# Jaguar and Panther Statistical Analysis

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## Introduction

This report provides a summary of the results of the recent statistical analysis that has been done for the performance data of both Jaguar and Panther equipment. It includes boxplots for visualization and comparison, data summary table for an organized data, and manual calculation of the following:

- Mean
- Median
- Mode
- Range
- Variance
- Standard Deviation
- Coefficient of Variation

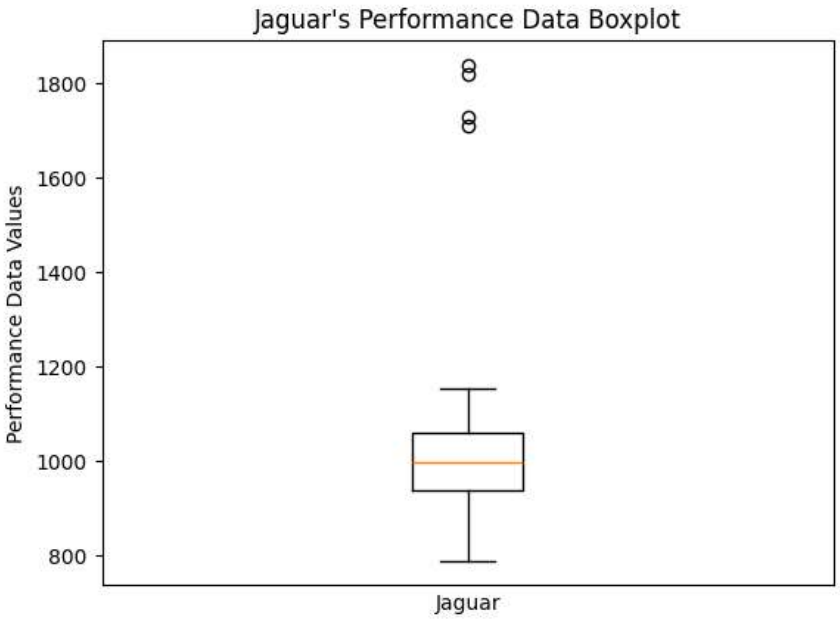
Additionally, results were calculated using manual calculations and was verified using python programming language to ensure accuracy of values and eliminate errors.

## Data Summary Table

| | Lot_No | Jaguar | Panther |
|---|---|---|---|
| 0 | 1 | 997 | 1035 |
| 1 | 2 | 1153 | 975 |
| 2 | 3 | 920 | 982 |
| 3 | 4 | 1074 | 1038 |
| 4 | 5 | 1013 | 891 |
| 5 | 6 | 960 | 907 |
| 6 | 7 | 890 | 960 |
| 7 | 8 | 910 | 978 |
| 8 | 9 | 944 | 1041 |
| 9 | 10 | 1065 | 1026 |
| 10 | 11 | 1083 | 590 |
| 11 | 12 | 1820 | 990 |
| 12 | 13 | 859 | 1076 |
| 13 | 14 | 1043 | 1092 |
| 14 | 15 | 1710 | 1026 |
| 15 | 16 | 933 | 935 |
| 16 | 17 | 790 | 1710 |
| 17 | 18 | 999 | 946 |
| 18 | 19 | 1028 | 1073 |
| 19 | 20 | 976 | 986 |
| 20 | 21 | 1015 | 1078 |
| 21 | 22 | 932 | 969 |
| 22 | 23 | 957 | 1083 |
| 23 | 24 | 936 | 790 |
| 24 | 25 | 977 | 1007 |
| 25 | 26 | 1037 | 934 |
| 26 | 27 | 997 | 999 |
| 27 | 28 | 1730 | 1011 |
| 28 | 29 | 1046 | 942 |
| 29 | 30 | 1840 | 1090 |

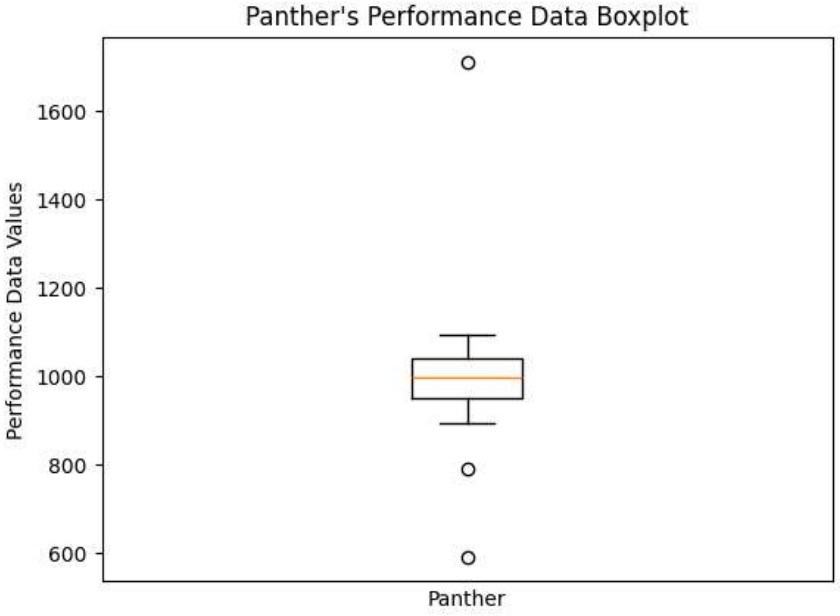
## Descriptive Statistics

### Jaguar Equipment

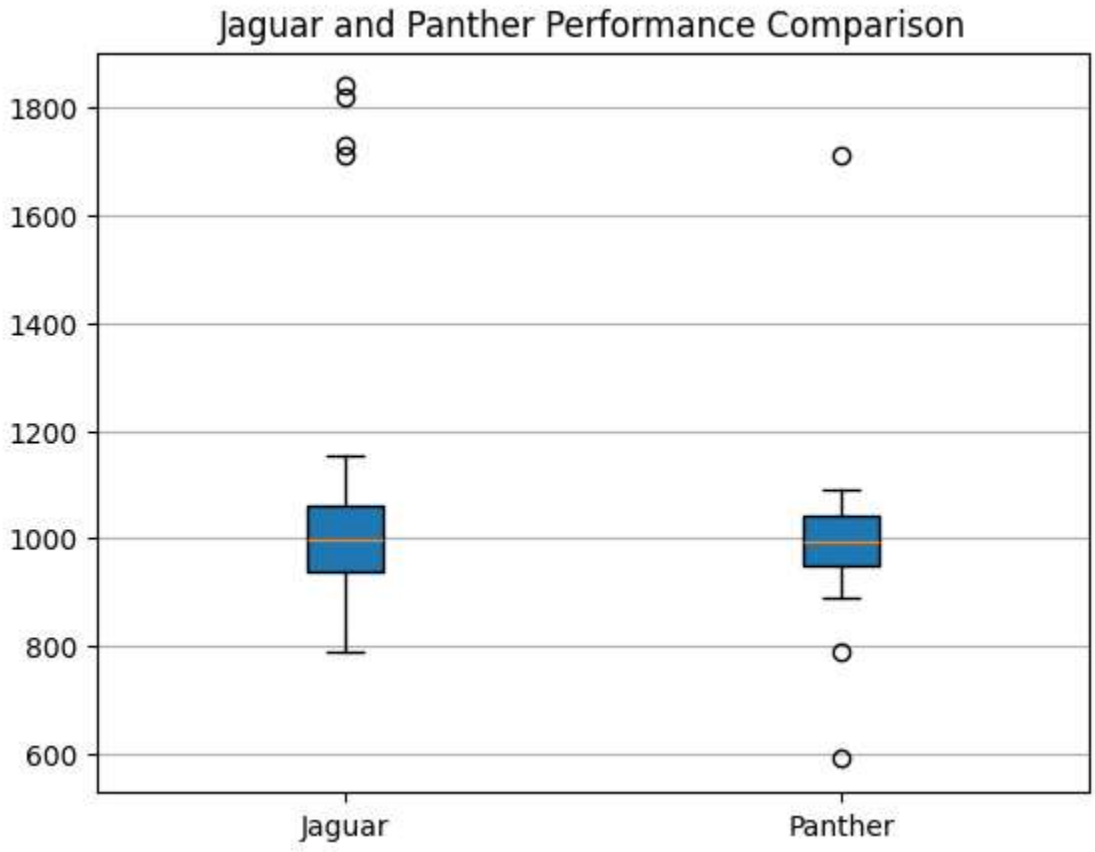



| | |
|---|---|
| Mean | 1087.8 |
| Median | 998 |
| Mode | 997 |
| Range | 1050 |
| Variance | 80749.82 |
| Standard Deviation | 284.17 |
| Coefficient of Variation | 0.2612 / 26.12% |

### Panther Equipment




| | |
|---|---|
| Mean | 1005.33 |
| Median | 994.5 |
| Mode | 1026 |
| Range | 1120 |
| Variance | 27642.85 |
| Standard Deviation | 166.26 |
| Coefficient of Variation | 0.1654 / 16.54% |




**Observations**

Based on the calculated statistics and boxplots:

- The Jaguar device shows a wider range of performance data (range = 1050) compared to the Panther device (range = 1120), indicating more variability in its performance.
- Jaguar has a higher standard deviation (284.17 vs. 166.26), suggesting that its performance is less consistent than Panther's.
- The coefficient of variation for Jaguar is also higher (26.12% vs. 16.54%), reinforcing that Jaguar's performance is more variable relative to its mean.
- Panther's performance is generally lower but more consistent than Jaguar's, as evidenced by its lower variance and standard deviation.

**Calculations**

**Mean:**

**Jaguar**

$$997 + 1153 + 920 + 1074 + 1013 + 960 + 890 + 910 + 944 + 1065 + 1083 + 182 + 859 + 1043 + 1710 + 933 + 790 + 999 + 1028 + 976 + 1015 + 932 + 957 + 936 + 977 + 1037 + 997 + 1730 + 1046 + 1840 = 32634$$

$$\frac{32634}{30} = \mathbf{1087.80}$$

**Panther**

$$1035 + 975 + 982 + 1038 + 891 + 907\ 960 + 978 + 1041 + 1026 + 590 + 990 + 1076 + 1092 + 1026 + 935 + 1710 + 946 + 1073 + 986 + 1078 + 969 + 1083 + 790 + 1007 + 934 + 999 + 1011 + 942 + 1090 = 30160$$

$$\frac{30160}{30} = \mathbf{1005.33}$$

**Median:**

**Jaguar**

790,859,890,910,920,…,1820,1840

Middle values: 997 and 999

$$Median = \frac{997 + 999}{2} = \mathbf{998}$$

**Panther**

590,891,907,935,942,…,1078,1090

Middle values: 990 and 999.

$$Median = \frac{990 + 999}{2} = \mathbf{994.5}$$

**Mode:**

**Jaguar:** 997

**Panther:** 1026

**Range:**

*Range = Maximum – Minimum*

**Jaguar**

Range = 1840 – 790

= **1050**

**Panther**

Range = 1710 – 590

= **1120**

**Variance:**

$$\delta^2 = \frac{\sum(x_i - \bar{x})^2}{n}$$

**Jaguar**

$$(997 - 1087.8)^2, (1153 - 1087.8)^2, \dots, (1840 - 1087.8)^2$$

$$\delta^2 = \frac{\sum(x_i - 1087.8)^2}{30} = \mathbf{80749.82}$$

**Panther**

$$(1035 - 1005.33)^2, (975 - 1005.33)^2, \dots, (1090 - 1005.33)^2$$

$$\delta^2 = \frac{\sum(x_i - 1005.33)^2}{30} = \mathbf{27642.85}$$

**Standard Variation**

$\delta = \sqrt{\delta^2}$

**Jaguar =**

$\delta = \sqrt{80749.82} \approx \mathbf{284.17}$

**Panther =**

$\delta = \sqrt{27624.85} \approx \mathbf{166.26}$

**Coefficient of Variation**

$$CV = \frac{\delta}{X\ (mean)}(100)$$

**Jaguar =**

$$CV = \frac{80749.82}{1087.8}(100) \approx \mathbf{26.12}\%$$

**Panther =**

$$CV = \frac{166.26}{1005.33}(100) \approx \mathbf{16.54}\%$$