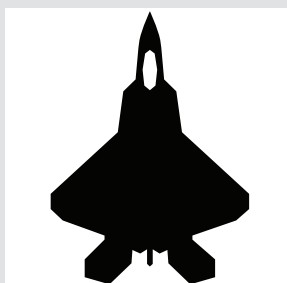
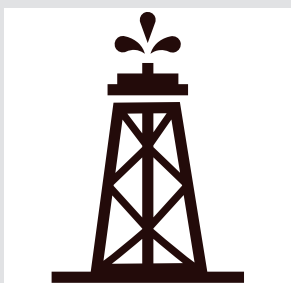




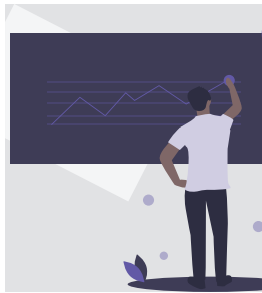
Kurvv

HOW KURVV DRIVES ADOPTION OF PREDICTIVE MAINTENANCE WITH MACHINE LEARNING



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Predictive maintenance, or the practice of using data to anticipate equipment failures, has become a tool that delivers meaningful time and cost savings for a wide range of businesses. With an ability to reduce breakdowns by an average of [70% and lower maintenance costs by an average of 25%](#), predictive maintenance is no longer an advanced R&D initiative considered only by early adopters. It is delivering real results for assets used in manufacturing, construction, industrial printing, oil and gas exploration, healthcare, defense and more.

At Kurvv, we continue to develop machine learning tools that can bring predictive maintenance capabilities to businesses of all sizes dedicated to improving their operations, even those with modest budgets or

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limited technical capabilities. Our solutions have also helped department leaders be recognized for bringing a new and valuable analytics-based practice into the company.

As the COVID-19 pandemic places new challenges on businesses of all types, those that adopt this valuable tool now will be better equipped to hit the ground running when global health and economic conditions improve.

HOW PREDICTIVE MAINTENANCE IS READY TO DELIVER BOTTOM-LINE RESULTS

Whenever a business makes an investment in equipment it must also

make a commitment to maintain that equipment. Asset failures can often be prevented by committing to a regular, pre-determined schedule of maintenance. This is the preventive maintenance that has been state-of-the-art for many years.

40% of scheduled maintenance costs are spent with negligible effect on uptime failure
30% of maintenance activities occur too infrequently
45% of all maintenance efforts are ineffective

But in many cases, the unique circumstances of how an asset is used will lead to faults happening unpredictably. In fact, only 18% of business assets have an age related failure pattern, and 82% of asset failures appear random, according to [according to IBM](#).¹ These faults can be enormously disruptive, as they can lead to unexpected downtime, broken timelines, idle employees, unhappy customers, and other competitive disadvantages.

For many organizations, especially those with high value assets, the maintenance strategies to prevent these disruptions introduce their own inefficiencies. [According to IBM](#):²

- 40% of scheduled maintenance costs are spent with negligible effect on uptime failure
- 30% of maintenance activities occur too infrequently
- 45% of all maintenance efforts are ineffective

In the case of predictive maintenance, advance analytics and data monitoring can more accurately discover patterns before failure occurs. This reliance on data about the actual use of an asset is why predictive maintenance is widely viewed as the lowest-cost approach to maintaining equipment operations. Today, thanks to a continuous improvement in monitoring and sensing technologies, the practice is becoming more accessible than ever.

Sensors made possible by the Internet of things (IoT), cloud, and machine learning technologies can now gather real-time data about asset temperature, vibration, location, energy usage, weather impacts, and countless other variables.

The cost reductions made possible by these technologies have pushed software providers that provide asset and equipment monitoring systems, like computerized machinery maintenance systems (CMMS) and/or Supervisory control and data acquisition (SCADA), for manufacturers to add predictive maintenance capabilities into their feature set.

¹ Source: IBM, Want to get more out of your asset management efforts? Time to include predictive maintenance, <https://www.ibm.com/downloads/cas/JPVYXV94>

² Ibid.

Manufacturers of high-end equipment are also providing their own monitoring systems that help them and their clients keep track of the condition of their equipment. These new data streams are being used to predictive breakdowns in advance to initiate maintenance before it occur, and also delay expensive maintenance that is unnecessary due to an asset's actual usage patterns.

These advances are now being used by businesses to detect defective products, recommend production optimization, monitor operations

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in real-time, predict the remaining usefulness of an asset, and identify the root causes of equipment failures that would otherwise lead to millions of dollars in losses.

[A recent position paper by Deloitte](#) captures how a predictive maintenance program can deliver a range of benefits, including:³

- 5-10% cost savings in operations
- 10-20% increase in equipment uptime and availability
- 5-10% reduction in overall maintenance costs
- 20-50% reduced efforts on maintenance time

Despite these benefits, a business that wants to adopt predictive maintenance must overcome a number of challenges:

- **Specialized skills are required:** Due to a limited talent pool, even firms with large software teams can find themselves without the data science skills required to rapidly deploy predictive maintenance solutions.
- **New assets need to be acquired:** In addition to data scientists, predictive maintenance may also require a new software platform, data center, or other capabilities that are difficult to implement.
- **Machine learning can be time-intensive:** Many machine learning consultants will require months or several quarters to build heavily customized prototype models that may not be able to handle the data a particular business is gathering.

³ Deloitte, Predictive maintenance: Taking pro-active measures based on advanced data analytics to predict and avoid machine failure, <https://www2.deloitte.com/de/de/pages/deloitte-analytics/articles/predictive-maintenance.html>

USING PREDICTIVE MAINTENANCE IN ANY BUSINESS ENVIRONMENT

At Kurvv we are offering businesses of all sizes a way to overcome these challenges. Our approach allows businesses to use the data they already have to quickly assess if predictive maintenance can be applied to their operations. If machine learning predictions can be made with the data we can deploy a solution for immediate use that can scale quickly, and drive bottom-line improvements.

In many cases, department leaders that bring these new machine learning solutions to their teams have earned recognition among their peers for improving operations. They are also being recognized by executive leadership for bringing new capabilities to the firm that are worth additional investment, simply because the ROI case can be easy to make once a few examples are in hand.

In one recent example, Kurvv worked with the maintenance division of a global manufacturer that provides customers with multimillion-dollar pieces of equipment critical to daily business operations. The division was seeking an efficient way to prototype and validate their vision of adding predictive maintenance into their solution without heavy

Kurvv's fast and low investment approach enabled the division leader to cut through the internal red tape quickly, and they were subsequently recognized for introducing a successful new initiative that grew to be strategic priority project for the entire company.

investments in time and resources.

They had an excellent team of software engineers that already built a solution that could monitor data coming from their equipment. But they didn't have the capability to apply machine learning models that could use the data to accurately predict failures. The division's team leader sought out Kurvv to discover an accessible way to get started.

As a first step, Kurvv deployed statistical analytic methods to the data to determine if machine learning tools could deliver meaningful predictions. Once this was confirmed, prototype machine learning models were developed to monitor and predict the behavior of a single piece of equipment.

When the model demonstrated it could make useful predictions, it was then expanded to use data from other pieces of equipment to predict their potential maintenance needs, too. This phased approach ensured the models could be scaled up across an entire line of assets with minimal disruption.

KurvV developed these models within a few weeks, and at a fraction of the cost the division had anticipated. In some cases, we find that we were 10 times faster and 10 times more cost efficient relative to other traditional offers.

Additionally, KurvV's fast and low investment approach enabled the division leader to cut through the internal red tape quickly, and they were subsequently recognized for introducing a successful new initiative that grew to be strategic priority project for the entire company.

The potential impact of the work included:

- Predicting over 70% of equipment failures.
- A significant reduction in equipment downtime
- A significant reduction in maintenance and personnel costs
- An integrated machine learning and data science capability with the in-house engineering teams

KurvV's goal is to make it easier than ever for businesses to adopt predictive maintenance.

- A tangible new tool that business leaders could expand beyond the division to benefit other operations

KURVV'S APPROACH DELIVERS PREDICTIVE MAINTENANCE CAPABILITIES QUICKLY AND RELIABLY

KurvV's goal is to make it easier than ever for businesses to adopt predictive maintenance.

Our machine learning models do not rely on heavy customization, but can still find extraordinarily useful patterns in data gathered from a wide range of assets.

In the case above, our team was able to apply our machine learning tools to the data our client was already gathering, from software platforms they were already familiar with. We developed and applied the models remotely, and the results were easy to understand and act upon.

With this approach we have been able to rapidly deliver machine learning models through our system that have enhanced the predictive maintenance capabilities of our clients, outperformed budget expectations, and delivered substantial cost savings for our clients and their customers.

Ready to learn how KurvV can develop machine learning tools to give your business a predictive maintenance advantage? Contact us to get started: <https://kurvv.ai/>

CONTACT KURVV

We are a team of developers and data scientists from leading machine learning companies like Microsoft, Amazon and Google, working behind the scenes to deliver exceptional models and experiences.

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