



AUTOMATED MACHINE LEARNING STREAMLINES ROOT CAUSE ANALYSIS

Root Cause Analysis (RCA) is critically important to the ongoing success of any manufactured product. Detecting design defects, raw material problems, build issues, and quality control shortfalls as early as possible fosters continuous product improvement, increased reliability and performance, and allows the company to maintain strong reputations for product brands.

RCA enables R&D personnel, purchasing agents, quality control inspectors, and the warranty team to find the fundamental cause of problems that may only become evident once products are in customers' hands. In addition to the benefits noted above, managing the RCA process properly will reduce the number and cost for warranty claims, improve profitability for the entire firm, and increase customer satisfaction.

Fix the Cause, Not the Symptoms

An RCA process will identify the fundamental causes of problems, not merely symptoms. Consider this hypothetical example: A manufacturer of cast metal parts experiences an excessive scrap rate. The proximate cause is determined to be contaminants in metal powders being fed into the casting machines; however, the root cause is a poor inspection process in the firm's purchasing and receiving operation. Correcting the problem requires improved documentation for the incoming raw materials inspection process and switching suppliers.

In order to be effective, RCA must be an ongoing, continuous process. Whenever problems are found, it's important to move quickly to define exactly what the problem is, gather as much relevant data as possible (including data from suppliers, the channel, and customers in many cases), separate symptoms from ultimate causes, and develop and test approaches to solve the problem. Finally, document and communicate the knowledge gained from each RCA process in order to reduce the time needed to correct similar problems that may arise in the future.

Maximize Business Impact: Focus on Critical Issues

In large manufacturing firms, there are typically thousands of components and finished goods that may suffer from quality problems of various types. Simply working on the most recently observed issues or the ones that are causing the most concern within the organization is not only impractical, it can also result in the most serious problems being ignored for too long. The "squeaky wheel" may not actually need grease and, in fact, it may be the road surface or the tire that is creating the issue. For this reason, prioritizing issues systematically is essential.

Machine Learning (ML) can streamline RCA prioritization with strategically-selected algorithms to recognize patterns, clusters, and trends in huge amounts of warranty claims, quality control,

CLEAN DATA MAKES IT
EASIER TO FIND CAUSES
FOR REPEATED PROBLEMS

MACHINE LEARNING
ALGORITHMS CAN SORT
AND CATEGORIZE ISSUES
AUTOMATICALLY

WEIGHTING ISSUES
USING THE RFM MODEL
ENSURES FOCUS ON THE
MOST CRITICAL ISSUES

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shipping, purchasing, and other data sets automatically. The analytics team can apply Recency, Frequency, and Monetary Value (RFM) criteria to weight the output of ML algorithms in order to ensure that issues that genuinely deserve high priority attention receive it. Further, ML tools can find how many small issues may be contributing incrementally to create what appears to be a single large problem.

Altair Data Analytics for Root Cause Analysis

Leveraging 30+ years experience in manufacturing and machine learning, Altair Data Analytics provides an automated, repeatable, and sustainable solution that is easy to deploy and supports the complete data lifecycle.

Altair enables manufacturing teams to access all the data they need, develop and use ML algorithms to detect and prioritize problems suitable for RCA, and visualize historical, current, and predicted future impacts of successful and unsuccessful RCA interventions.

Data Preparation: Access, cleanse, and format warranty and service utilization data from CRM, ERP, and systems managed by channel partners, as well as PDF and Excel reports and big data sources without any manual data entry or coding.

Machine Learning: Altair's industry-leading visual approach to data analytics enables businesses to build and deploy machine learning models in almost any analytic infrastructure. Altair's automated ML and explainable AI functions eliminate repetitive tasks, makes data scientists and business analysts more productive, and enables managers to create profitable, attractive service packs.

Streaming Analytics: Build stream processing applications and sophisticated analytical dashboards without writing any code. Solve difficult problems quickly, understand complex relationships in seconds, and identify issues requiring further investigation with just a few clicks.



A properly prioritized Root Cause Analysis process is essential in every manufacturing operation. It's never enough to know what the problems are; you must understand the causal relationships that create the problem so you can truly fix it once and for all."

Sam Mahalingham, CTO, Altair

Optimize the RCA modeling process using Altair® Knowledge Studio® to automate data mining, model building, and model comparison.

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