CNC Cost and Feature Analysis — Report

Overview

This report explores the relationship between part features and manufacturing cost in CNC machining. Using a dataset of 200 parts aimed to identify which factors most significantly impact the estimated production cost.

Key Findings

- **Part volume and cycle time** were observed to be important contributors to cost. Larger parts that take more time to machine generally cost more.
- **Feature count** (the number of design elements like holes, pockets, or slots) also plays a role, as it affects the complexity and machining time.
- Visual analysis suggested that cost distribution varies widely, and some parts clearly stand out as **outliers** in terms of cost—likely due to higher complexity or size.
- The **correlation heatmap** showed strong relationships between cost and several features like volume, length, and cycle time—indicating that these are reliable predictors of cost.

Conclusion

The analysis confirms what many in manufacturing already know: **larger, more complex parts with longer machining times cost more to produce**. This data-driven approach supports that intuition and provides a foundation for building cost estimation models but due to limited data the model’s efficiency is greatly limited.