

# 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.
- profit important (score=0.563)
- customers important (score=0.225)
- satisfaction important (score=0.088)

### *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	9.548
EDA Agent	SUCCESS	5.057
Anomaly Detection Agent	SUCCESS	0.013
ML Agent	SUCCESS	6.398

### 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.

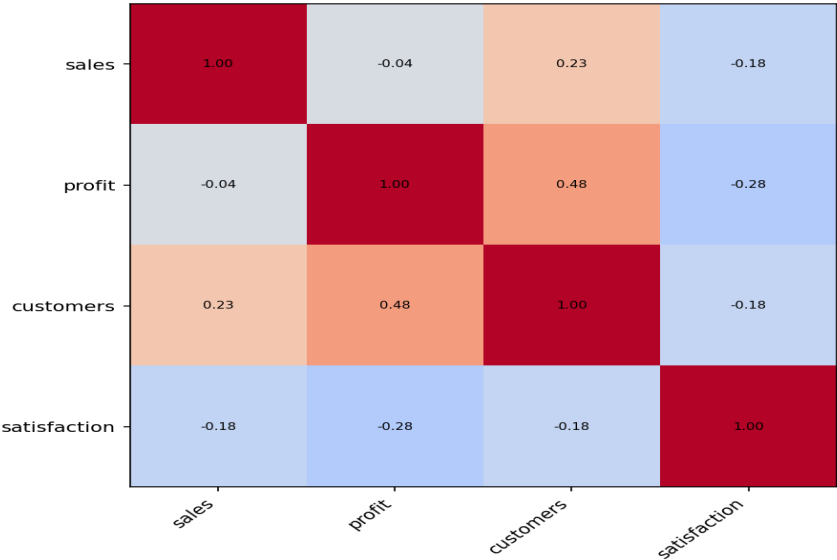
### Data Cleaning Agent - Results

This agent focuses on data preparation and quality assurance within the pipeline. It performs critical tasks such as handling missing values, resolving format inconsistencies, and removing duplicate records. The agent standardizes data types to ensure consistency and reliability. Its purpose is to provide a clean, analysis-ready dataset, minimizing errors and improving the accuracy of subsequent analytical processes.

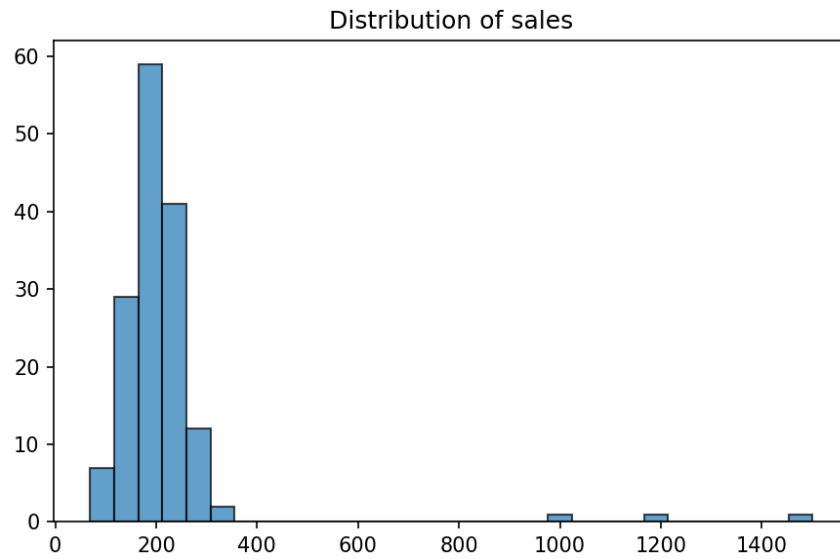
### EDA Agent - Results

The EDA Agent performs exploratory data analysis to uncover key patterns and insights within the dataset. It generates statistical summaries and visualizations to reveal trends, correlations, and distributions. Its purpose is to provide a comprehensive understanding of the data's structure and relationships. Ultimately, this agent identifies potential data quality issues, informing subsequent data processing steps.

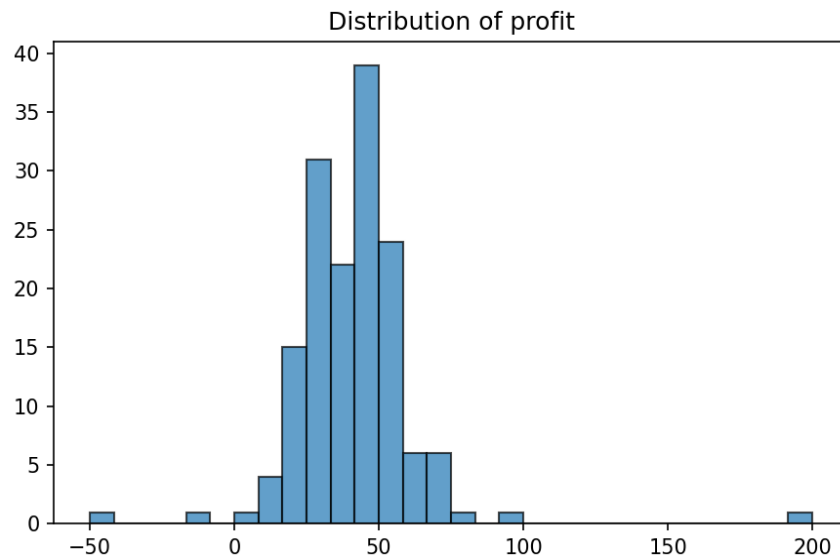
#### *correlation\_heatmap*



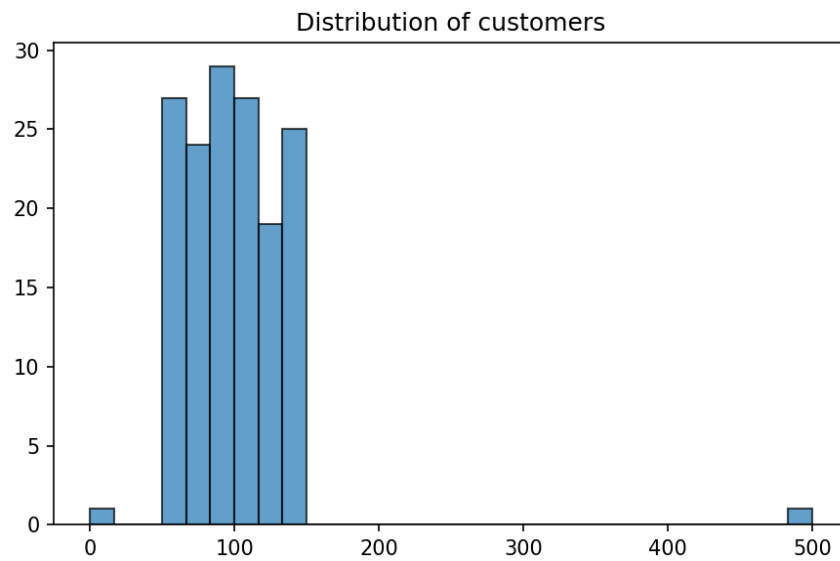
#### *distribution\_sales*



***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 pipeline. It performs baseline model training and calculates feature importance scores to identify key predictive patterns. The agent's purpose is to reveal the underlying drivers of the target outcome. Ultimately, it outputs a ranked list of features, enabling informed decision-making based on data-driven insights.

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

- profit: 0.5629
- customers: 0.2253
- satisfaction: 0.0878
- date: 0.0520
- category: 0.0431
- region: 0.0290