

AI Directions

PPMS - Predictive Proactive Maintenance Solution

Reactive, Preventive, and Predictive Maintenance

Poor maintenance strategies can reduce an organization's overall productive capacity. It can be difficult to determine how often a machine should be taken offline to be serviced as well as weigh the risks of lost production time against those of a potential breakdown. Currently, most maintenance organizations are forced to handle this dilemma with a complicated balancing act between maximizing the useful life of a part and asset at the risk of machine downtime. Maintenance strategies traditionally fall into one of three categories, each with its own challenges and benefits.

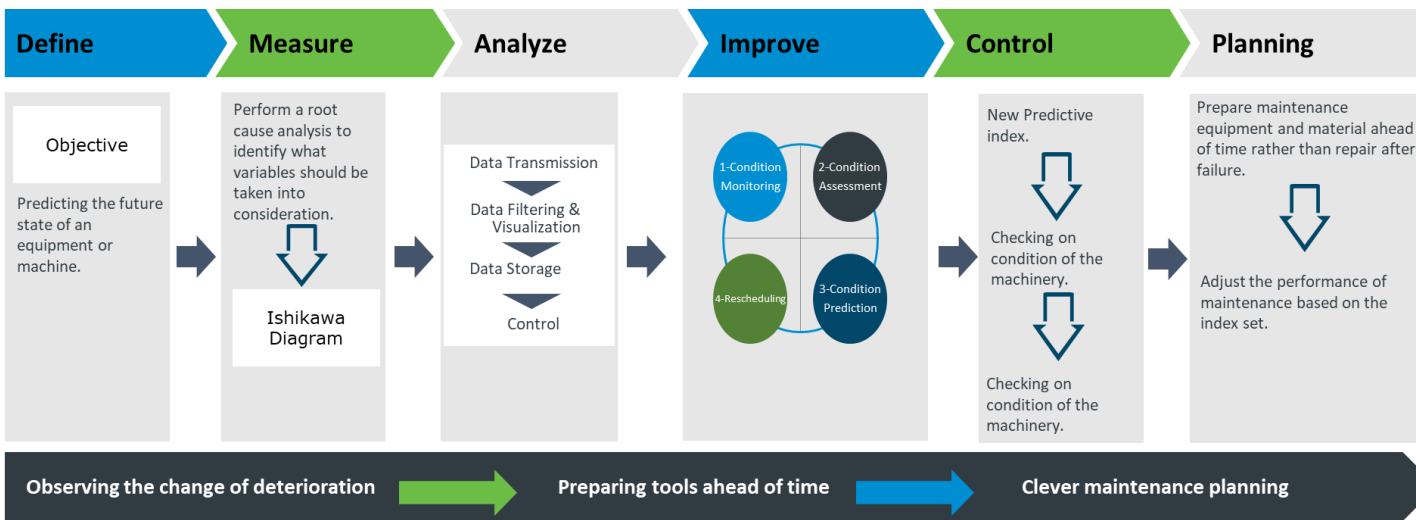
	Benefits	Challenges
Reactive	<ul style="list-style-type: none">• Maximum utilization and production value from asset	<ul style="list-style-type: none">• Unplanned downtime• Potential for further damage to the asset• Higher maintenance costs
Preventive	<ul style="list-style-type: none">• Lower maintenance costs• Less equipment malfunction and unplanned downtime	<ul style="list-style-type: none">• Need for spare part and inventory management• Increased planned downtime• Maintenance on seemingly perfect assets
Predictive	<ul style="list-style-type: none">• Connected technologies provide a holistic view of asset health• Improved analytics options• Removes necessity to run-to-failure or replace a part while it still has life	<ul style="list-style-type: none">• Increased upfront infrastructure management• Complex system implementation requirements including data management, technology and user adoption

With predictive maintenance, planned and unplanned downtime, high maintenance costs, the potential for further asset damage, and unnecessary maintenance on working assets is decreased.

The connected technologies involved in predictive maintenance pull data from multiple systems to provide real-time insights into asset health, allowing the computers to complete the work behind the scenes and allow the maintenance managers to deploy their resources more effectively and efficiently. In fact, a recent research study by [McKinsey](#) shows predictive maintenance cost savings of 18% to 25% in maintenance expenditures alone, with additional savings and benefits through increased uptime. With predictive maintenance and connected technologies, maintenance teams can better address the issue of the right asset with the right part and the right person at the right time.

AI Directions is proud to present its AI-based solution for predictive maintenance **PPMS** (Predictive Proactive Maintenance Solution).

PPM-AIDirections' Predictive Maintenance Solution



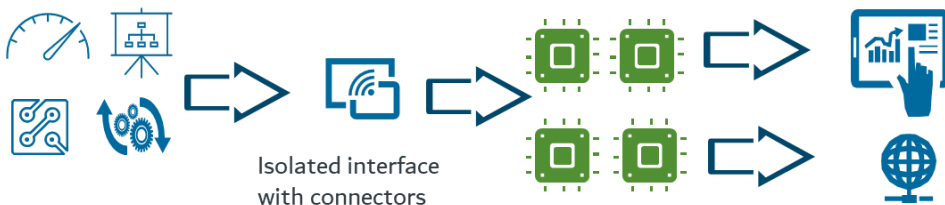
• PPMS – Forecasting Failures: How it works?

PPMS has an embedded ML/AI module that answers the following question: **“what is the probability that the Machine with ID ‘xyz’ might exhibit a failure tomorrow?”**

To this end, PPMS fetches data from various sensors. Next, these data are aggregated on a daily basis. This aggregation is followed by feature extractions. The features extraction process aims to summarize and symbolize the behavior of each machine separately. Here are a few notes on PPM:

- PPMS considers each machine independently. This helps PPMS to distinguish the (ab)normal activities of each machine based on its specific characteristics; and, consequently, provide a more accurate failure’s forecast.
- Initially, PPMS fetch the data from the DB. It also compose a set of new features on the server side. Thus, the frontend user’s machine can respond faster to the user’s command.
- PPMS can save the new features of each machine separately on the local drive. This will save time. So, instead of fetching the DB every time from the server, PPMS can use a local version of the data.
- The accuracy of PPMS’s forecasts will increase as more data will be added in the future.

Sensors will be continuously reading data and monitoring equipment condition



Control monitoring and alert system that keeps predicting and monitoring the state of the equipment

AI model processing the data and generating the predictive maintenance index

PPMS-AIDirections' Predictive Maintenance Solution

Main Benefits:

- **Reduced downtime:** PPMS allows maintenance technicians to plan for a repair — taking steps such as shifting capacity to other equipment and scheduling maintenance for times with the least impact on production. Unplanned downtime is one of the biggest cost sinks in manufacturing. PPMS provides an immense reduction in this area.
- **More targeted Maintenance:** PPMS takes a proactive approach to address real issues before they create production problems. Thus, PPMS will help in spending maintenance resources more efficiently.
- **Higher productivity:** With more downtime and more effective maintenance, equipment can run at maximum capacity and optimal quality for a much higher percentage of its available time. This provides improvements in key metrics such as mean time to failure (MTTF) and other effectiveness measurements.
- **More efficient inventory management:** The output of PPMS can also inform procurement, ordering and inventory management.

Success Factors:

There are a number of success factors for PMMS projects, which are outside of AIDirections' control:

- Availability of all data needed for predictive maintenance over a given period
- Reliable quality of the data retrieved and processed
- Input from an experienced facility manager is available to set the parameters