion



Efficiency



Visibility



Cost Control

**And that's a wrap...
Consider this project move-in ready!**

Thank you for listening!

Questions?