



Smart Predictive Maintenance Module

What's smart? Unlike expensive and unreliable services from Robot manufacturers that send mountains of data to central servers, Tend's In.advance™ smart predictive maintenance uses an A.I. based machine-learning engine with anomaly detection "at the Edge" to provide a secure, local method to detect potential failures.

In.advance™ equips maintenance teams and robot engineers with an early-warning system for robot issues by servo. With the Smart Predictive Maintenance module factory managers can rest assured they will receive ample warning should a robot begin to show signs of failure and schedule maintenance during normal production suspension periods.

Eliminate Most Factory Shutdowns Due to Robot Failures

Convert Reactive Maintenance to Predictive Maintenance:

- **Automated set-up:** Our machine learning algorithm identifies a normal baseline for each robot program
- **Smart Alerts:** Emails and SMS messages are sent based on the severity and urgency of the problem detected
- **Identify high-risk** conditions in robots before they fail and maintain so not to interfere with factory operations
- **Time-horizon analytics:** Managers can view forward looking analytics to schedule robot maintenance
- **Secure:** Local "edge" machine learning algorithms that don't require high data flows to third-party sites
- **Robot program change detection:** Automatically reset the machine base-line when a program is changed

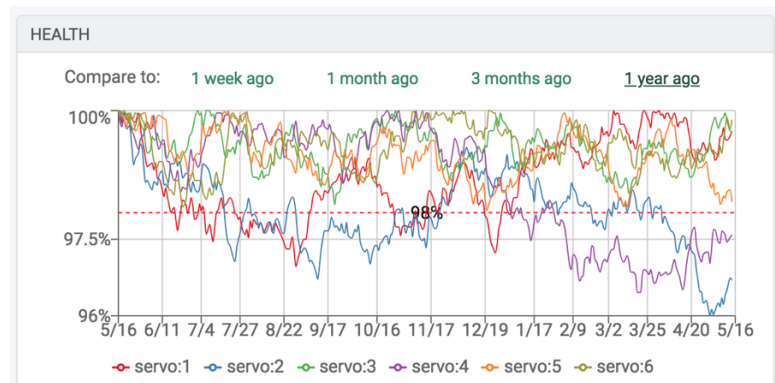
Collect live data and process it locally – no need to send data off-site:

Tend offers multiple options to collect and analyze robot data locally:

- **Cell.Mate™:** This small footprint device mounts on a DIN rail in the Robot cell and provides many monitoring, alerting and remote diagnostics capabilities for robots and devices. With In.advance™, data generated by locally attached robots is processed on-site with Machine Learning Algorithms, alerting of potential failures.
- **Virtual Cell.Mate™:** Tend's In.advance™ Predictive Maintenance can be deployed within the factory virtually, running on your servers connected to your robots on the same local network without additional hardware.

Feature Summary

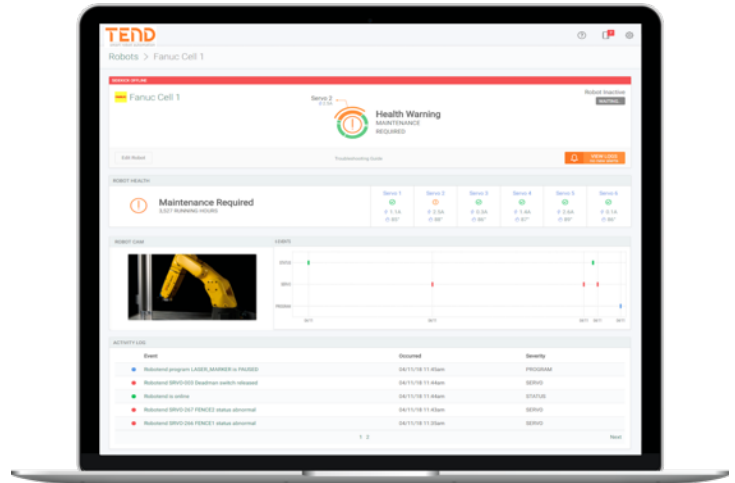
- **Proactively assess robot health,** along with failure predictions
- **Robot prediction algorithms** assess equipment failure probability with confidence
- **High torque risks** are flagged for further investigation
- **Automatically detects program changes** and resets anomaly baseline unless over-ridden



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Feature Summary (continued):

- **Track, benchmark, and rank** performance of individual robots based on probability and impact of failure using intuitive KPIs including Probability of Failure (PoF) and Risk Score (that combines PoF with the economic impact of failure) to correctly prioritize action
- **Alerts and Notification** to facilitate effective reactions. Alerts are summarized and presented within the application and can be configured for delivery to designated contacts via SMS and/or email for proactive response



Benefit Summary

Operational and economic value of the In.advance™ module accrue through multiple touch points:

- **Reduced downtime** due to early identification of equipment at high-risk of failure, allowing equipment repairs to be performed as needed
- **Streamlined workflow** by defining maintenance scenarios that enable maintenance planners to effectively bundle high priority work and schedule it at the right time in the equipment operating cycle
- **Reduced capital expenditures** by driving asset replacement decisions using asset risk scores
- **Reduction in inventory costs** by anticipating the need for replacement parts



In.production™: Tend.ai delivers an easy-to-use, yet powerful software platform to take your factory automation to the next level. Each of our software modules share our core design pillars:

- ✓ Secure
- ✓ Intuitive
- ✓ Set-up in minutes without programming
- ✓ Instant alerts and remote access
- ✓ Complete robot cell view & diagnostics

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