How AI and analytics can predict machine performance

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Introduction

The art of predicting the future bestowed unlimited power on people in the old ages, and the case continues to be the same today. With 2.5 quintillion bytes of data created on an everyday basis, data and information continues to provide an opportunity to predict future events – with a little help from analytics, artificial intelligence, and machine learning. According to a recent PwC survey, over 90% of enterprises are implementing or planning to invest in ML, AI solutions to address current business concerns and be future-ready. Travel and hospitality (89%) has taken the lead in AI adoption, followed by TMT (86%), financial services (82%), and healthcare and pharma (73%) quotes the survey.
Overview

The AI, ML and analytics practice at Marlabs is powered by a substantial network of digital practitioners, best-in-class technology partners, and innovators. Our skilled network of experts helps us formulate retrofit digital solutions that can be scaled up with ease. Our latest venture with an American IT enterprise witnessed collaboration on a granular level to improve fixes, logistics, and supply chain visibility in case of a machine failure. Our approach to the problem was creating a most viable product by leveraging data science, analytics, machine learning, and artificial intelligence.

Our approach

Understanding the workflows, processes, and nuances of our partner organization was of primary importance, as it allowed us to leverage our expertise in AI/ML/NLP and automation to build a predictive algorithm. This algorithm utilized the historical data available with the partner organization to form a base for its predictions.

After understanding the workflows and the needs of the partner organization, we identified two approaches - Proactive and Reactive. The proactive approach uses the data generated by the machines and sensors, compares it with the historical pattern, and identifies instances where machine failure may be possible. The algorithm is designed to predict a call, as well as the reason to call for help by leveraging machine data and artificial intelligence. After accurately determining the reason, the algorithm predicts the parts that might be needed to fix the (upcoming) issue.

While Proactive approach prevents the occurrence of a ticket or machine failure through predictive analytics, reactive approach helps in identifying the problem type by using historical call log data and machine data using AI. It also finds a resolution to the problem based on the type of issue reported by a customer, and provides useful insights after a ticket has been raised.

Arriving at the solution

Directed by our approach, two main use cases were identified – Reducing the number of tickets (by predicting failure) and increasing the number of remote solves (by providing relevant information to negate the need for a trip).

In order to reduce the number of tickets, our hypothesis suggested that an accuracy score of more than 60% in predicting correct time to failure was necessary. The algorithm also suggested the reason for failure, so that adequate replacements, parts or alternatives could be arranged quickly. The accuracy of this metric will improve over time with better syncing in terms of machine-generated data and accurate mapping of problem types. The solution also included a feature called Parts recommendation, where the part(s) for the machine that may be necessary for a solution are mentioned clearly.

The algorithm also suggested service representatives to get the right tickets assigned to them before an on-site visit, minimizing unresolved service requests. The Parts recommendation for a call feature provided a comprehensive list of the part(s) a service representative would need to carry for on-site visit – thus reducing repeat visits for the same ticket. Our hypothesis suggested that a 30% increase in accuracy in terms of correct parts being recommended in the top three recommendations can be considered as success.

To increase remote resolves, the algorithm recommended a fix against a ticket - Where agents try to solve the problem based on insights
made available to them, once users report an issue. The agents get top three recommended knowledge articles needed to successfully execute a remote solve, gleaned off three sub-algorithms based off fault code information, symptom text, and historical data. The system then actively predicts which resolution (knowledge article) would enable the representative to solve the ticket remotely.

**Key takeaways**

Our end-to-end solution based on data accuracy generated significant ROI for the partner organization. In addition, we reduced the number of unresolved issues responsible for machine failure, while increasing the percentage of solutions administered remotely. It also helped improve supply chain visibility and logistics and allowed service representatives to decide if an on-site visit is necessary in case of a machine failure.

The ‘parts recommendation for a call’ feature entailed training on over 1,000 machines that had service requests and parts associated with them. An accuracy of 80% was achieved, which was more than 1.5 times higher than the success benchmark set.

During the demonstration of our solution, business users confirmed the solution addressing the business priorities, like better response time to a service request, adherence to SLAs that will prevent an unnecessary rise in penalties, better addressal of customer queries and escalations, and improved system integration. These features make it easier for the representative to understand the failed machine’s case history and recommendation of parts.

Our remote solve solution used device data and CRM metadata to recommend relevant knowledge articles and solutions to the agent. These knowledge articles are ranked by a confidence score i.e., the percentage likelihood that the suggested course of action will accurately solve the issue. The agent had access to relevant metadata to make an informed decision. The integration of our solution with CRM systems is the key to success.
What next?

The power of prediction, enabled by AI, ML, analytics and data, can be the gamechanger in many industries. The uncertain times call for strong measures, and organizations that try to extract the most out of their information and use it wisely, will come out on top. The application of predictive maintenance can be readily seen in industries like manufacturing, where machines can work non-stop for days, weeks or months. Even in case of scientific studies, predicting patterns based on historic data is necessary, so that the data collection devices are replaced promptly in cases of impending failures. A survey by McKinsey about the state of healthcare in Europe found that AI is now top-of-mind for healthcare decision makers, governments, investors and innovators. The survey also lists various applications of AI, ML and analytics in use in healthcare today to illustrate the full range of areas where an impact has been noticed – be it apps that help patients manage their care themselves, AI tools that assist in checking symptoms online, optimizing scheduling or bed management, predicting risk of hospital admission, aiding in detection of specific cancers, or optimizing R&D in healthcare.

While the scale of many of these solutions remains small, their increasing rate of adoption shows a seismic change in a risk-averse field. The impact of change in progressive fields is much higher: We have already seen the advantages of predictive maintenance in IT sector, and the benefits of AI-driven logistics optimization can result in real-time forecasts that reduce spends, and the principles of this can add substantial value to the operations of organizations from varied sectors.

In a relatively more human-oriented tasks like customer service management, AI and analytics can help address personalization challenges. From simple changes like improved speech recognition and call routing through AI can result in a more seamless experience for customers. Combining customer demographic, social media data and historical transaction records can result in targeted recommendations that we equate with Amazon and Netflix.

Even small-scale applications, like home automation and other commonly used features, can provide better service by using predictive methods. With the right amount of data, the process can help organizations to evaluate outcomes, and choose the best course of action. With analytics, AI & ML, the opportunities are unlimited across industry sectors.

Biswa Chakraborty
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About Marlabs

Marlabs designs and develops advanced digital solutions that help its clients improve business outcomes swiftly and precisely. It succeeds by harnessing the power of the Digital Collective™, which brings together design-led digital innovation with human experience, composable digital platforms, and a collaborative ecosystem of first-class technology partners and innovators.

Marlabs is headquartered in the New York Metro area, with offices in the US, Germany, and India. Its 2500+ global workforce includes highly experienced technology, platform, and industry specialists from the world’s leading technical universities.

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