intelligentMRO™ by Perspect Analytics Inc.

Objective Statement

By the utilization of Artificial Intelligence (AI) and Machine Learning (ML) techniques explicitly designed for maintenance and asset management, Perspect Analytics' solutions holistically analyze historical maintenance data so as to provide clear, specific, and actionable opportunities that have a high probability of success to achieve maintenance, productivity, safety, and financial goals of our clients. Our solutions help managers, technicians and engineers refocus their time on value-added activities while providing a foundational tool to drive an accountable and data driven continuous improvement culture in MRO (Maintenance, Repair and Operation).

Available Solutions

intelligentMRO™ Framework

intelligentMRO™ platform is an MRO data infrastructure used to consolidate MRO related data from maintenance, MRO inventory, procurement and workflow / HR for on-going analysis to improve operations. It is data agnostic and designed for high performance computing to support (near) real time modelling and insight generation. Main functions are:

a. Virtual Consultant™ uses AI/ML algorithms to find hidden patterns highlighting the effectiveness of equipment reliability programs, match the MRO inventory program with financials, maintenance and entity requirements as well as highlight improvements in MRO business processes and manpower efficiencies.
b. CI Support™ provides distilled data and patterns from work orders, MRO inventory, procurement and HR data against individual entities, entity classifications or departments to support future CI initiatives.
c. System wide analytical tools, such as asset hierarchy and spare part and entity usage association.
d. CMS (Content Management System) supports fast and seamless implementation, allowing customized analysis to create new and specific insights.

All the functions are available to business modules outlined below.

MRO Inventory Optimization Module

Full-scale health evaluation of MRO (Maintenance, Repair and Operations) inventory operations, providing traceable continuity to the inventory process, ensuring optimal reliability at the lowest possible cost. A primary goal is to reduce holding costs and yearly spending of MRO inventory while improving maintenance accessibility to spare parts, minimizing the risk of stock-outs and costly unexpected production outages due to lack of spare parts. Such as:

a. Risk assessment and usage pattern identification of individual SKUs in MRO inventory for optimal inventory level settings based on historical usage, business risk, production risk, and vendor performance.

b. Identification of parts picked or purchased but not installed / used.
c. Identification of opportunities through usage prediction models to reduce urgent orders of spare parts in order to lower cost and streamlining purchase operations.
d. Identification of opportunities to move suitable parts out of inventory to direct purchase.
e. Identification of consignment opportunities for frequently used items.
f. Multi-dimensional evaluation of individual inventory items, such as ABC, FNSD, HML, and XYZ analysis
g. Identification of potential duplicate parts in MRO inventory.

The benefits for the organization include:

a. Reduced inventory holding cost, improved spare parts availability, and lowered annual spare part spending without affecting equipment reliability or workforce efficiency.
b. Reduced inventory spending through business process improvement in the kitting and scheduling stages.
c. Understanding of usage patterns of MRO inventory items to determine the best supply chain strategy, and to focus efforts on parts that are of higher risk to the organization.
d. Enables an MRO inventory continuous improvement data-driven culture.

Preventive Maintenance Effectiveness Module

Upgrade a static PM program to a dynamic one based on models derived from the historical patterns of individual equipment. The solution makes improvement suggestions based on widely-accepted MRO best practice principles. The CI Section provides historical data in a format to drive Reliability Centered Maintenance II, Total Productive Maintenance, Uptime and Six Sigma CI initiatives. With different data sources, our PM effectiveness solution provides different levels of functionalities. Such as:

a. Identify the components with the worst PM program (bad actors) with suggested actions for investigation and adjustment.
b. Assess the risk of the current PM program toward equipment reliability with failure prediction and suggested mitigation possibilities.
c. Determine what effects the current proactive maintenance strategy has on equipment reliability and maintenance costs by work order types.
d. By entity, evaluate the effectiveness of the current program and suggest changes to maintenance frequency.
e. Forward predict individual entity's reliability based on models learned from the entity's work order history.

The benefits for the organization include:

a. Improved safety, equipment reliability and operational efficiency. Know the exact effect the proactive maintenance program is having on reliability and maintenance costs.
b. Potentially reduced maintenance cost by dynamically adjusting maintenance activities and frequencies.
c. Enables an equipment reliability continuous improvement data-driven culture.

Workflow and HR Efficiency Module

Full scale evaluation of workflow efficiency and HR utilization help achieve a lean and effective maintenance process and culture. If applicable, this module also analyzes scheduling and planning practices to fine tune its efficiency. It

makes suggestions based on actual history of MRO workflow and maintenance crew, focusing on reducing risk, improving efficiency, enhancing compliance and managing talent pool. Such as:

a. Manpower requirement and succession planning
b. NCS (net capacity scheduling) prediction
c. Asset risk assessment and cost management
d. Improvements in work order process, time to repair, procurement and PM delivery accuracy
e. Identifying maintenance failures in scheduling and planning, introducing new PM opportunities
f. Identify individual MRO employee training opportunities based on equipment environment and equipment reliability.

The benefits for the organization include:

a. Improved workflow efficiency and human resource utilization.
b. Potentially reduced risks in scheduling, planning, resource availability, PM delivery accuracy, spare part procurement, compliance, and succession management.
c. Identifying new maintenance opportunities to improve equipment availability and production throughput.
d. Reduce new hire on-boarding window.
e. Enables an MRO continuous improvement data-driven culture.

Client Data Requirements (What We Need)

Minimum of 3 years, 5 or 7 years preferred, historical data:

- Entity hierarchy of the physical maintenance structure.
- History of all work orders, including work order status audit trail.
- Preventive maintenance programs.
- MRO part master list.
- MRO inventory usage history.
- MRO related purchase history with vendor information (both inventory replenishment and direct purchases).
- MRO inventory store information.
- MRO time cards
- Maintenance human resource information
- History of all work requests, scheduling and planning history

Functionalities, Results and Potentials (What You Get)

A software solution that contains:

- intelligentMRO™ platform – source agnostic analytical platform with fully integrated MRO data from multiple CMMS/EAM/ERP/AMP systems through the MRO data hub and analytical tools, supporting custom insight creation and (near) real time modelling.
- Virtual Consultant – providing actionable suggestions to have immediate impacts on maintenance operations with measurable improvements

- CI Support – supporting existing and future continuous improvement activities. This module enables:
  - Exploration of continuous improvement opportunities in your maintenance operations
  - Support of existing continuous improvement projects, compatible with methodologies such as RCM, TPM, Six Sigma, FMEA, Uptime and Kaizen
- Business modules: MRO inventory optimization, PM effectiveness, and Workflow/HR efficiency.

Future Potentials (Planned Functionalities in Development)

Focusing on providing real time, on-the-spot suggestions and operational knowledge to maintenance technicians and managers for their day-to-day tasks for more efficient workflow, Perspect Analytics is developing a suite of AI and machine learning-based tools. Our clients will soon benefit from an online trouble shooting and solution advisory module, and action dashboards for reliability, inventory and HR operations.

mroAdvisor™

Marrying LLM (Large Language Model) such as GPT4, with your own maintenance history and knowledge base such as manuals and procedures, mroAdvisor™ helps floor technicians quickly identify problems and solutions in real time. It also helps planners and schedulers to better estimate resources. This module is delivered through plugins and mobile applications. Minimal training is required as technicians will be working within their current CMMS/EAM/ERP/AMP environment.

Real Time Reliability Dashboards

Relying on sophisticated predictive models, our Action Dashboards make suggestions to maintenance managers and lead technicians what to expect in the near future and the priority they should pay attention to. They cover:

- Equipment reliability
- MRO Inventory management
- Workforce management