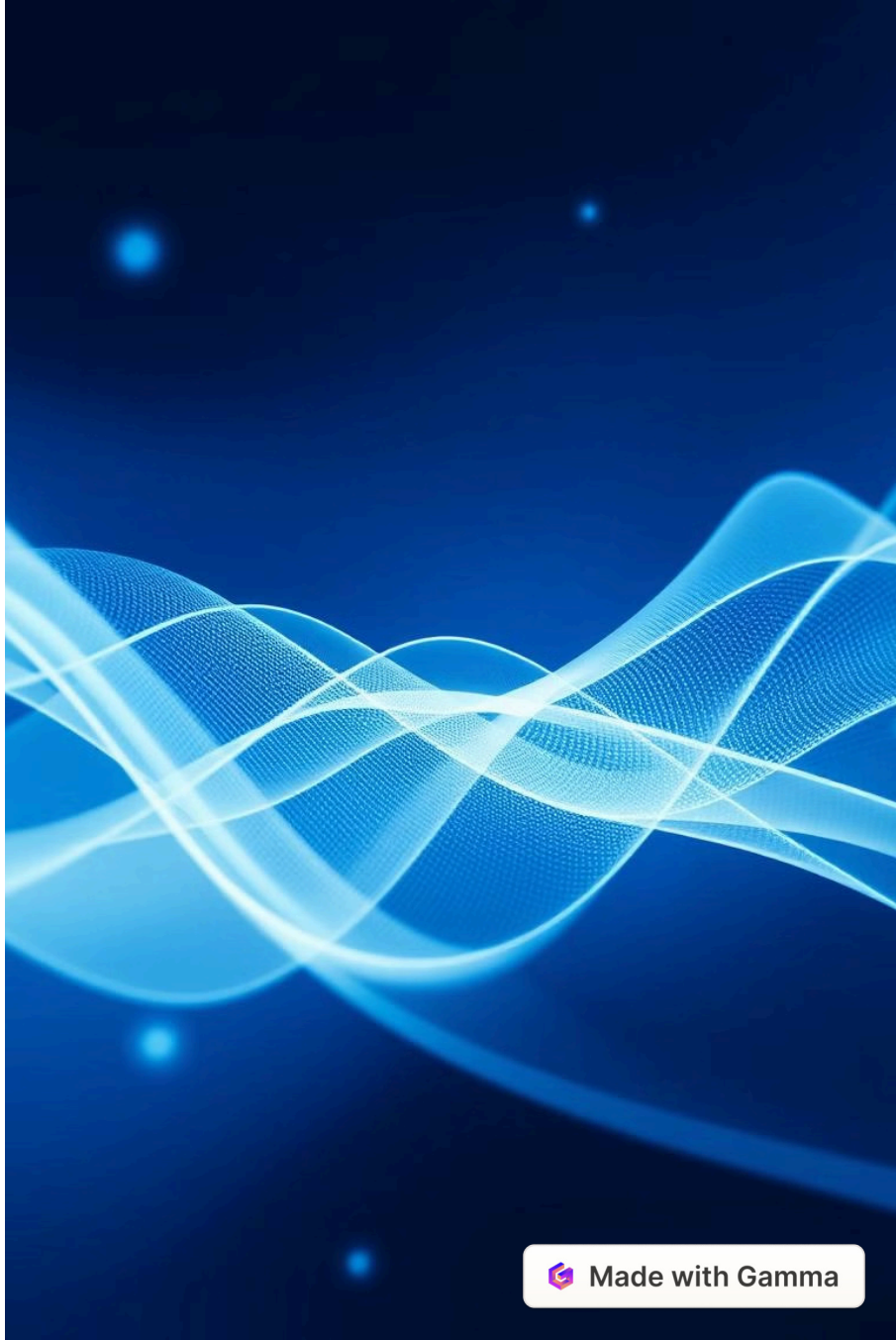
Store Sales Analysis and Forecasting

This presentation explores the insights gained from Exploratory Data Analysis (EDA) and Autoregressive Integrated Moving Average (ARIMA) modeling applied to store sales data. We'll delve into key findings, model performance, and actionable recommendations for optimizing future sales.



Objective and Dataset

Goal

Analyze sales trends using EDA and forecast future sales using ARIMA modeling.

Dataset

Contains holiday-related information and sales data. Key columns include type, locale, description, sales, and transferred.

Exploratory Data Analysis (EDA)

1 **Missing Values**

Identified and handled missing values using forward fill.

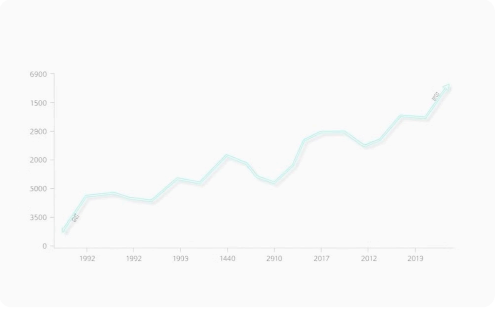
2 **Summary Statistics**

Performed summary statistics to identify key features.

3 **Visualizations**

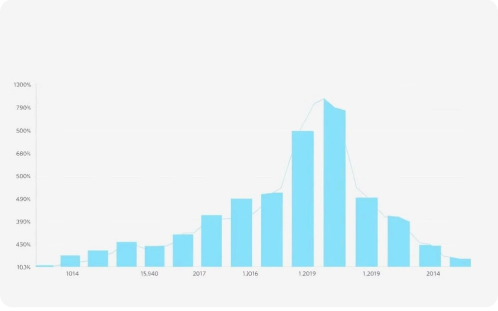
Created time-series plots, histograms, box plots, and seasonal decomposition for trends and seasonality.

EDA Visualizations



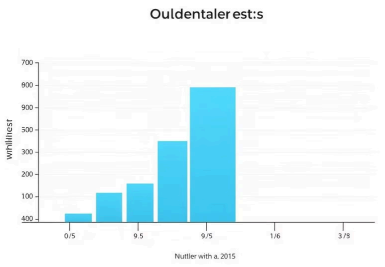
Time-Series Plot

Shows overall sales trends over time, highlighting peaks during holidays.



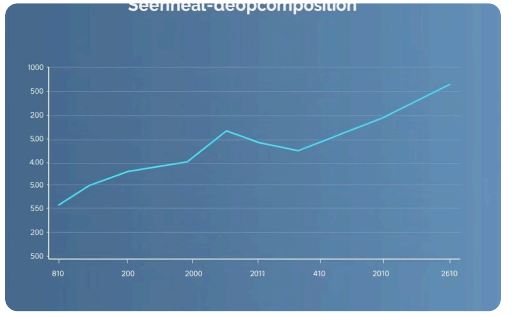
Histogram

Highlights the sales distribution, revealing its range and concentration.



Box Plot

Identifies outliers or unusual spikes in sales data.



Seasonal Decomposition

Observed consistent patterns, such as spikes during specific holidays.

ARIMA Modeling Approach

Data Preparation

Performed the Augmented Dickey-Fuller (ADF) test for stationarity and applied differencing to make the data stationary if needed.

Model Selection

Used Autocorrelation Function (ACF) and Partial Autocorrelation Function (PACF) plots to select parameters for ARIMA (p, d, q).

Model Evaluation

Evaluated the model using Root Mean Squared Error (RMSE) and Mean Absolute Error (MAE) to assess its accuracy.

Forecast

Predicted sales for the next 10 days.

ARIMA Results

ARIMA(1..

Model Parameters

The ARIMA model parameters were determined based on the ACF and PACF plots.

12.45

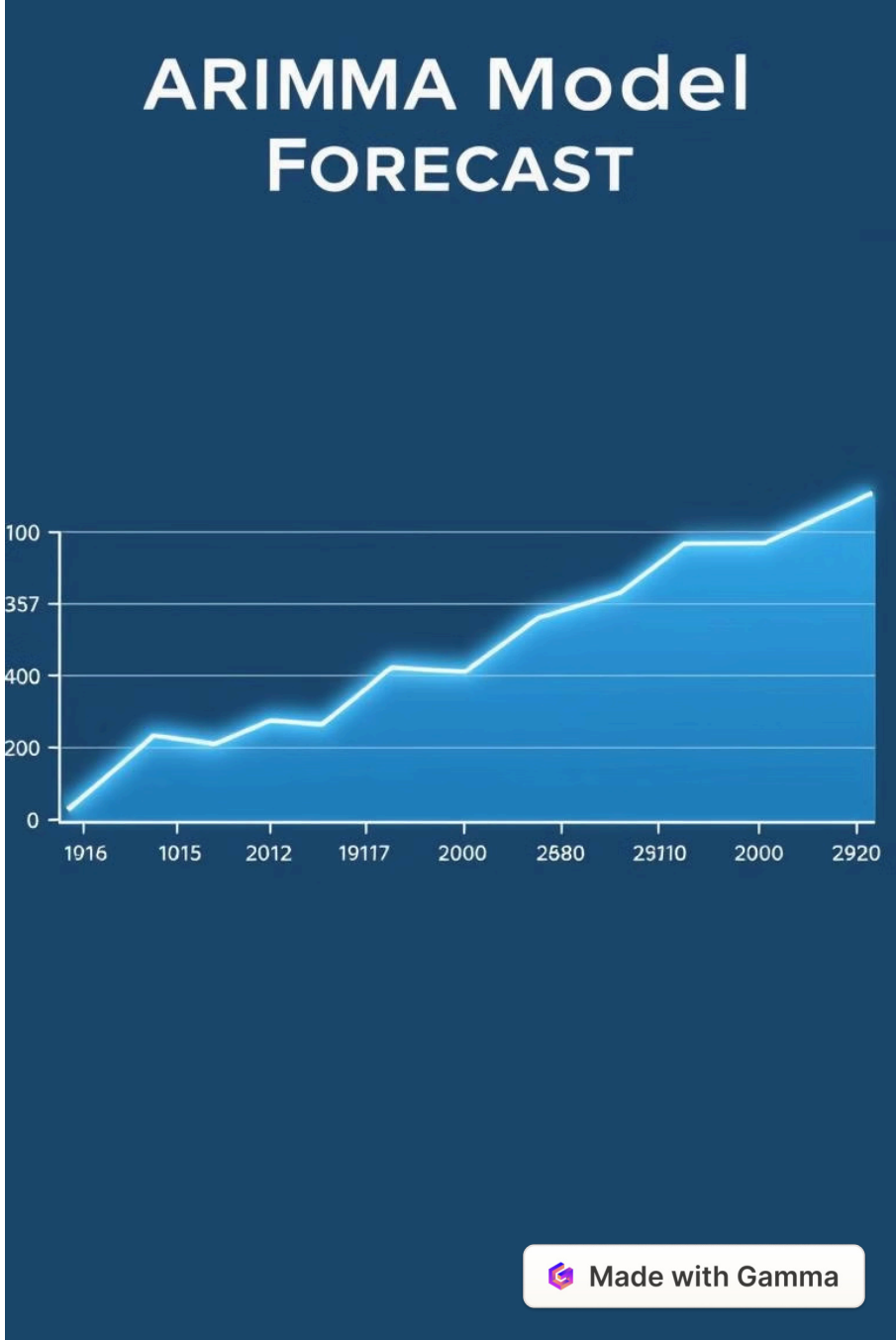
RMSE

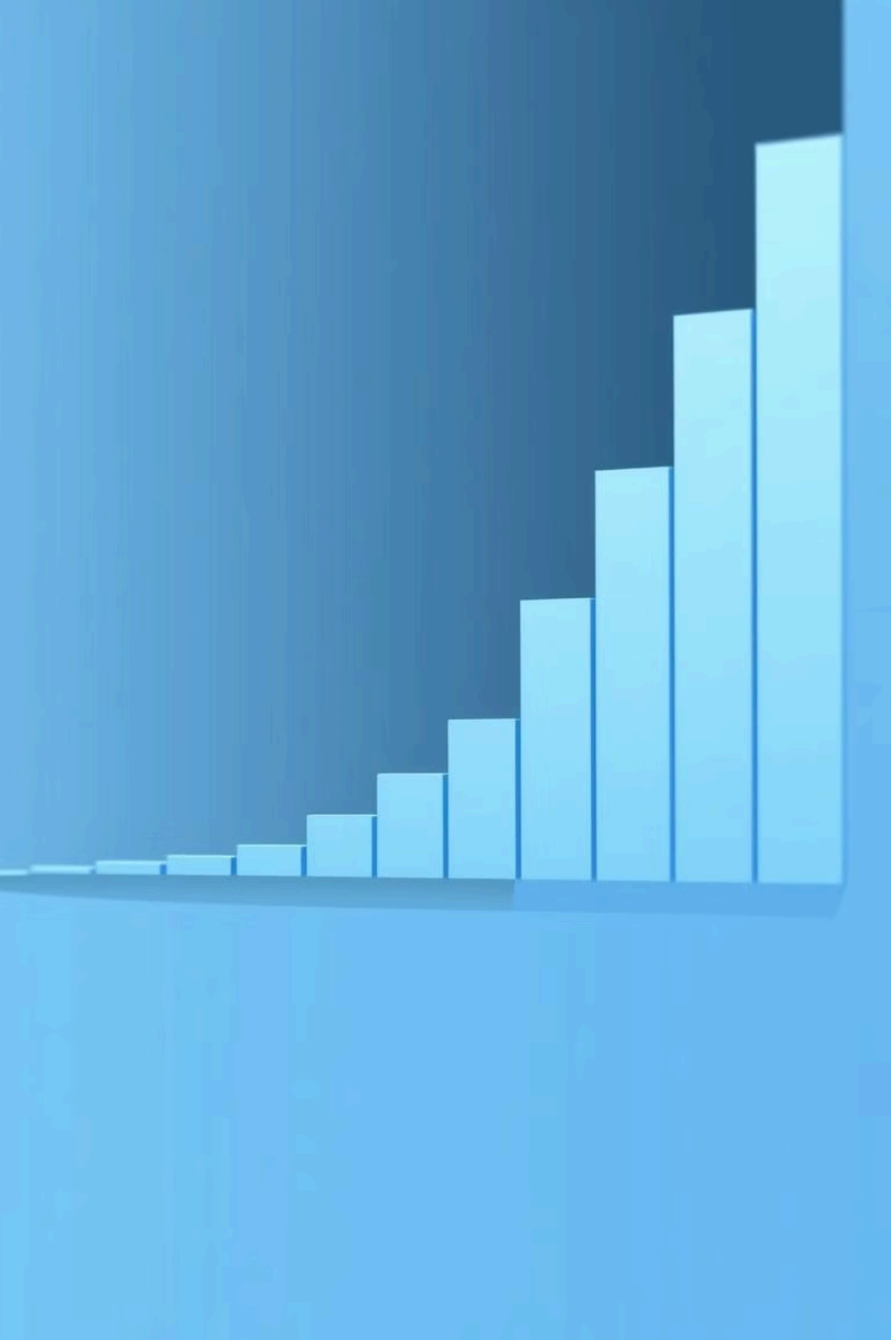
The RMSE measures the model's accuracy in predicting actual values.

9.35

MAE

The MAE represents the average magnitude of errors.





Key Insights and Recommendations

EDA Findings

Sales trends vary based on holiday types and regions, with peaks during holidays like "Carnaval" suggesting seasonality.

ARIMA Forecast

Forecasted values align well with observed trends, providing valuable insights for planning future inventories during holiday seasons.

Recommendations

Leverage forecast data to optimize inventory management and focus marketing efforts on high-sales periods.

Future Work

Advanced Forecasting

Explore advanced forecasting methods like SARIMA or machine learning models.

Additional Datasets

Utilize additional datasets like promotions or weather data for enhanced insights.

Automated Dashboard

Develop an automated dashboard for continuous analysis and monitoring of sales trends.

Conclusion

EDA revealed meaningful patterns in sales data, while ARIMA provides a reliable method for short-term forecasting. By leveraging these insights, we can optimize inventory management and marketing strategies to maximize sales during peak holiday seasons.

Thank You!

Thank you for your time. We welcome any questions or discussion. Please feel free to contact us for further information.