

# Multi-Agent Data Analysis Report

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## Executive Summary

Processed dataset with 153 rows and 7 columns.

## Insights

### ***Key Findings***

- Detected 11 anomalies across numeric columns.
- customers important (score=0.297)
- satisfaction important (score=0.252)
- sales important (score=0.237)

### ***Recommendations***

- Investigate outliers for data quality or business trends.
- Leverage top features to improve predictive modeling and decision-making.

## Agent Execution Summary

Agent	Status	Execution Time (s)
Data Cleaning Agent	SUCCESS	6.920
EDA Agent	SUCCESS	4.333
Anomaly Detection Agent	SUCCESS	0.013
ML Agent	SUCCESS	5.942

### Insights Agent

The Business Insights Agent consolidates outputs from all other agents, transforms them into actionable findings, and generates recommendations. It acts as the decision-making layer of the pipeline, summarizing complex analyses into clear business-focused insights.

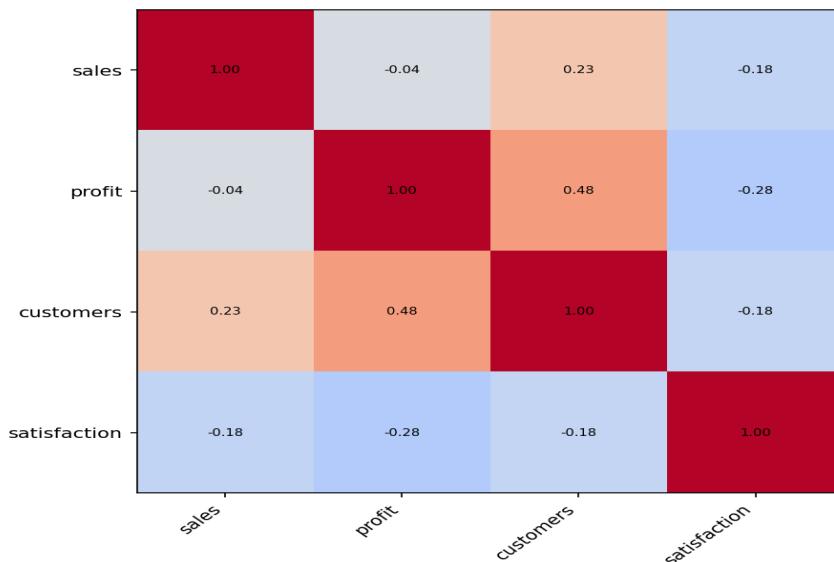
### Data Cleaning Agent - Results

This agent focuses on data preparation and quality assurance within the pipeline. It performs crucial tasks such as handling missing values, resolving format inconsistencies, and standardizing data types. Its purpose is to deliver a clean, reliable dataset, thereby ensuring the accuracy and validity of subsequent analyses. Ultimately, this agent minimizes errors and maximizes the value derived from the data.

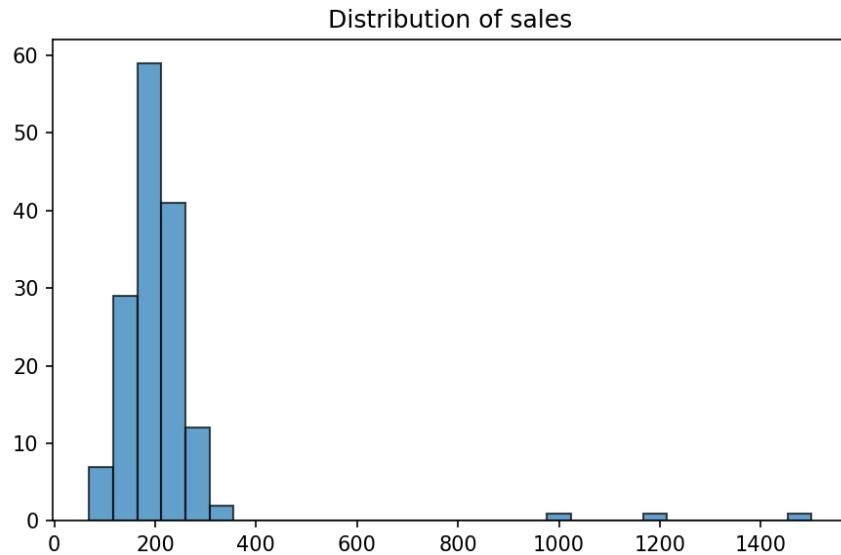
### EDA Agent - Results

The EDA Agent performs exploratory data analysis to uncover hidden patterns and insights within the dataset. It generates statistical summaries and visualizations to reveal data structure, relationships, and distributions. Identifying trends, correlations, and potential quality issues is also a key function. This agent provides critical information for informed decision-making in subsequent stages of the data analysis pipeline.

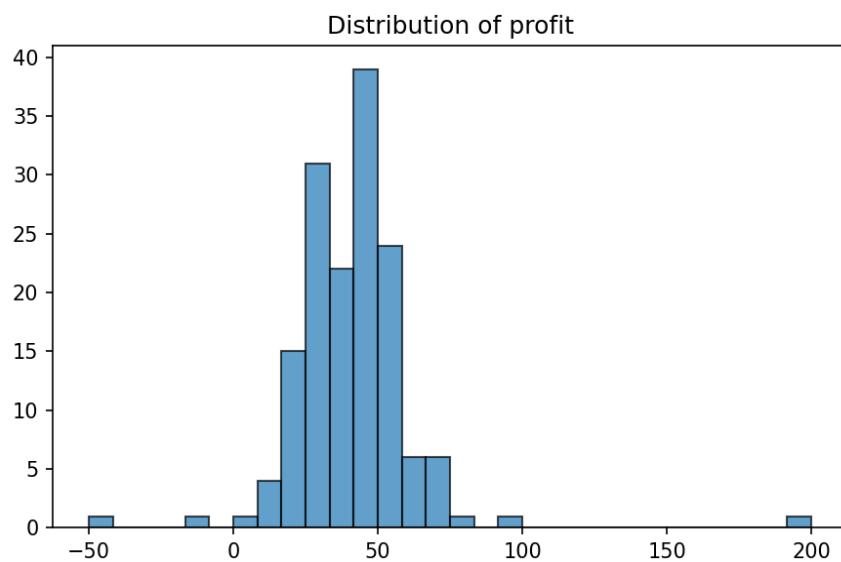
#### *correlation\_heatmap*



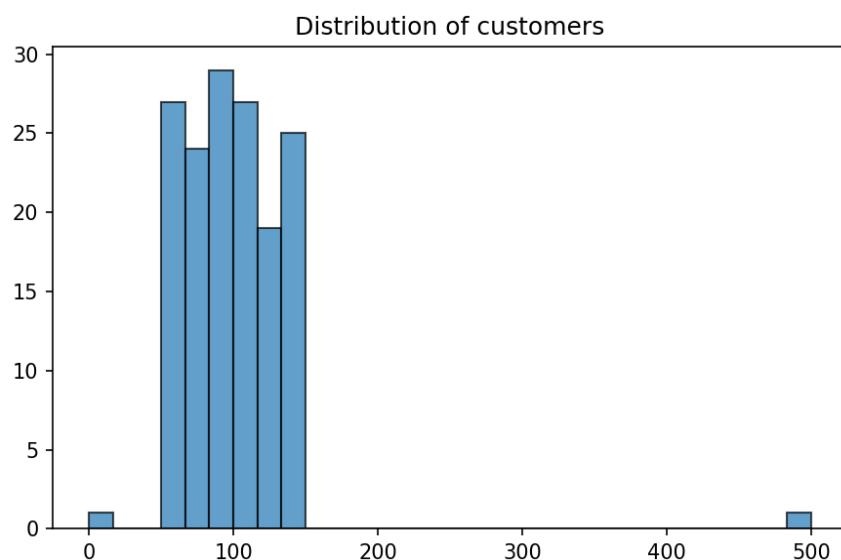
#### *distribution\_sales*



***distribution\_profit***



***distribution\_customers***



## Anomaly Detection Agent - Results

This agent focuses on outlier detection and data quality monitoring within the pipeline. It performs anomaly detection using IQR-based statistical methods, flagging potential errors or noteworthy events in the data. The agent's purpose is to identify unusual patterns that may indicate data quality issues or significant occurrences. Its output provides a summary of detected anomalies, including the affected features and their corresponding counts.

### ***Anomaly Summary:***

- sales: 5 outliers (3.27%)
- profit: 4 outliers (2.61%)
- customers: 1 outliers (0.65%)
- satisfaction: 1 outliers (0.65%)

## ML Agent - Results

This ML Agent focuses on predictive modeling and feature analysis within the data pipeline. It performs baseline model training and calculates feature importance scores to identify key predictive patterns. Its purpose is to reveal the underlying drivers of the target outcome. Ultimately, the agent delivers a ranked list of features, enabling data scientists to prioritize variables for further investigation and model refinement.

### ***Top Features:***

- customers: 0.2965
- satisfaction: 0.2519
- sales: 0.2366
- date: 0.1301
- region: 0.0443
- category: 0.0406