



Automated Machine Learning for Predictive Maintenance in the Government



When scheduling major overhauls and ordering parts for tanks, helicopters, aircraft, weapon systems or vehicles, it is common to use mean time to failure metrics and other heuristics. Traditional predictive maintenance processes require machines to be repaired at intervals based on time and usage. However, these methods still result in equipment failure, increased scrap rates, lost revenues and unhappy customers. The public sector can take advantage of machine learning (ML) and artificial intelligence (AI) to create models that test for critical component failures, ensuring better supply chain performance and proactively scheduled maintenance.

The Challenges of Machine Learning in Government

According to [Gartner Research](#), more than half of all data analytics projects aren't completed within budget or on time, or they fail to deliver expected results. Similarly, DataRobot sees that 90% of chosen models are never deployed across all industries, not just government agencies. There is a universal and critical need for clear executive sponsorship, direction, and expertise in data science. The executive component is especially difficult for the government, because deploying models for operational use nearly always involves coordination across the many departments within an agency or even across agencies. In addition, since there is fierce competition for data science talent across both the public and private sector, it is often difficult to attract and retain the best data scientists.

An AI Roadmap

DataRobot is fanatical about our customers' success. We work with our government clients to produce a clear roadmap, including use case workshops and getting models into production fast to ensure the success of your AI project. We remain engaged at every step along the way, assisting our customers as needed to help them make progress toward their AI goals.

Delivering the Power of Automated Machine Learning to Everyone

Automated machine learning reduces the time and level of expertise needed for agencies to move into artificial intelligence and machine learning. Automation delivers the power of machine learning to the domain experts who need it without having to learn a programming language or needing to hire cost-prohibitive data scientists. DataRobot is the leader in Enterprise AI and offers automated machine learning capabilities that are simple and safe to use, providing guardrails for less experienced users to ensure valid modeling results.

Automated Machine Learning for Predictive Maintenance

AI-based predictive maintenance uses a variety of data from IoT sensors embedded in the equipment, environmental data, and manufacturing operations data to determine which components should be replaced before they fail.

DataRobot customers use automated machine learning for predictive maintenance in the following ways:

CAUSE ANALYSIS

Government officials are challenged with time-consuming Failure Mode, Effects, and Criticality Analyses (FMECAs) and root cause analyses when parts failures occur. Failure modes can be modeled using DataRobot, and DataRobot can identify patterns in components' environments to provide more accurate predictions for the component lifespans. This can be used in accident analysis, industrial process control, labor optimization, etc. At a large materials manufacturer, root cause analysis using DataRobot's automated machine learning provided insights on fault attribution, reducing maintenance workload by an estimated 50% and reducing cost of goods sold (COGS) by an estimated \$375,000.



OPTIMIZING THE MIXING OF MATERIALS

Using automated machine learning, we can estimate in hours how often an airport runway needs maintenance or predict the strength of high-performance concrete or asphalt. Along with predicting the strength of the materials, we can use data to see how many airplane landings weaken the strength of the concrete or asphalt. The ability to control this process can minimize costs, since maintenance will only be done when necessary. At a civil engineering and construction company, DataRobot helped an R&D team leverage automated machine learning to predict the performance of concrete based on materials and conditions, accelerating the development of better mixtures.

FAULT DETECTION

For complex processes, detecting issues in supplier parts when they occur can be difficult and labor-intensive. Automated machine learning can learn to recognize issues from myriad inputs, reducing the need for human inspection and maintaining higher levels of uptime. At one heavy industry manufacturer, DataRobot's automated machine learning solution produced models that provided accurate fault alerts in machine components. If deployed, these alerts could produce an estimated 25% reduction in downtime and \$500,000 in savings annually.

ANOMALY DETECTION

Machine learning for anomaly detection includes techniques that provide a promising alternative for detection and classification of anomalies in equipment based on an initially large set of features. Human inspection is often insufficient or cost-prohibitive for detection of rarely seen troubles and defects. Using automated machine learning, DataRobot can recognize unusual patterns and trigger alerts to the relevant teams. DataRobot-developed anomaly detection models can be installed in a 24-hour monitoring solution that provides real-time alerts to engineers, reducing monitoring workloads and downtime. At one metal parts manufacturer, a DataRobot-developed solution was assessed to have the potential to save \$500,000 in cost savings per year, for just a single production line.

MAINTENANCE PREDICTION

DataRobot can predict the faulty parts of machines to optimize maintenance engineering cost and inventories. DataRobot provides not only the prediction but also the reason behind it, helping engineers act on the prediction. One energy utility manufacturer used DataRobot to train a model to predict faulty parts based on customer-provided information. The insights from this model increased the resolution rate for the first service visit from 15% to 60%, with an estimated savings of \$450,000 per year.

Contact the Public Sector sales team at DataRobot to learn more: public-sector@datarobot.com.