$6.9M PER YEAR THROUGH PREDICTIVE ANALYTICS FOR A LEADING AUTO MANUFACTURER

In the face of ever-changing consumer demand and economic uncertainty, operational excellence enabled by advanced analytics has become a key to success in the automotive industry. Uptake helped a leading auto OEM tackle the challenges of managing vast amounts of data from various systems and deployed Uptake Radar to create tangible value.

In order to improve its ability to make data-driven decisions, a large automotive manufacturer in the U.S. implemented Uptake Radar within its key production processes. The firm utilized the application in its press shop to benefit from the predictive power of pre-built data science models for stamping presses.

MACRO VIEW

Industry 4.0 is fundamentally changing how the world manufactures goods, and the automotive industry is at the forefront of this digital transformation. Today’s automotive manufacturers are no longer in a position to simply try out use cases. Firms are in a race to extract the most value from their process data in order to gain a competitive advantage. In an industry where it’s critical to drive cost productivity while improving product quality and to maintain the capacity for mass customization, whereby customized products are created using mass production techniques, the stakes have never been higher to unlock operational efficiencies using new technology.

MICRO VIEW

One of the world’s largest automotive manufacturers previously implemented new digital technologies in its downstream processes, including its paint shop and final assembly operations. However, the press shop—typically an overlooked area—remained a significant untapped opportunity for improving overall efficiency and driving additional cost savings.

The manufacturer searched for a solution that combined the best of traditional asset performance management (APM) and enterprise asset management (EAM) tools with powerful new data science capabilities. To make the most of available information, the manufacturer sought to aggregate data from its entire manufacturing and control system.
Uptake’s software was the ideal solution because of its unique ability to ingest and analyze data from multiple manufacturing data sources—in this case, from across the entire stamping process and from a wide array of data sources never before analyzed in aggregate—within a single platform for generating predictive insights.

**SOLUTION**

Uptake Radar improved the manufacturer’s process optimization by deploying data science models at the asset level, providing predictive analysis for each asset in the stamping process.

In this particular example, the manufacturer had a destacking robot plus five individual die set presses on a given line. Across those assets, Uptake aggregated data from:

- Programmable logic controller (PLC) alarms, events and sensor inputs
- Single variable threshold alarms or statistical process control (SPC) data
- Manufacturing execution system production orders and part number details
- Maintenance work order history

*By pulling all of this data from each machine on the customer’s line, Uptake was able to unlock a clear view of the whole line’s performance, including how one asset’s performance might be impacting the quality of another.*

Using both supervised and unsupervised machine learning methods, Uptake Radar generated insights from its anomaly detection and failure prediction engines. Those insights tied directly to improvements in the manufacturer’s machine availability, line performance, and process quality.

Importantly, Radar produced actionable insights for the customer based on real-time data directly within the application interface. Those insights helped the manufacturer’s operators and maintenance technicians identify opportunities for immediate improvements.

Each insight provided the customer details on why it was generated in the first place, plus the noteworthy trends hidden in the inputted data. Also included was the ability for the user to accept or disregard the insight, thus completing the closed feedback loop and allowing for continuous improvement through machine learning techniques.

In terms of operational visibility, the monitoring screen of Radar enabled the manufacturer to gain a single view of key metrics like total unplanned downtime, strokes per hour, first-pass quality, list of top alarms, and an overview of work orders for a given line.

The customer used this dashboard report to improve the efficiency of shift hand-offs and production meetings. By visualizing the insights harvested across available data sources, the report served as the one-stop-shop for quickly summarizing what happened during the previous run of a given part number, in addition to details on the downtimes, alarms, events and work orders that impacted performance.
PEAK TONNAGE DEVIATION — SIGNIFICANT DEVIATIONS
The manufacturer’s stamping press was equipped with four strain gauges — one on each corner — to measure press tonnage. Uptake developed a model that compares more than 250 data points per stroke to a controlled baseline, identifying deviations in peak tonnage values. Prior to Uptake’s model being implemented, the press shop was scrapping or salvaging more than 3,000 panels per year; the model’s insights reduced that scrap by more than 30%. What’s more, the tonnage deviations were found to be indicative of catastrophic press failures, which Uptake’s models were able to predict in 9 out of every 10 instances, allowing the manufacturer to achieve an estimated $6.9 million cost avoidance across the manufacturer’s deployed sites by repairing the press before failure.

PEAK TONNAGE DEVIATION — DECREASING TONNAGE
Uptake’s multivariate model analyzed press tonnage and press shut height to uncover a consistently decreasing tonnage over time for specific part numbers. This decline was invisible to the human eye — for the manufacturer, any given production run appeared to be operating at consistent tonnage values. Uptake’s models combined hundreds of data points across multiple production runs to reveal that the shut height mechanism was actually faulty. This was determined to be the root cause of the accumulating defective parts. Armed with this insight, the manufacturer addressed the issue, and quality yield immediately improved.

HYDRAULIC PUMP AND CLUTCH BRAKE OIL LEAKS
It’s not out of the ordinary for stamping presses to leak oil. When it happens, it causes safety hazards in addition to indirect material and labor costs for the plant. Uptake’s oil leak model alerted the manufacturer to downward-trending oil levels and delivered an actionable insight to the maintenance team to investigate. The team found that the visual oil indicator was being ignored, and that the internal oil level gauge was broken. Operators had been refilling the oil on a weekly basis without solving the root cause, and as a result the manufacturer was losing 23 gallons of oil per week while the problem persisted. Uptake’s actionable insight proved effective at uncovering and resolving the root cause, ultimately reducing indirect material waste by 90% over the 12-month period.

RARE ALARMS
Data overload and nuisance alarms were becoming a problem for the customer’s maintenance team. As the manufacturer connected more assets and set more alarm thresholds, its maintenance team was having to filter through thousands of machine alerts each day. Operators would either ignore the alarms or set thresholds well above (or below) the range of advanced warning. Uptake’s rare alarms model automated the noise filtering — identifying the alarms that are statistically rare and critical to process performance — delivering actionable insights with enough lead time to get ahead of the issue. Instead of passively monitoring a dashboard of alarms by machine, the maintenance team could now manage alarms by exception — only investigating the actionable insights — which significantly improved maintenance technician efficiency.

9/10
Catastrophic press failures predicted by Uptake’s models

90%
Reduction in indirect material waste over 12-month period
Case Study: Manufacturing

RESULTS

Over a 12-month period, Uptake Radar drove more than $160,000 in incremental direct cost savings per stamping line through a combination of throughput improvement and reductions in variable operating costs.

In addition to the direct cost savings delivered to the manufacturer, Radar increased rated capacity by 1.6% per line per year as a result of improved machine availability, efficiency, and quality yield. The manufacturer can monetize this additional capacity as planned surge capacity with minimal overtime labor costs or use it to support future growth with minimal additional capital investment.

Uptake’s software was instrumental in transforming data from machines, events, work orders, and alarms into actionable insights that delivered real business value to the customer. Instead of just trying to improve operational efficiency generically, the customer was able to directly and specifically improve machine availability, process efficiency, and quality yield—all while achieving quantifiable cost productivity, improving overall process performance, and avoiding catastrophic failures.

Empower your team with data-backed recommendations that establish a learning culture, reduce variation and uncertainty, and inform smarter, safer decisions.

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