



Manufacturing

CASE STUDY

Product Defect

Source: Generated by Adobe Firefly

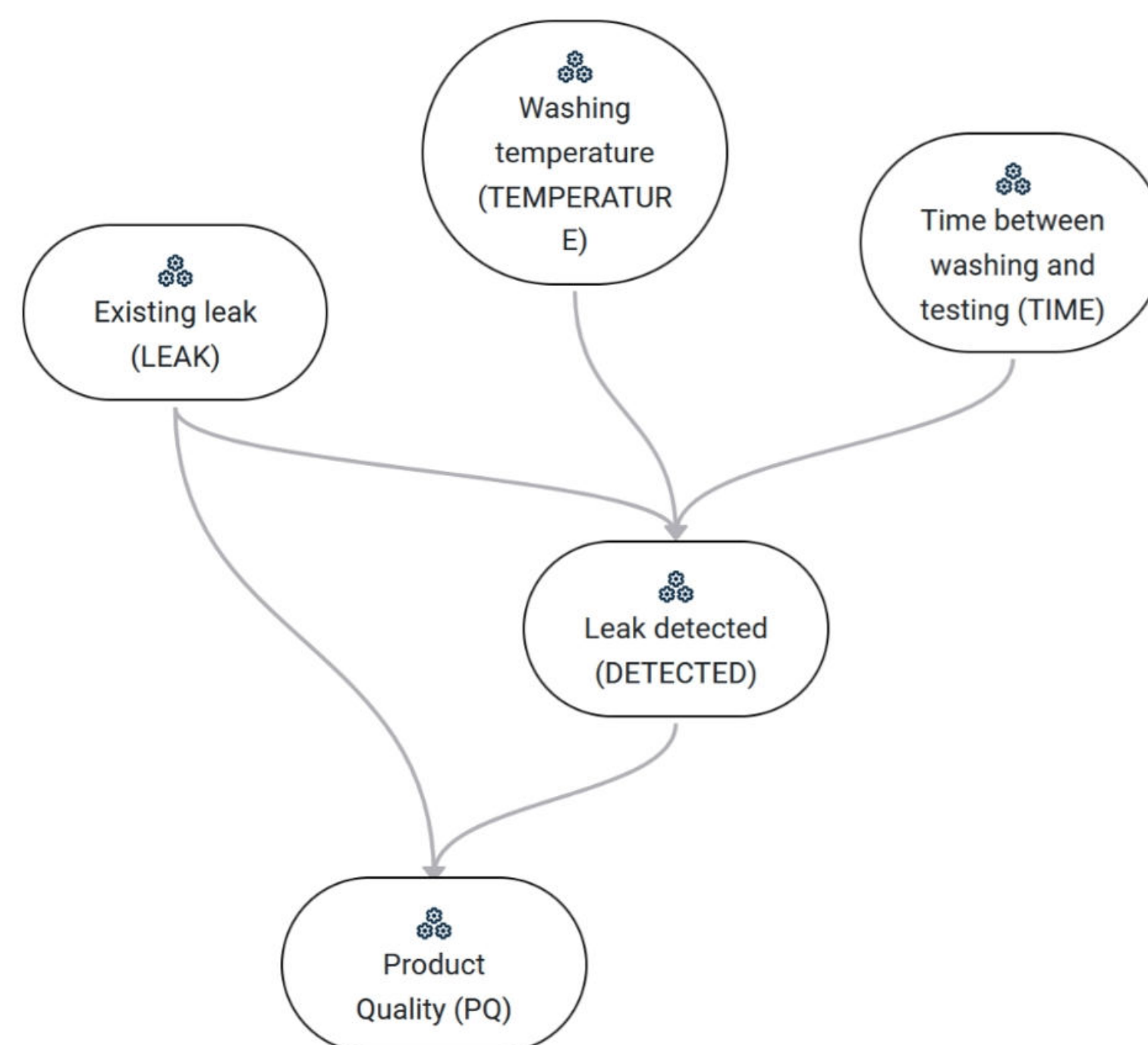
CHALLENGE

A major challenge in the manufacturing industry is ensuring high product quality, particularly for items requiring stringent testing protocols. In the case of producing cylinder head gaskets for machines, a key issue identified involves understanding how various factors, such as the time between washing and testing, washing temperature, and the detection of leaks, impact the overall quality of the product. The complexity arises in quantifying these relationships and using this understanding to reduce defects and improve quality.

APPROACH

To address this, an advanced causal model was developed using Whyond, focusing on the intricate relationships between different factors influencing product quality. The solution entailed:

- **Integration of Process Knowledge:** The model was informed by comprehensive knowledge of the manufacturing process, incorporating real-world data and expert insights to enhance its predictive accuracy.



- **Connections between Decisive Variables:** Key variables such as washing temperature are integrated to ensure accurate calculations and a comprehensive understanding of relationships among the influencing variables.
- **Extension to Predictions:** Moving beyond traditional AI's correlation-based predictions, Whyond delves into causal analyses, enabling a robust comparison of product quality. In addition, root cause analysis enables the identification of the strongest triggers of product quality problems. The following types of questions can be answered with Whyond.

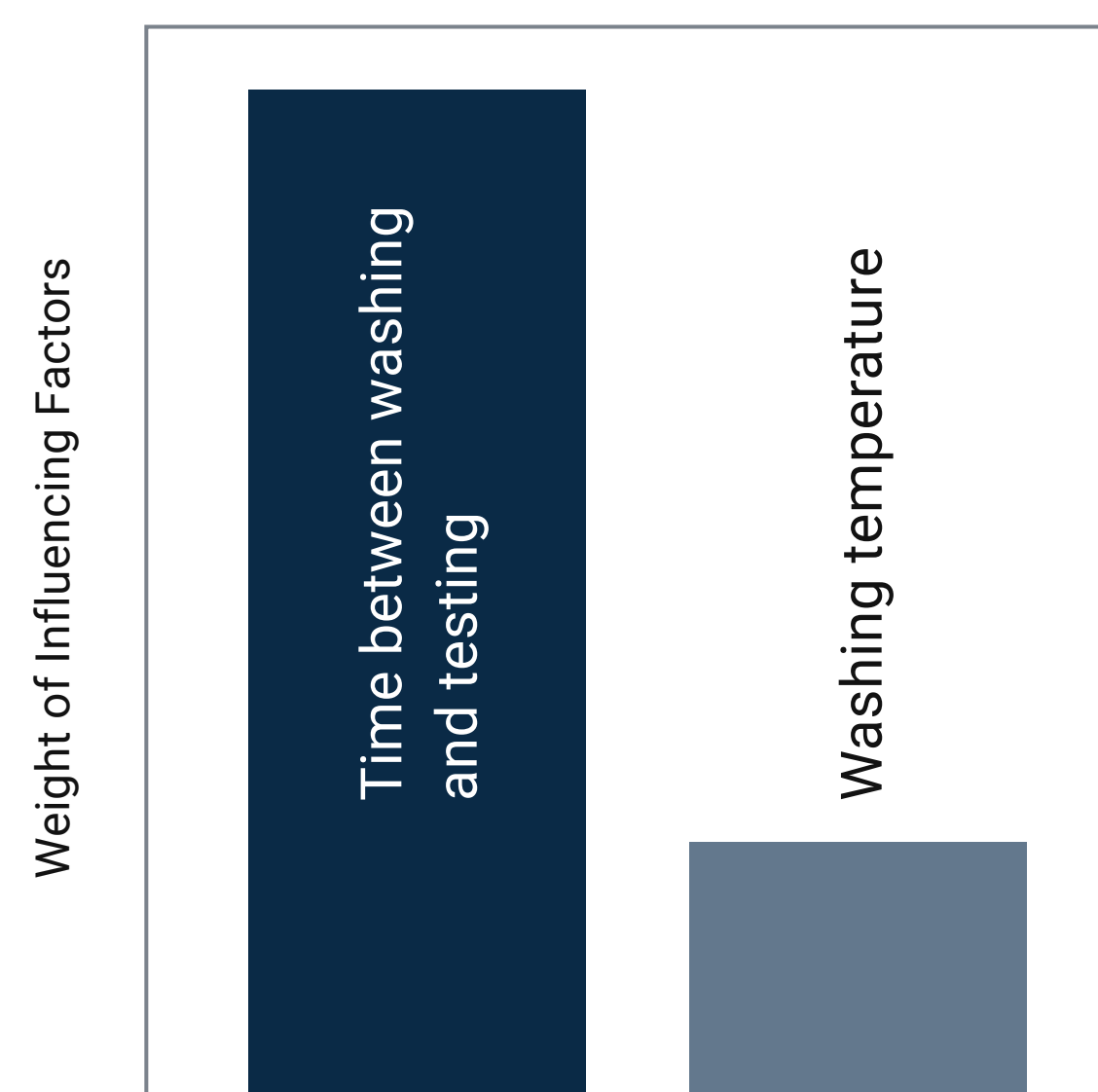
For example:

- How does the relationship between washing temperature, the time interval between washing and testing, and the occurrence of leaks relate with the overall product quality?
- In the case of poor quality, which variable had a stronger effect on the respective damages?
- What effect would altering the washing temperature have on product quality compared to changing the time interval between washing and testing?
- If the washing temperature had been different, would product quality have improved more than by adjusting the time interval between washing and testing?

IMPACT/OUTCOME

The application of Whyond yielded clear insights in what factors have how much in which influence on the final product quality. This insight helps manufacturers modifying the production process accordingly and significantly improving its outcome.

Result of Whyond's root cause analysis, show which variable had which influence on the lowered product quality.



By optimizing factors such as the timing, there was a measurable reduction in the rate of substandard goods, improving overall quality. Understanding the causal relationships helped streamline the testing process, reducing waste and increasing efficiency.