

AI & Machine Learning: The Antidote to Improve Healthcare Provider Performance

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Today, IT and product teams are applying AI and machine learning (ML) solutions to everything from robotics to refrigerators—everywhere machines produce performance or environmental data. Similarly, there is an abundance of ways AI and ML can increase revenue and lower costs to healthcare organizations by rapidly creating new, actionable insights for equipment maintenance teams.

IT teams are often overwhelmed by the sheer volume of machine log data as a burden they don't have the resources to address. Data appears in a variety of formats—structured, semi-structured, or unstructured—which complicates their ability to analyze it. However, valuable information is available in that data for the managers willing to apply AI and ML solutions and discover predictive and prescriptive insights.

Harbor Research, a leading strategy and technology research firm, notes that utilizing AI/ML to leverage complex machine data from healthcare imaging equipment alone will provide \$11.1 billion in revenue value (from decreased costs and increased revenue generation) by 2022. (Allmendinger, 2018)

To put this AI/ML impact into perspective, consider the total costs. An MRI machine can provide \$3,500 in revenue per hour of service.

If a machine goes down for 24 to 48 hours, the cost to the hospital ranges from \$84,000 to \$168,000. Assuming the system goes down five or six times per year, the annual downtime cost is from \$420,000 to over \$1 million. If the healthcare delivery organization has 30 MRI machines, the potential total annual cost of downtime is \$12.6 to \$30.2 million. If the facility can reduce repair time to four to six hours and can reduce each machine's down time to two or three times per year, the annual costs drops dramatically to between \$840,000 and \$1.9 million.

ENHANCE ASSET UTILIZATION

Healthcare organizations overprovision imaging machines, especially at acute or emergency care locations, wasting millions of dollars annually. In many situations, however, this equipment may be *underutilized*. CT scanners and MRI machines, for example, operate below capacity at certain facilities when organizations purchase additional machines in nearby facilities because they do not understand how the overall fleet is being utilized.

Today, teams typically collect manual data from legacy systems, scheduling software, or computerized maintenance management systems (CMMS) systems, all of which produce reports that lack necessary detail and often take a long time to generate, making them all virtually useless. However, combining transactional data from CMMS systems with machine data and applying AI/ML analytics can predict machine utilization with far greater accuracy, a game changer for healthcare organizations.

INCREASE MACHINE AVAILABILITY

Today, machine uptime of 95 to 97 percent is the standard many hospital management and IT teams are content with. By analyzing machine data in near real-time, teams can catch anomalous behavior, alert system engineers, and plan maintenance and repairs without disrupting patient care. This translates to greater patient throughput per machine per year and therefore more revenue for the provider.

STREAMLINE THE SUPPLY CHAIN

Purchasing spare parts on an as-needed basis—facilitated by AI and ML—rather than on a fixed schedule saves time and budget. Many healthcare equipment OEMs today prescribe specific maintenance schedules and part replacement based on time versus when the part stops functioning. As a result, parts that wear out sooner than expected can cause expensive, unplanned downtime; at the other extreme, hospital staff may throw away parts that are still functioning effectively.

For healthcare equipment OEMs, AI/ML analytics brings the concept of just-in-time to manufacturing. Rather than purchasing parts and building expensive equipment that sits idle at various depots until a healthcare organization needs it, manufacturers can build and deliver new equipment tailored to historical trends and projected demand in that region when analytics insights indicate replacement is necessary.

OPTIMIZE CAPITAL EXPENDITURE PRACTICES

IT teams are laser-focused on optimizing the return on capital expenditures. As analytics indicates an increasing frequency of anomalies that increase downtime, the organization can calculate the optimal cost/benefit ratio for

purchasing replacement equipment. In addition, such analytics can help organizations determine the level of functionality and type of features the organization should purchase.

For example, analysis might demonstrate that demand for a piece of equipment might be just 80 percent of the machine's maximum uptime. As a result, managers might purchase a machine that performs its functions 10 to 20 percent slower and costs 30 to 40 percent less than the machine it replaces.

SHARE EXPENSIVE HEALTHCARE EQUIPMENT

In many urban and suburban areas, healthcare facilities are often located in proximity to each other. Sharing machine data analytics allows managers at multiple facilities to see what CT scanners (for example) might be available at another facility when their CT scanner is not operational. This is a much less expensive alternative than either purchasing another scanner or placing rush orders for new parts.

Healthcare teams definitely want their complex, expensive equipment to inform them when conditions are less than optimal—whether a part is failing, the room is too warm or cool, or another anomaly exists. Today's new generation of AI/ML solutions can provide that information and the predictive/prescriptive insights that will help healthcare organizations optimize revenue. ●

REFERENCES

Allmendinger, Glen [2018]. *Machine Data Analytics Drives Innovation in Healthcare Market*, Harbor Research, April.