Car Sales Trend Analysis

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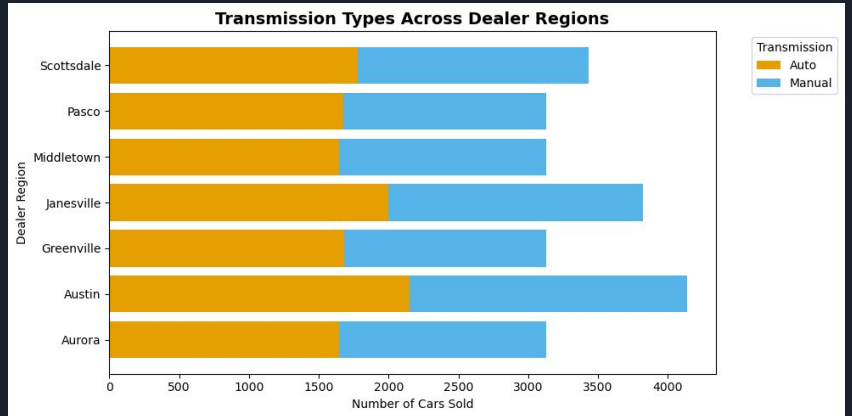
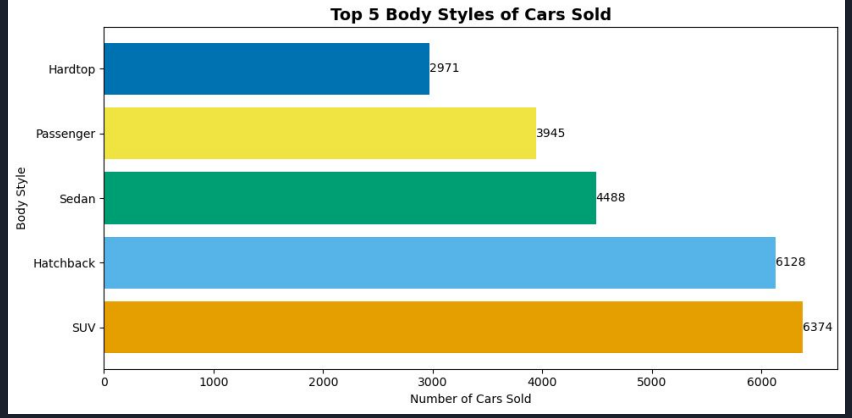
Objectives

Our goal was to uncover meaningful insights from the car sales data, using data cleaning, exploratory data analysis, and machine learning models.

We wanted to answer three main questions:

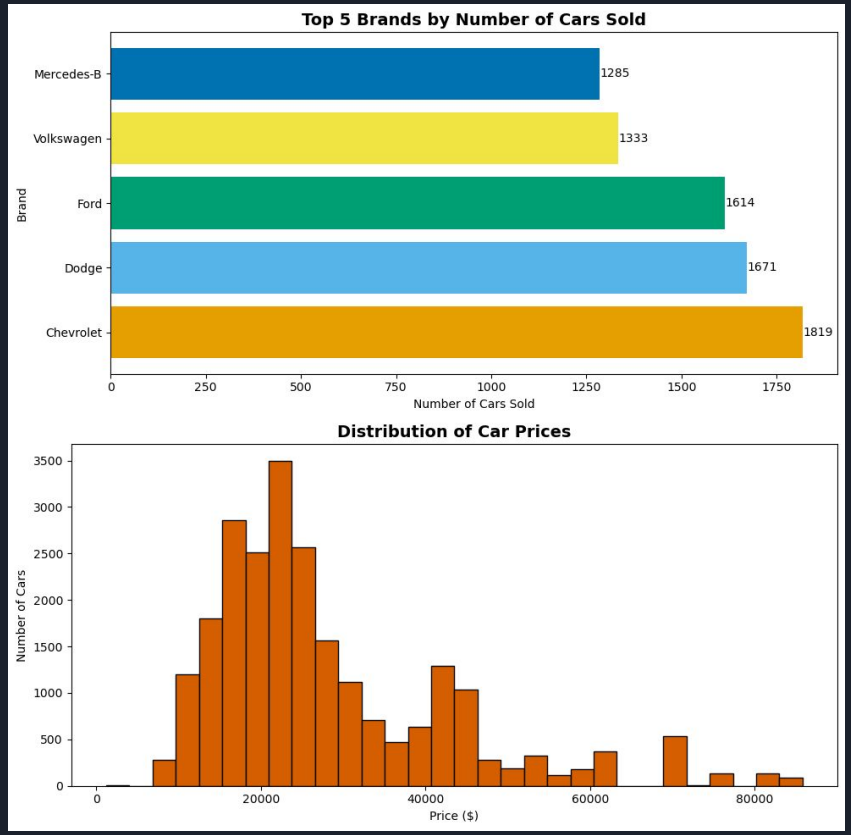
- What types of cars are most popular?
- Which customer segments buy which types of cars?
- Can we predict future sales trends reliably?





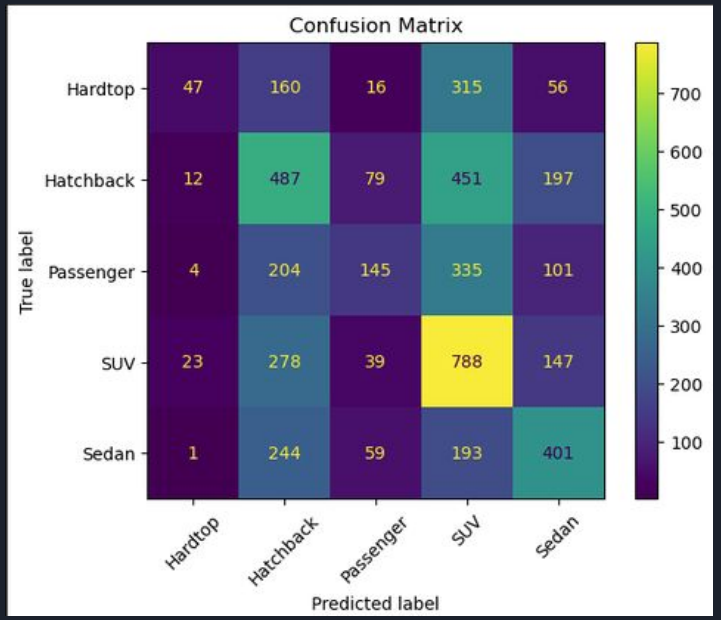
Data Key Insights

- SUVs and Hatchbacks dominate – especially in mid to high income segments.
- Automatic transmissions dominate across all regions.
- Car price strongly correlates with customer income – higher income, higher price.
- Some models like Hardtop and Passenger underperform and may need to be re-evaluated.



Methods - Logistic Regression

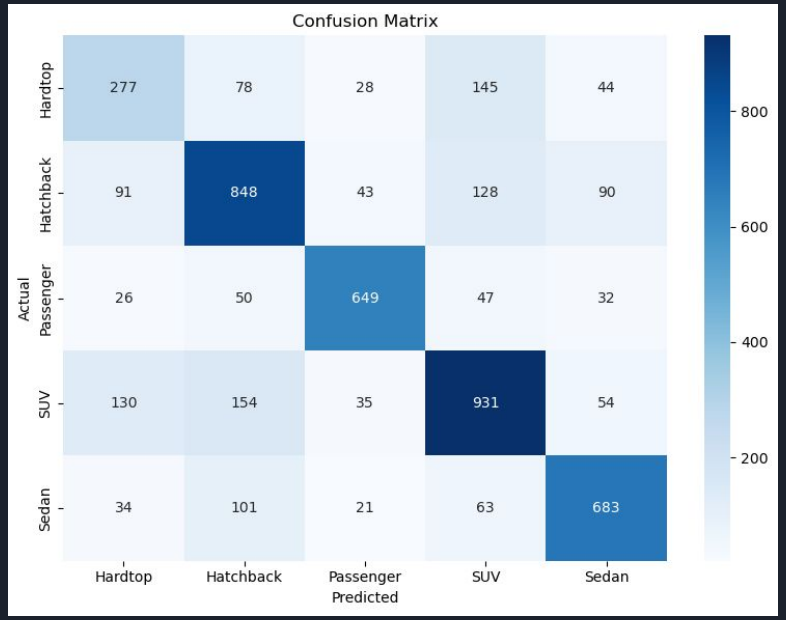
- Classified car types using structured features (Company, Price, Transmission, etc.)
- Model Accuracy: 39%, best F1 scores for SUV and Sedan
- Logistic regression was limited by class overlap and feature sparsity



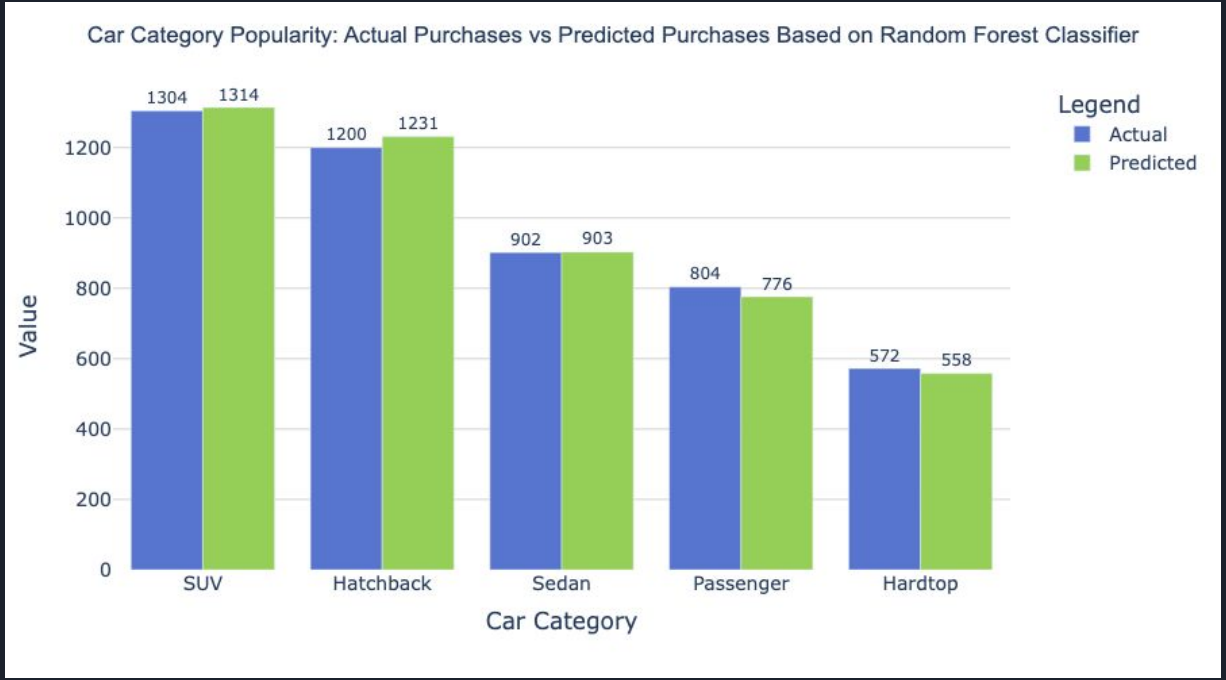
Methods - Random Forest Classifier

- Type: Ensemble learning algorithm that builds multiple decision trees
- Model non-linear relationships between features
- Strength: Performance & Complexity (Ave Accuracy: 71%)
- Trade-off: Interpretability

The model is promising and valuable as a decision-support tool. Continuous improvement is critical.



Car Sales Trend Based on Prediction



Team-Specific Recommendations

- Sales Team:
  - Focus inventory and promotions on SUVs, Hatchbacks and Passenger. And avoid overstocking niche models.
- Marketing Team:
  - Run targeted campaigns emphasizing top categories.
- Product Management:
  - Continue improving SUV models and revisit low-demand products.
- Executives:
  - Reliable forecasts allow confident investment planning. Future enhancements can include additional features like marital status or end-owner details.

Conclusion & Next Steps

In short, our data-driven approach can empower all stakeholders to make more accurate, confident decisions. Therefore, our next steps would be:

- Predict “best-seller” car models.
- Estimate car pricing based on detailed features.
- Analyze popularity by region using deeper segmentation.

Thank you for your attention!